



Project Manual

For construction contracts greater than \$20,000

New Natural Gas Pipeline Installation Project

SU-021919

Dated February 19, 2019

Proposal Due Date

March 26th, 2019

State University of New York Purchase College

735 Anderson Hill Road

Purchase, New York 10577-1402

F. Edward Herran, Director of Procurement & Accounts Payable

Project Number: SU-021919
Project Name: New Natural Gas Pipeline Installation Project
Agency/Div Code: SUNY Purchase College 28260

Date: 02/19/2019
Contract No.: T021919

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Attachments –Contractor Documentation

3. [Form 7554-07](#) – Contractor Proposal
4. [Form 7554-10](#) - Bid Bond and Acknowledgement (*required with bid*)
5. Affirmative Action and Minority & Women Owned Business Enterprises *from SUNY Procedure Item #7557 “Participation by Minority Group Members and Women (MWBEs) with Respect to State University of New York Contract” (applies >\$100,000)*
 - a. [Form 7557-121b](#) – MWBE Prospective Bidders Notice
 - b. [Form 7557-107](#) - M/WBE Utilization Plan (*required within seven days of the bid*)
 - c. The Contractor’s EEO Policy Statement or [Form 7557-104](#) (*required within seven days of the bid*)
 - d. [Form 7557-108](#) - M/WBE-EEO Work Plan (*required within seven days of the bid*)

Note: In accordance Procedure Item #7557 MWBE Utilization Plans, EEO policy statements and EEO Work Plans are due within seven days of submittal of the bid.

6. Service Disabled Owned Business Enterprise *from SUNY Procedure Item #7564 “Participation by Service-Disabled Veteran-Owned Business (SDVOBs) with Respect to State University of New York Contracts” (applies >\$100,000)*
 - a. [Form 7564-121b](#) – SDVOB Prospective Bidders Notice
 - b. [Form 7564-107](#) - SDVOB Utilization Plan (*required with the bid*)

7. New York State Finance Law §139-1 Certification
8. EO 177 Certification

Attachments –Additional Contractor Documentation (required after bid opening from the low bidder)

9. State Finance Law §§139-j and 139-k *from SUNY Procedure Item #7552 “Procurement Lobbying Procedure for State University of New York” (applies >\$15,000)*
 - a. [Form A](#) - Summary: Policy and Procedure of the State University of New York Relating to State Finance Law §§139-j and 139-k
 - b. [Form B](#) - Affirmation with respect to State Finance Law §§139-j and 139-k
 - c. [Form C](#) - Disclosure and Certification with respect to State Finance Law §§139-j and 139-k
10. Procurement Forms *from SUNY Procedure Item #7553 “Purchasing and Contracting (Procurement)”*
 - [Form I](#) Omnibus Procurement Act of 1992 (*applies >\$1,000,000*)
 - [Form II](#) Omnibus Procurement Act of 1992, Out of state firms (*applies >\$1,000,000*)
 - [Form XIII](#) Public Officers Law Compliance
11. Bonds and Certificate of Insurance *from SUNY Procedure Item #7554 “Construction Contracting Procedures”*
 - a. [Form 7554-11](#) Labor & Materials and Performance Bonds (*applies >\$50,000*)
 - b. [Form 7554-12](#) Certificate of Insurance (*applies to all contracts*)
 - c. NYS Workers Compensation and Disability Insurance (*applies all contracts*)
12. Vendor Responsibility
 - a. OSC’s [Vendrep - Online System](#) or [Link to paper forms](#) (*form applies \geq \$100,000*)
13. NYS Labor Law, Section 220-a
 - a. [Form 7554-13](#)
 - i. Form AC 2947, Prime Contractor's Certification
 - ii. Form AC 2948, Subcontractor's Certification
 - iii. Form AC 2958, Sub-subcontractor's Certification

Notice to Bidders and Newspaper Advertisement

Notice to Bidders

The State University of New York **Purchase College** will receive sealed bids for project number **SU-021919** titled **New Natural Gas Pipeline Installation Project**, until **1:00 p.m.** local time on **March 26th, 2019** at the Purchasing and Accounts Payable Office, Campus Center South 3rd Floor, State University of New York (SUNY) Purchase College, 735 Anderson Hill Road, Purchase New York 10577-1402, where such proposals will be publicly opened and read aloud. Proposals may be hand delivered or mailed to the above location and must be received by such time.

All work on this Contract is to be completed within **100** calendar days, starting ten (10) calendar days after the contract approval date.

A non-mandatory Pre-Bid Conference and site walk-through for prospective Bidders will be held at **11:00AM** on **March 6th, 2019** at the Capital Facilities Planning Building conference room at SUNY Purchase College, 735 Anderson Hill Road, Purchase New York 10577-1402. Please note: This will be the only guided walk-through of the subject project facilities.

For directions to Purchase College, see

<https://www.purchase.edu/admissions/travel-and-transportation/#Directions>

For a campus map, see

<https://www.purchase.edu/live/files/220-campus-map>

Purchase College is dedicated to environmentally sustainable practices and development. In an effort to conserve resources and reduce waste, the Bidding and Contract Documents will only be available electronically in PDF format for viewing and downloading at the following website:

<https://www.purchase.edu/PurchaseMeansBusiness>

There will be a Question Period from February 20th, 2019 – March 14th, 2019. During this time any questions must be submitted in writing (no telephone calls) to the following email address muneeza.ismail@purchase.edu. The email should reference the project in the subject line and include prospective bidder contact information and email address. A response to all questions submitted within the Question Period and any required Addenda will be posted no later than the close of business on March 18th, 2019 to <https://www.purchase.edu/PurchaseMeansBusiness>

Bids must be submitted in duplicate in accordance with the instructions contained in the Information for Bidders. Security will be required for each bid in an amount not less than five (5) percent of the Total Bid.

It is the policy of the State of New York and the State University of New York to encourage minority business enterprise participation in this project by contractors, subcontractors and suppliers, and all bidders are expected to cooperate in implementing this policy. The minority (MBE) and women (WBE) owned business contractor/subcontractor participation goals for this

construction procurement are 25.51% for MBEs and 8.86% for WBEs. The service disabled veteran owned business (SDVOB) subcontractor participation goal is 6%.

The rates of wages and supplements determined by the Industrial Commissioner of the State of New York as prevailing in the locality of the site at which the work will be performed can be found at:

<https://applications.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1473421>

The Prevailing Rate Case (PRC) Number assigned to this project is **PRC# 2019001894**

Pursuant to State Finance Law §§139-j and 139-k, this solicitation includes and imposes certain restrictions on communications between Purchase College and an Offeror/Bidder during the procurement process. An Offeror/Bidder is restricted from making contacts from the earliest notice of intent to solicit proposals through final award and approval of the Procurement Contract by Purchase College/State University of New York and, if applicable, the Office of the State Comptroller (“restricted period”) to other than designated staff unless it is a contact that is included among certain statutory exceptions set forth in State Finance Law §139-j(3)(a). Pursuant to the statute, Purchase College employees are also required to obtain certain information when contacted during the restricted period and maintain a record of the communication, and make a determination of a knowing and willful contact. Contact made to other than designated staff regarding this procurement may disqualify the vendor from the current award and affect future procurements with government entities in the State of New York.

The State University of New York reserves the right to reject any or all bids.

Designated Contacts:

Muneeza Ismail
Project Manager, Capital Facilities Planning
Purchase College
State University of New York
735 Anderson Hill Road
Purchase, NY 10577-1402
Tel: (914) 251-6024
Fax: (914) 251-6063
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Newspaper Advertisement

NOTICE TO BIDDERS: Purchase College, State University of New York will receive sealed Proposals for **Project SU-021919**, Titled “**New Natural Gas Pipeline Installation Project**” until **1:00 P.M. Local Time on March 26th, 2019**, at the Purchasing & Accounts Payable Office, Campus Center South 3rd Floor, State University of New York (SUNY) Purchase College, State University of New York, 735 Anderson Hill Road, Purchase, New York 10577-1402, when they will be opened publicly and read.

A non-mandatory Pre-Bid Conference and site walk-through for prospective Bidders will be held at **11:00AM on March 6th, 2019** in the Capital Facilities Planning Building conference room, SUNY Purchase College, 735 Anderson Hill Road, Purchase New York 10577-1402. Please note: This will be the only guided walk-through of the subject project facilities.

For directions to Purchase College and for a campus map, see:
<https://www.purchase.edu/admissions/travel-and-transportation/>

The Bidding and Contract Documents are available at the following website:
<https://www.Purchase.edu/PurchaseMeansBusiness> . Telephone/fax requests will not be considered.

Submitted by:
F. Edward Herran
Interim Director of Procurement & Accounts Payable
Purchase College
State University of New York
Campus Center South 3rd Floor
735 Anderson Hill Road
Purchase, NY 10577-1402
Tel: (914) 251-6070
Fax: (914) 251-6075
Email: edward.herran@purchase.edu

INFORMATION FOR BIDDERS

Section 1 Definitions

All definitions set forth in the Agreement are applicable to the Notice to Bidders, Information for Bidders and the Proposal, all of which documents are hereinafter referred to as the Bidding Documents.

Section 2 Issuance of Bidding and Contract Documents

- (1) Purchase College is dedicated to environmentally sustainable development. In an effort to conserve resources and reduce waste, the Bidding and Contract Documents will only be available electronically in PDF format for viewing and downloading at the following website:
<https://www.purchase.edu/purchasemeansbusiness>

Section 3 Proposals

- (1) Proposals must be submitted in duplicate on the forms provided by the University. They shall be addressed to the University in a sealed envelope, marked with the name and address of the bidder, the title of the Project and the Project number. The University accepts no responsibility for Proposals that may be delivered by any courier or other messenger service that does not contain all of the above-noted information on the outside of a sealed envelope. Facsimile or email copies of the Proposal will not be accepted.

Sealed Proposals are to be delivered to:

F. Edward Herran
Interim Director of Procurement & Accounts Payable
Purchase College – 3rd Floor Campus Center South
State University of New York
735 Anderson Hill Road
Purchase, NY 10577-1402

Proposals must be received in the Purchasing & Accounts Payable Office by the due date and time. Bidders mailing their Proposals must allow sufficient time to ensure receipt of their Proposals by the date and time specified. Bidders are cautioned that, although using a trackable mailing/courier/messenger service, bids must be received in the Purchasing & Accounts Payable Office by the due date and time. Although bids may be signed for by Purchase College Mail Operations personnel prior to bid opening time on the day of the bid, this does not guarantee that the Purchasing & Accounts Payable Office will receive the bid by bid opening time. No bid will be considered that is not physically received in the Purchase College Purchasing & Accounts Payable Office by the bid opening time.

- (2) All blank spaces in the Proposal must be filled in and, except as otherwise expressly provided in the Bidding Documents; no change is to be made in the phraseology of the Proposal or in the items mentioned therein.
- (3) Proposals that are illegible or that contains omissions, alterations, additions or items not called for in the Bidding Documents may be rejected as informal. In the event any bidder modifies, limits or restricts all or any part of its Proposal in a manner other than that expressly provided for in the Bidding Documents, its Proposal may be rejected as informal.

- (4) Any Proposal may be considered informal which does not contain prices in words and figures in all of the spaces provided or which is not accompanied by a bid security in proper form. In case any price shown in words and its equivalent shown in figures do not agree, the written words shall be binding upon the bidder. In case of a discrepancy in the prices contained in the Proposal forms submitted in duplicate by the bidder, the Proposal form which contains the lower bid shall be deemed the bid of the bidder; provided, however, the University at its election may consider the Proposal of such bidder informal.
- (5) If the Proposal is made by a corporation, the names and places of residence of the president, secretary and treasurer shall be given. If by a partnership, the names and places of residence of the partners shall be given. If by a joint venture, the names and addresses of the members of the joint venture shall be given. If by an individual, the name and place of residence shall be given.
- (6) No Proposal will be considered which has not been deposited with the University at the location designated in and prior to the time of opening of bids designated in the Bidding and Contract Documents or prior to the time of opening as extended by Addendum.
- (7) Bids may be modified, withdrawn or canceled only in writing or by email notice received by the University prior to the time of opening of bids designated in the Bidding and Contract Documents. A written or email notice of modification, withdrawal or cancellation shall be marked by the bidder with the name and address of the bidder, the title of the Project and the Project number. Upon receipt by the University a duly authorized employee of the University, who shall note thereon the date and time of receipt and shall thereupon attach said written or email notice of modification, withdrawal or cancellation to the envelope submitted by the bidder pursuant to subdivision (1) of this
- (8) Permission will not be given to modify, explain, withdraw or cancel any Proposal or part thereof after the time designated in the Bidding and Contract Documents for the opening of bids, unless such modification, explanation, withdrawal or cancellation is permitted by law and the University is of the opinion that it is in the public interest to permit the same.

Section 4 Examination of Bidding and Contract Documents

- (1) Prospective bidders shall examine the Bidding and Contract Documents carefully and, before bidding, shall make written request to the Consultant (with a copy thereof to the University) for an interpretation or correction of any ambiguity, inconsistency or error therein which should be discovered by a reasonably prudent bidder. Such interpretation or correction as well as any additional Contract provision the University shall decide to include will be issued in writing by the Consultant as an Addendum, which will be sent to each person recorded as having received a copy of the Bidding and Contract Documents from the Consultant, and which also will be available at the places where the Bidding and Contract Documents are available for inspection by prospective bidders. Upon such emailing or delivery and making available for inspection, such Addendum will become a part of the Bidding and Contract Documents and will be binding on all bidders whether or not the bidder receives or acknowledges the actual notice of it. Prospective bidders are responsible for ensuring that all addenda have been incorporated into the bid. The requirements contained in all Bidding and Contract Documents shall apply to all Addenda.
- (2) Only the written interpretation or correction so given by Addendum shall be binding. Prospective bidders are warned that no trustee, officer, agent or employee of the University or the Consultant

is authorized to explain or interpret the Bidding and Contract Documents by any other method, and any such explanation or interpretation, if given, must not be relied upon.

Section 5 Computation of Bid

- (1) In computing their bids, bidders are not to include the sales and compensating use taxes of the State of New York or of any city and county in the State of New York for any supplies or materials which are incorporated into the completed Project as the University is exempt from such taxes.
- (2) Unit prices may be inserted in the Proposal by the University or the bidder at the discretion of the University. Any unit prices listed in the Proposal by the University are based upon the Consultant's appraisal of a fair cost for the work involved. Such listed prices will be binding upon both the bidder and the University unless the bidder wishes to change any of such unit prices by crossing out the listed unit price and inserting a revised unit price. Such revised unit price shall not be binding upon the University unless it accepts the same, in writing, before it issues a Notice of Award. In the event the Proposal contains blank spaces for unit prices or the bidder revises any stated unit price, the amount of such unit prices for additions shall not vary by more than 15 percent from the prices inserted by the bidder for deductions, and, if the variance of such prices exceeds 15 percent, the University may adjust the deduction price inserted by the bidder so that it is only 15 percent lower than the addition price inserted by the bidder. In addition, the University may adjust any unit price filled in by a bidder to an amount agreeable to both the bidder and the University or it may reject any unit prices.
- (3) Alternates, if any, listed in the Proposal shall be accepted in the order indicated and will be used in combination with the Base Bid to determine the low bidder. Unit prices will not be used to determine the low bidder.
- (4) If a tie bid should occur the University reserves the right to use one of the following methods to determine the successful bidder. For tie bids between two contractors the University representative shall flip a coin, both affected contractors must be present for the coin toss. For tie bids between three or more contractors the University representative shall pull names from a bowl, hat or other container. The affected contractors must be present for the drawing.

Section 6 Payment of Bid Security

- (1) Each Proposal must be accompanied by the required amount of the bid security, which is 5% or the full and just sum of the difference between the Principal and the Total Bid of the bidders submitting the next lowest bid, whichever sum is higher, in the form of a bank draft or certified check, payable at sight to the University and drawn on a bank authorized to do business in the United States, or by a Bid Bond, on a form approved by the University, duly executed by the bidder as principal and having as surety thereon a surety company or companies, approved by the University, authorized to do business in the State of New York as a surety. Attorneys-in-fact who execute a Bid Bond on behalf of a surety must affix thereto a certified and effectively dated copy of their power of attorney.
- (2) The University will return, without interest, bid securities in accordance with the following procedure:
 - a. To all bidders except the apparent three (3) lowest bidders within two (2) working days after the opening of bids.
 - b. To any bidder submitting a Bid Bond as a replacement for a previously provided bank draft

- or certified check, within two (2) working days after the University's approval of such Bid Bond.
- c. To the apparent three (3) lowest bidders, unless their bid security was previously returned, within two (2) working days after delivery to the University by the successful bidder of the executed Agreement and required Bonds, or within two (2) working days of the University's rejection of all bids or within two (2) working days after the expiration of forty-five (45) calendar days after the bid opening, whichever event shall occur first.
 - d. Bid Bonds, due to their nature, will not be returned.
- (3) The University reserves the right to deposit bid security drafts or checks pending final disposal of them.

Section 7 Qualifications of Bidders

- (1) A bidder must demonstrate, to the satisfaction of the University, that it has successfully completed three (3) contracts similar in size, scope and complexity to this contract within the last five (5) years.
 - a. For scope and complexity, similar work is defined as **installation of new gas pipeline, site work, utility tie-in, and testing**, of as further described in the General Requirements, Description of Work.
 - b. The determination of relevant contract experience in terms of size, scope and complexity will be at the sole discretion of the University.
 - c. The above three projects shall be submitted on Attachment A of the Proposal (Form 7554-07), "List of Completed Similar Construction Projects" (the List). If the List is not provided or is missing information, and/or is found to have erroneous information or information that is no longer current, a Proposal may be rejected as not responsive. If requested by the University, the bidder may be permitted to add missing information, modify and/or explain erroneous information or information that is no longer current on the List. Modifications and/or explanations of the List must be received within 48 hours of receipt of the University's request.
- (2) All prospective bidders must demonstrate to the satisfaction of the University that they have the skill and experience, as well as the necessary facilities, ample financial resources, ability to manage staff and subcontractors effectively, ability to anticipate and plan construction work for optimal progress, ability to create, strive for and maintain working environments and relationships that are constructive, communicative and cooperative, organization and general reliability to do the work to be performed under the provisions of the Contract in a satisfactory manner and within the time specified.
- (3) Each bidder must demonstrate to the satisfaction of the University that it has working capital available for the Project upon which it is bidding in an amount equal to 15 percent of the first \$100,000 of the amount of its Base Bid plus 10 percent of the next \$900,000 plus 5 percent of the remainder of its Base Bid. Working capital is defined as the excess of current assets over current liabilities. The University defines current assets as assets which can be reasonably expected to be converted into cash within a year, and current liabilities as debts which will have to be paid within a year.

- (4). The University may make such investigation as the University deems necessary to determine the ability of any bidder to perform the Work. Bidders shall furnish to the University all information and data required by the University, including complete financial data, within the time and in the form and manner required by the University. The University reserves the right to reject any bid if the evidence submitted by or an investigation of such bidder fails to satisfy the University that such bidder is properly qualified to carry out its obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.
- (5) At the time of the bid opening, all bidders and subcontractors, domestic and foreign, must be in compliance with New York State business registration requirements. Contact the NYS Department of State regarding compliance.

Section 8 Submission of Post-Bid Information

- (1) Within forty-eight (48) hours after the opening of bids, each of the apparent three lowest bidders, unless otherwise directed by the University or otherwise provided in the Bidding and Contract Documents, shall submit to both the University and the Consultant:
 - a. Evidence of a completed New York State Uniform Contracting Questionnaire (Vendor Responsibility Questionnaire For-Profit Construction (CCA-2)). Either email confirmation that the bidder's CCA-2 is current and certified in the New York State VendRep System (VendRep) within the last six months from the bid date, or deliver a certified paper format CCA-2, including all attachments, to the University.

The University recommends that vendors file the required CCA-2 online via the VendRep. To enroll in and use the VendRep, see the VendRep Instructions at http://www.osc.state.ny.us/vendrep/vendor_index.htm or go directly to the VendRep online at <https://portal.osc.state.ny.us>. To request assistance, contact the Office of the State Comptroller's ("OSC") Help Desk at 866-370-4672 or 518- 408-4672 or by email at ciohelpdesk@osc.state.ny.us.

The paper format CCA-2 and accompanying definitions are available on the OSC website at the following location:

http://www.osc.state.ny.us/vendrep/forms_vendor.htm

- b. A working plan and schedule showing clearly, in sequence and time-scale, all significant activities of the work. The working plan and schedule shall be in the form of suitable charts, diagrams or bar graphs and shall be based on the Contractor's logic and time estimates for the anticipated time of commencement and completion of the work and its significant phases and activities and the interrelationship between such significant activities and other items pertinent to the work. This requirement is in addition to and not a substitute for the schedule requirements of section 3.02 (Time Progress Schedule) of the Agreement. Although the working plan and schedule submitted shall not be used in determining the lowest responsible bidder, failure to submit the working plan and schedule may result in the rejection of the Proposal as not responsive.
- c. The names and addresses of the bidder's proposed subcontractor for the Asbestos Abatement work of any value, and proposed subcontractors for Electrical Work, the Heating, Ventilating and Air-Conditioning Work and the Plumbing Work for each of said

work categories valued at \$100,000 or more.

- i. For each proposed subcontractor named, provide a completed “List of Completed Similar Construction Projects (the List).” If the List is not provided or is missing information, and/or is found to have erroneous information or information that is no longer current, a proposed subcontractor may be rejected. If requested by the University, the bidder may be permitted to add missing information, modify and/or explain erroneous information or information that is no longer current on the List; modifications and/or explanations of the List must be received promptly after receipt of the University’s request.
- ii. Only one proposed subcontractor should be named for each of such trades. Proposed subcontractors of the bidder may not be changed except with the specific written approval of the University.
- iii. The naming of the bidder itself for any of such work is not acceptable and may result in rejection of the bidder unless the bidder can demonstrate to the University that it has successfully completed or substantially completed three (3) contracts similar in size, scope and complexity for the designated work within the last five (5) years. The determination of relevant contract experience in terms of size, scope and complexity will be at the sole discretion of the University.
- iv. The bidder will be required to establish, to the satisfaction of the Consultant and the University, the reliability and responsibility of each of their said proposed subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to each of such proposed subcontractors' respective trades. By submission of the “List of Completed Similar Construction Projects,” a proposed subcontractor must be able to demonstrate that they have successfully completed or substantially completed three (3) contracts similar in size, scope and complexity for the designated work within the last five (5) years. The determination of relevant contract experience in terms of size, scope and complexity will be at the sole discretion of the University.
- v. For each of the proposed subcontractors, the bidders must submit to the University, within seven (7) calendar days after the bid opening, evidence of a completed New York State Uniform Contracting Questionnaire (Vendor Responsibility Questionnaire For-Profit Construction (CCA-2)). Either email confirmation that the subcontractor’s CCA-2 is current and certified in the New York State VendRep System (VendRep) within the last six months from the bid date, or deliver a certified paper format CCA-2, including all attachments, to the University.
- vi. In the event that the University and the Consultant reject any of said proposed subcontractors, the bidder, within two (2) working days after receipt of notification of such rejection, shall again submit to the University and the Consultant the name of another proposed subcontractor in place of the one rejected and it will be required to establish to the satisfaction of the University and the Consultant the reliability and responsibility of said proposed subcontractor; When naming another proposed subcontractor, the bidder must promptly submit the proposed subcontractor’s completed “List of Completed Similar Construction Projects” and their completed CCA-2.

- vii. The bidder will not be permitted to submit another proposed subcontractor if it designated itself for any of the aforesaid categories of work.
 - viii. Proposed subcontractors of the bidder, approved by the University and the Consultant, must be used on the work for which they were proposed and approved and they may not be changed except with the specific written approval of the University.
 - d. A breakdown of the amount of the bidder's Proposal. Such breakdown shall be prepared in accordance with industry standards. No bidder shall be barred from revising, in the Contract breakdown required under the provisions of Section 4.08 of the Agreement, the various amounts listed in the bid breakdown required under the provisions of this Section. The amount set forth in said bid breakdown will not be considered as fixing the basis for additions to or deductions from the Contract consideration.
- (2) Except for Contracts of \$100,000 or less, within seven (7) calendar days after the opening of bids, unless otherwise directed by the University, the three low bidders shall submit to the University for its approval, a Minority and Women-owned Business Enterprise Utilization Plan (Form 7557-107).
- (3) Except for contracts of \$100,000 or less, within seven (7) calendar days after the opening of bids, the three low bidders shall submit to the University for its approval, an Equal Employment Opportunity Statement and EEO Plan (Form 7557-105) to ensure equal employment opportunities without discrimination because of race, creed, color, sex or national origin. Such Statement and plan should demonstrate the bidder's intent to comply with the provisions of Article VI of the Agreement. The EEO plan should include the methods that the bidder will use to address nondiscrimination and affirmative action so that minorities and women will be included in the work force. The Equal Employment Opportunity ("EEO") Policy Statement that shall contain, but not necessarily be limited to, a provision that the bidder, as a precondition to entering into a valid and binding Contract with the University, shall during the performance of the Contract, agree to the following:
 - a. It will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability or marital status, will undertake or continue existing programs of affirmative action to ensure that minority group membership and women are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on the Contract.
 - b. It shall state in all solicitations or advertisements for employees that, in the performance of the Contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.
 - c. At the request of the University, it shall request each employment agency, labor union or authorized representative of workers, with which it has collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the bidder's obligations herein.
 - d. After the award of the contract, it shall submit to the University a work force utilization report, in a form and manner required by the University, of the work force actually utilized

on the Contract, broken down by specified ethnic background, gender and Federal occupational categories or other appropriate categories specified by the University.

- (4) The above information and such other information as the University or the Consultant may request or obtain will be used by the University in determining the reliability and responsibility of the bidder and any proposed subcontractors. Each bidder must comply promptly with all requests by the University and the Consultant for information and must actively cooperate with the University and the Consultant in their efforts to determine the qualifications of the bidder and any proposed subcontractors. Failure to comply with the latter may result in the rejection of the Proposal as not responsive. All information required to be furnished to the University under this Section shall be sent to the State University at {insert address or email address}.

Section 9 Award of Contract

- (1) The award of the Contract shall be made to the bidder submitting the lowest bid that is responsive to the solicitation and who, in the sole opinion of the University, is qualified to perform the work. The University shall determine the lowest bid by adding to or deducting from the Base Bid of the bidders the additive or deductive alternates, if any, the University elects to accept after the opening of the Proposals. Alternates will be accepted in the order they are set forth in the Proposal. The unit prices set forth in the Proposal for additions to or deductions from the work shall not be considered in determining the lowest bid.

The lowest base bid shall not exceed the amount of funds then estimated by the University as available to finance the contract. If the lowest bidder exceeds such amount, the University may reject all bids, or may award the contract on the base bid combined with deductive alternates applied in the order they are set forth in the Proposal as produces the net amount which is within the available funds.

- (2) The right is reserved, if, in the University's judgment, the public interest will be promoted thereby, to reject any or all Proposals, to waive any informality in any Proposal received or to afford any bidder an opportunity to remedy any deficiency resulting from a minor informality or irregularity. Without limiting the generality of the foregoing:
- a. A Proposal may be rejected as not responsive if the bidder fails to furnish the required bid security or to submit the data required with or after its Proposal and this Information for Bidders.
 - b. A Proposal may be rejected as not responsive if the bidder cannot show to the satisfaction of the University: (i) that it has the necessary qualifications and capital; or (ii) that it owns, controls or can procure the necessary plant and equipment to commence the work at the time prescribed in the Contract and thereafter to prosecute and complete the work at the rate, or within the time specified; or (iii) that it is not already obligated by the performance of so much other work as is likely to delay the commencement, prosecution or completion of the work contemplated by the Contract.
 - c. A Proposal will be rejected as not responsive if it does not provide for the completion of the work by the date of completion specified in the Proposal.
- (3) The University also expressly reserves the right to reject any Proposal as not responsive if, in its opinion, considering the work to be performed, the facts, as to the bidder's business or technical organization, plant, financial and other sources of business experience compared with the work bid

upon, justify rejection.

- (4) The award of the Contract shall not be construed as a guarantee by the University that the plant, equipment and the general scheme of operations and other data submitted by the bidder with or after its Proposal is either adequate or suitable for the satisfactory performance of the work.

Section 10 Required Bonds and Insurance

- (1) Unless otherwise agreed to by the University, within ten (10) working days after the receipt of Letter of Intent, the Contractor shall procure, execute and deliver to the University and maintain, at its own cost and expense:
 - a. A Performance Bond and a Labor and Material Bond, both of which bonds shall be on the form prescribed by the University and in an amount not less than 100 percent of the total amount of the Contract awarded to the Contractor by the University said bonds must be issued by a surety company approved by the University and authorized to do business in the State of New York as a surety.
 - b. Attorneys-in-fact who execute said Bonds on behalf of a surety must affix thereto a certified and effectively dated copy of their power of appointment.
- (2) Prior to the commencement of work the Successful Bidder will provide, at its sole cost and expense, Certificates of Insurance in accordance with Section 5.06 and 5.07 of the Construction Agreement, which shall remain in force throughout the term of the agreement, or any extension thereof. Such Certificates of Insurances shall be from an insurance company licensed by the New York State Department of Insurance with a rating of at least "A-" as published with Standard & Poor's, and a liability insurance policy with limits no less than 2,000,000.00 per claim. If during the term of the policy, the carrier's rating falls below "A-", the liability insurance must be replaced no later than the renewal date of the policy with an insurer acceptable to the State of New York. Such policies shall name the STATE UNIVERSITY OF NEW YORK as an additional insured. The policy shall designate the State University of New York as the loss payee and shall contain a provision that the State University of New York shall receive at least thirty (30) days' notice prior to material change, cancellation or expiration of any such policy.
- (3) **Workers Compensation Insurance & Disability Benefits Coverage**
All employees of the Successful Bidder shall be adequately and properly covered by Workers' Compensation Insurance and Disability Benefits coverage for all work related to the resultant contract. Such policies shall name the STATE UNIVERSITY OF NEW YORK as an additional insured and are to be written by recognized and well-rated insurance companies authorized to transact business in the State of New York. The Successful Bidder shall deliver certificates of such coverage, or proof that such coverage is not required, in the required format, as required by the Workers' Compensation Board, to the following when the agreement is signed by the parties and thereafter not less than thirty (30) days prior to material change or cancellation of such coverage.
- (4) Proof of insurances with the specific coverage and limits required in Article V of the Agreement. Acceptable documents are:
 - i. Proof of NYS Worker's Compensation is only accepted on the C-105.2 or U-26.3 form.
 - ii. Proof of Disability insurance is only accepted on the DB-120.1 form.

Use the link below for a description of the required forms for Workers Compensation and Disability:

<http://www.osc.state.ny.us/agencies/guide/MyWebHelp/Content/XI/18/G.htm>

- iii. All other proof of insurance must be on the Acord 25 Certificate of Liability Insurance form.
- iv. A 60 day schedule
 - a. After receipt of the Letter of Intent but before receipt of the Contract is Awarded, the Contractor, unless otherwise directed by the University, shall update the working plan and schedule previously submitted in accordance with the Information for Bidders to define the contractor's planned operations during the first 60 days and submit it to the University and the Consultant for their acceptance. The updated working plan and schedule shall be in the form of suitable charts, diagrams or bar graphs and shall be based on the Contractor's logic and time estimates. When updated, such plan and schedule shall be sufficiently detailed to show clearly, in sequence, all salient features of the work of each trade including: the anticipated time of commencement and completion of such work and the interrelationship between such work, submission of Shop Drawings and Samples for approval, approval of Shop Drawings and Samples, placing of orders of materials, fabrication and delivery of materials, installation and testing of materials, contiguous or related work under other contracts, and other items pertinent to the work. The Notice to Proceed may be withheld until this schedule is received and is deemed responsive to the project requirements.
 - b. After Contract Award, but before processing second progress payment application, the Contractor, unless otherwise directed by the University, shall submit to the University and the Consultant for their acceptance its proposed working plan and project time schedule for all the work covered by the Contract, and shall include activities for preparation and submission of all Shop Drawings and Samples. Said proposed working plan and schedule shall be prepared in accordance with the form and requirements set forth in the preceding paragraph.

Section 11 Opportunities Programs

- (1) Minority and Women's Business Enterprises
 - a. Pursuant to New York State Executive Law Article 15-A, the University recognizes its obligation under the law to promote opportunities for maximum feasible participation of certified minority-and women-owned business enterprises and the employment of minority group members and women in the performance of University contracts.
 - b. For purposes of this solicitation, the University hereby establishes an overall goal of **34.37%** for MWBE participation, **25.51%** for Minority-Owned Business Enterprises ("MBE") participation and **8.86%** for Women-Owned Business Enterprises ("WBE") participation (based on the current availability of qualified MBEs and WBEs). For additional information please refer to the MWBE requirements outlined in the Prospective Bidders Notice ([Form 7557-121b](#)) and Exhibit A-1.
 - c. For guidance on how the University will determine a Contractor's "good faith efforts," refer to 5 NYCRR §142.8.

- d. Please note the forms identified in the Prospective Bidders Notice ([Form 7557-121b](#)) must be submitted within seven days of the bid opening. Required forms include the MWBE-EEO Policy Statement ([Form 7557-104](#) or equivalent), the MWBE Utilization Plan ([Form 7557-107](#)) and the EEO Staffing Plan ([Form 7557-108](#)).
- e. Any modifications or changes to the MWBE Utilization Plan after the Contract award and during the term of the Contract must be reported on a revised MWBE Utilization Plan and submitted to the University. The University will review the submitted MWBE Utilization Plan and advise the Bidder of the University's acceptance, or issue a notice of deficiency within 30 days of receipt.

(2) Service Disabled Veteran Owned Business Enterprises

- a. Consistent with the State University of New York's commitment to, and in accordance with, Article 17-B of the New York State Executive Law, contractors are required to ensure that good faith efforts are made to include meaningful participation by Service Disabled Veteran-Owned Business in SUNY's MWBE Program. The requirements apply to contracts in excess of \$100,000.
- b. To ensure that SDVOB Enterprises are afforded the opportunity for meaningful participation in the performance of the University's contracts, and to assist in achieving the SDVOB Act's statewide goal for participation on state contracts the University hereby establishes an overall goal of 6% for SDVOB participation for this solicitation.
- c. For additional information please refer to the SDVOB requirements outlined in the Prospective Bidders Notice ([Form 7564-121b](#)). Please note the SDVOB Utilization Plan [Form 7564-107](#) must be submitted within seven days of the bid opening.

Section 12 Encouraging Use of New York State Business Businesses in Contract Performance

- (1) New York State businesses have a substantial presence in State contracts and strongly contribute to the economies of the state and the nation. In recognition of their economic activity and leadership in doing business in New York State, bidders/proposers for this contract for commodities, services or technology are strongly encouraged and expected to consider New York State businesses in the fulfillment of the requirements of the contract. Such partnering may be as subcontractors, suppliers, protégés or other supporting roles.

Bidders/proposers need to be aware that all authorized users of this contract will be strongly encouraged, to the maximum extent practical and consistent with legal requirements, to use responsible and responsive New York State businesses in purchasing commodities that are of equal quality and functionality and in utilizing services and technology. Furthermore, bidders/proposers are reminded that they must continue to utilize small, minority and women-owned businesses, consistent with current State law.

Utilizing New York State businesses in State contracts will help create more private sector jobs, rebuild New York's infrastructure, and maximize economic activity to the mutual benefit of the contractor and its New York State business partners. New York State businesses will promote the contractor's optimal performance under the contract, thereby fully benefiting the public sector

programs that are supported by associated procurements.

Public procurements can drive and improve the State's economic engine through promotion of the use of New York businesses by its contractors. The State therefore expects bidders/proposers to provide maximum assistance to New York businesses in their use of the contract. The potential participation by all kinds of New York businesses will deliver great value to the State and its taxpayers.

- a. Information on the availability of New York State subcontractors and suppliers is available from: New York State Department of Economic Development, Procurement Assistance Unit, One Commerce Plaza, Albany, New York 12245, Phone: (518) 474-7756, Fax: (518) 486-7577.

Section 13 Single Contract Responsibility

This is a single bid general construction project. The Contractor submitting the bid is responsible for all work associated with this Project.

Section 14 Examination of Site and Conditions of Work

- (1) A pre-bid conference and project walk-through will be held on **March 6th, 2019 at 11:00 a.m.** with all contractors assembled at **Capital Facilities Office building 2nd floor conference room, State University of New York Purchase College, 735 Anderson Hill Road, Purchase, NY 10577.** No individual or additional walk-throughs will be provided. Failure to attend a walk-through shall not be the cause for extra payment.
- (2) Each bidder must inform itself fully of the conditions relating to the construction of the project and the employment of labor on the project. Failure to do so will not relieve a successful bidder of their obligation to furnish all material and labor necessary to carry out the provisions of their contract. To the extent possible, the contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

Section 15 General Terms and Conditions

- (1) The following items will be incorporated into, and made part of, the formal agreement: (1) the University's Invitation for Bid; (2) the Successful Bidder's proposal; (3) Exhibit A, Standard Contract Clauses; (4) Exhibit A-1, Affirmative Action Clauses; and, (5) Forms A and B Procurement Lobbying Forms.
- (2) In the event of any inconsistency in or conflict among the document elements of the agreement described above, such inconsistency or conflict shall be resolved by giving precedence to the document elements in the following order: (1) Exhibits A and A-1; (2) Forms A and B Procurement Lobbying Forms, (3) the Agreement; (4) this IFB; and (5) the Successful Bidder's proposal.

Section 15.1 Vendor Debriefing and Contract Award Protest Procedure

- (1) Upon being notified of their unsuccessful bids, unsuccessful bidders may request in writing a debriefing within 15 calendar days of such notice. The 15 day period starts once unsuccessful bidders are notified. Once a request is made by the bidder, the University must schedule a debriefing within a reasonable time of such request. Unless the campus and bidder mutually

agree to use another method such as by telephone, video conference or another type of electronic communication the debriefing must be conducted in person with the bidder.

- (2) This procurement is subject to SUNY Procedure Item 7561, Contract Award Protest Procedure.

Section 15.2 Proposal Confidentiality

- (1) All proposals and qualifications submitted for the University's consideration will be held in confidence. However, the resulting contract is subject to the New York State Freedom of Information Law (FOIL). Therefore, if an Bidder believes that any information in its proposal constitutes a trade secret or should otherwise be treated as confidential and wishes such information not to be disclosed the Bidder shall submit with its proposal a separate letter to the designated contact. The letter shall specifically identify the page number(s), line(s) or other appropriate designation(s) containing such information, explaining in detail why such information is a trade secret and formally requesting that such information be kept confidential. Failure by an Bidder to submit such a letter will constitute a waiver by the Bidder of any rights it may have under Section 89(5) of the Public Officers' Law relating to protection of trade secrets.
- (2) The proprietary nature of the information designated confidential by the Bidder may be subject to disclosure if ordered by a court of competent jurisdiction. A request that an entire proposal be kept confidential is not advisable since a proposal cannot reasonably consist of all data subject to FOIL proprietary status.

Section 15.3 Information Security Breach and Notification Act

- (1) The Bidder shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa and State Technology Law, Section 208). The Bidder shall be liable for the costs associated with such breach if caused by its negligent or willful acts or omissions, or the negligent or willful acts or omissions of its agents, officers, employees or subcontractors.

Section 15.4 State Finance Law §§ 139-j and 139-k

- (1) State Finance Law §§139-j and 139-k imposes certain restrictions on communications between the University and a Bidder during the procurement process. During the restricted period the Bidder is restricted from making contacts to other than designated contact unless it is a contact that is included among certain statutory exceptions set forth in State Finance Law §139-j(3)(a). The restricted period is from the earliest notice of intent to solicit offers through final award and approval of the Contract.
- (2) University employees and their designated representatives are also required to obtain certain information when contacted during the restricted period and make a determination of the responsibility of the Bidder pursuant to these two statutes. Certain findings of non-responsibility can result in rejection for contract award and in the event of two findings within a 4 year period the Bidder is debarred from obtaining government procurement contracts.

Section 16 Additional Terms and Conditions

- (1) The terms and conditions of the State University of New York Construction Agreement (Form 7554-09) shall apply, and is provided as an attachment to this IFB.

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- (2) The resulting agreement shall be binding upon its execution by both parties and, if required by New York State law, upon the approval of the Attorney General and the Office of the State Comptroller.
 - (3) The agreement may be revised at any time upon mutual consent of the parties in writing. Such written consent will not be effective until signed by both parties and, if required by New York State law, approved by the Attorney General and the Office of the State Comptroller.
 - (4) The relationship of the Successful Bidder to the University shall be that of independent contractor.
 - (5) Compliance with the post-employment restrictions of the Ethics in Government Act is required.
 - (6) The submission of a proposal constitutes a binding offer to perform and provide said services.
 - (7) In the event the Successful Bidder uses partners, subcontracts or subcontractors, the Successful Bidder will remain responsible for compliance with all specifications and performance of all obligations under the contract resulting from this IFB. For the resulting agreement, the Successful Bidder will be the prime contractor.
 - (8) The University will not be liable for any costs associated with the preparation, transmittal, or presentation of any proposals or materials submitted in response to this IFB.
 - (9) Public announcements or news releases regarding this IFB or any subsequent award of a contract must not be made by any Bidder without the prior written approval of SUNY.
 - (10) The Successful Bidder is responsible for compliance with all applicable rules and regulations pertaining to cities, towns, counties and State where the services are provided, and all other laws applicable to the performance of the resulting contract. The Successful Offeror shall provide all necessary safeguards for safety and protection as set forth by the United States Department of Labor, Occupational Safety and Health Administration.
 - (11) The Successful Bidder will be responsible for the work, direction and compensation of its employees, consultants, agents and contractors. Nothing in the resulting agreement or the performance thereof by the Successful Bidder will impose any liability or duty whatsoever on the University including, but not limited to, any liability for taxes, compensation, commissions, Workers' Compensation, disability benefits, Social Security, or other employee benefits for any person or entity.
 - (12) In the event the Successful Bidder is required to be reimbursed for travel, Bidder shall be reimbursed at rates not to exceed the current NYS Schedule of Allowable Reimbursable Travel Expenses. Refer to the U.S. Government Administration Rates for Travel at: <http://www.gsa.gov>
 - (13) In addition, the University reserves the right to:
 - a. Not accept any and all proposals received in response to this IFB, waive requirements or amend this IFB upon notification to all bidders, waive minor irregularities or adjust or correct cost or cost figures with the concurrence of the bidder if mathematical or typographical errors exist.
 - b. To terminate any resulting contract for: (1) unavailability of funds; (2) cause; (3) convenience; (4) in the event it is found that the certification filed by the Bidder in

accordance with State Finance Law §§139-j and 139-k are found to be intentionally false or intentionally incomplete; and if applicable, the Department of Taxation and Finance Contractor Certification Form ST-220CA was false or incomplete. Upon such finding the University may exercise its termination right by providing written notification to the Bidder in accordance with the written notification terms of the contract.

- c. Request certified audited financial statements for the past three (3) completed fiscal years and/or other appropriate supplementation including, but not limited to, interim financial statements and credit reports.
- d. Contact any or all references.
- e. Request clarifications from Bidders for purposes of assuring a full understanding of responsiveness, and further to permit revisions from all Bidders determined to be susceptible to being selected for contract award, prior to award.
- e. Advise Bidder of any objectionable employee(s) and/or subcontractor(s) and request their removal from the project. Such removal shall not be reasonably withheld by the Bidder.

Section 17 Executive Order 177 (EO 177)

The New York State Human Rights Law, Article 15 of the Executive Law, prohibits discrimination and harassment based on age, race, creed, color, national origin, sex, pregnancy or pregnancy-related conditions, sexual orientation, gender identity, disability, marital status, familial status, domestic violence victim status, prior arrest or conviction record, military status or predisposing genetic characteristics.

The Human Rights Law may also require reasonable accommodation for persons with disabilities and pregnancy-related conditions. A reasonable accommodation is an adjustment to a job or work environment that enables a person with a disability to perform the essential functions of a job in a reasonable manner. The Human Rights Law may also require reasonable accommodation in employment on the basis of Sabbath observance or religious practices.

Generally, the Human Rights Law applies to: (i) all employers of four or more people, employment agencies, labor organizations and apprenticeship training programs in all instances of discrimination or harassment; (ii) employers with fewer than four employees in all cases involving sexual harassment; and (iii) any employer of domestic workers in cases involving sexual harassment or harassment based on gender, race, religion or national origin.

In accordance with Executive Order No. 177, prior to contract award, successful bidder must submit a certification that it does not have institutional policies or practices that fail to address harassment and discrimination as described above. SUNY is electing to obtain the certification with the bid documents to avoid unnecessary delay in the contract award process.

All bidders must sign and submit the certification that is part of this solicitation.

Section 18 State Finance Law § 139-I Certification

Pursuant to N.Y. State Finance Law § 139-I, every bid made on or after January 1, 2019 to the State or any public department or agency thereof, where competitive bidding is required by statute, rule or

regulation, for work or services performed or to be performed or goods sold or to be sold, and where otherwise required by such public department or agency, shall contain a certification that the Bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of N.Y. State Labor Law § 201-g.

N.Y. State Labor Law § 201-g provides requirements for such policy and training and directs the Department of Labor, in consultation with the Division of Human Rights, to create and publish a model sexual harassment prevention guidance document, sexual harassment prevention policy and sexual harassment prevention training program that employers may utilize to meet the requirements of N.Y. State Labor Law § 201-g. The model sexual harassment prevention policy, model sexual harassment training materials, and further guidance for employers, can be found online at the following URL: <https://www.ny.gov/combating-sexual-harassment-workplace/employers>.

Pursuant to N.Y. State Finance Law § 139-I, any bid by a corporate bidder containing the certification required above shall be deemed to have been authorized by the board of directors of such Bidder, and such authorization shall be deemed to include the signing and submission of such bid and the inclusion therein of such statement as the act and deed of the Bidder.

If the Bidder cannot make the required certification, such Bidder shall so state and shall furnish with the bid a signed statement that sets forth in detail the reasons that the Bidder cannot make the certification. After review and consideration of such statement, SUNY may reject the bid or decide that there are sufficient reasons to accept the bid without such certification.

All bidders must sign and submit the certification that is part of this solicitation.

Section 19 Purchase College Policies

All State University of New York Purchase College policies must be followed by Contractor while on the Purchase College grounds and in providing the goods and/or services of this solicitation to Purchase College.

The Purchase College policies include:

- (1) Domestic Violence in the Workplace policy*
- (2) Nondiscrimination policy*
- (3) Policy on Sexual Harassment*
- (4) Regulations for a Drug Free Environment and Information on Counseling and Treatment*
- (5) Tobacco Free Policy*
- (6) Title IX of the Education Amendments*

The full text of the above listed Purchase College policies can be accessed at:

<https://www.purchase.edu/offices/purchasing/policies/>

NAME OF BIDDER

ADDRESS OF BIDDER

PROPOSAL FOR

Project Number: **SU-021919**

Date: **02/19/2019**

Project Name: **New Natural Gas Pipeline Installation Project**

TO THE STATE UNIVERSITY OF NEW YORK:

1. **The Work Proposed Herein Will Be Completed Within 100 Calendar Days, Starting 10 Calendar Days After The Contract Approval Date.** In the event the bidder fails to complete such work by said date or dates, or within the time to which such completion may have been extended in accordance with the Contract Documents, the bidder agrees to pay the University liquidated damages in an amount equal to the values indicate in the Liquidated Damages Schedule below for each calendar day of delay in completing the work.

LIQUIDATED DAMAGES SCHEDULE

<u>Contract Amount</u>	<u>Liquidated Damages</u>
Under \$100,000	\$100/day
\$100,000-\$499,999	\$200/day
\$500,000-\$999,999	\$300/day
\$1MM-\$1,999,999	\$400/day
\$2MM-\$3,499,999	\$500/day
\$3.5MM-\$5MM	\$700/day
Over \$5MM (to be determined by the University in each instance)	\$____/day

2. The bidder hereby declares that it has carefully examined all Bidding and Contract Documents and that it has personally inspected the actual location of the work, together with the local sources of supply, has satisfied itself as to all the quantities and conditions, and understands that in signing this Proposal, it waives all right to plead any misunderstanding regarding the same.
3. The bidder further understands and agrees that it is to do, perform and complete all work in accordance with the Contract Documents and to accept in full compensation therefore the amount of the Total Bid, modified by such additive or deductive alternates, if any, as are accepted by the University.
4. The bidder further agrees to accept the unit prices, if any, set forth in paragraph (5) of this proposal, except as the same may be modified pursuant to the provisions of Section (5) of the Information to Bidders, as full payment for the amount of the credit to the University for any deletions, additions, modifications or changes to the portion or portions of work covered by said unit prices.

5. BID CALCULATION

a. **BASE BID** (*does not include allowances*)

\$ _____
(in numbers)

(in words)

b. **ALLOWANCES:** In accordance with the Schedule I and Section 4.05 of Agreement, the bidder further agrees to the following additions to the Base Bid:

Work or Materials Description	Amount in Words	Amount in Figures

c. **TOTAL BID** (*base bid + allowances = total bid*)

\$ _____
(in numbers)

(in words)

d. **ALTERNATES:** In accordance with Section B of the General Requirements the bidder proposes the following additions to or deductions from the Total Bid for the alternates listed below:

Alternate Number	Add/Deduct	Amount in Words	Amount in Figures

e. **UNIT PRICES:** In accordance with Section (5) paragraph (2) of the Information to Bidders and Section 4.04 of the Agreement the bidder or the University may insert unit prices for the work or materials listed below for clarification.

Work or Materials	Amount in Words	Amount in Figures
-------------------	-----------------	-------------------

Description		

6. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief: (a) the prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (b) unless otherwise required by law, the prices have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and (c) no attempt has been made or will be made by the bidder to induce any person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (a), (b) and (c) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where (a), (b), and (c) above shall have not been complied with, the bid shall not be considered for award nor shall any award be made unless the Campus President, or designee, or Vice Chancellor for Capital Facilities, or designee, determines that such disclosure was not made for purposes of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of this Section.

7. The bidder agrees that if awarded the Contract, it will commence work within (10) calendar days after date of receipt of a fully executed Agreement and that it will fully complete the work by the date stated herein.
8. The bidder acknowledges the receipt of the following addenda, but agrees that it is bound by all addenda whether or not listed herein.

Addendum Number	Date	Addendum Number	Date
_____	____/____/____	_____	____/____/____
_____	____/____/____	_____	____/____/____
_____	____/____/____	_____	____/____/____

9. The bidder submits herewith bid security in an amount not less than five (5) percent of the Total Bid. In the event that (a) the bidder's Total Bid is the lowest one submitted and the bidder does not timely provide the Post-Bid Information required by the Information for Bidders or (b) this Proposal is

accepted by the University and the bidder shall refuse or neglect, within ten (10) calendar days after date of receipt of Agreement, to execute and deliver said Agreement in the form provided herein, or to execute and deliver a Performance Bond and a Labor and Material Bond in the amounts required and in the form prescribed, the bidder shall be liable to the University, as liquidated damages, for the amount of the bid security or the difference between the Total Bid of the bidder and the Total Bid of the bidder submitting the next lowest bid, whichever sum shall be higher, otherwise the total amount of the bid security will be returned to the bidder in accordance with the provisions set forth in the Information for Bidders. The University may apply the bid security in full or partial payments, as the case may be, of said liquidated damages and in the event the bid security is less than the amount of liquidated damages to which the University is entitled, the bidder shall pay the difference, upon demand, to the University.

10. The bidder certifies that all wood products that are to be used in the performance of this Contract shall be in accordance with the Specifications and provisions of Section 167 b. of the State Finance Law which Section prohibits the purchase and use of tropical hardwoods.
11. The bidder affirms that it understands and agrees to comply with the procedures of the Fund relative to permissible contacts as required by Sections 139-j(3) and 139-j-(6)(b) of the State Finance Law.
12. The bidder certifies that all information provided or to be provided to the University in connection with this procurement is, as required by Section 139-k of the State Finance Law, complete, true and accurate.

Dated ____ / ____ / ____

Firm's Federal ID Number or
Social Security Number as applicable _____

Legal name of person, partnership, joint venture or corporation:

By _____
(signature)

Title _____

Email address _____

ACKNOWLEDGMENT FOR THE PROPOSAL

THE LEGAL ADDRESS OF THE BIDDER

Telephone No. _____ Facsimile No. _____

If a Corporation

Name

Address

PRESIDENT _____

SECRETARY _____

TREASURER _____

If a Partnership

Name of Partners

Address

If a Joint Venture

Name of Members

Address

If an Individual

Name of Individual

Address

Attachment A – List of Completed Similar Construction Projects

Bidder Name:
Project No.:

Bidders must provide three (3) example projects completed in the past five (5) years in which the Bidder served as the prime contractor. Example projects must be of similar size, scope and complexity to the project currently being bid, as further described in the Description of Work. Each project must include the Owner/Agency, Award Date, Contract Amount, Date Completed, Contact Person, Telephone number of the contact, Architect and/or Engineer's Name, Contract Number, Contact Email, and the Project Title and a brief scope description. Reference contacts may be used to verify project size, scope, dollar value, percentages and quality of performance.

1.	Agency/Owner			Award Date	Contract Amount	Date Completed
	Agency/Owner Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Contact Email	Project Title & Scope			
2.	Agency/Owner			Award Date	Contract Amount	Date Completed
	Agency/Owner Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Contact Email	Project Title & Scope			
3.	Agency/Owner			Award Date	Contract Amount	Date Completed
	Agency/Owner Contact Person		Telephone No.	Designer Architect and /or Design Engineer		
	Contract No.	Contact Email	Project Title & Scope			
Completed By:				Phone Number: Email: Date:		

Division 1 - General Requirements
SECTION A - Description of Work

1. Work to be Done

The work to be done under the Contract, in accordance with the Contract Documents, consists of performing, installing, furnishing and supplying all materials, equipment, labor and incidentals necessary or convenient for the construction of Project Number SU-021919, titled New Natural Gas Pipeline Installation Project and carry out all of the duties and obligations imposed upon the Contractor by the Contract Documents.

The main features of the work shall include, but not be limited to the following:

All labor, materials, equipment and services necessary to complete the Music sound stage interior renovation as shown on the drawings and specifications

- Furnish and install natural gas piping between existing 16-inch gas main and the Physical Education Building.
- Test all natural gas piping as required by Consolidated Edison.
- Backfill excavation/trench for natural gas line and restore surfaces to original conditions.
- Furnish and install natural gas pressure regulating station and gas meter.

2. Work Not Included:

Work not included in the work of the Contract are those items marked "N.I.C"; except those specifically specified or indicated on the Drawings; and items marked "by others".

SECTION B – Alternates

1. General

- a. Refer to Proposal Form. State thereon the amount to be added to or deducted from the Total Bid for the Alternates described herein.
- b. Extent and details of the Alternates are indicated on the Drawings, and described in the Specifications.
- c. Where reference is made in the description of the Alternate to products, materials, or workmanship, the specification requirements applicable to similar products, materials or workmanship in the Total Bid shall govern the products, materials, and workmanship of the Alternate as if these specification requirements were included in full in the description of the Alternates.

2. Alternates

“NONE”

SECTION C - Special Conditions

1. Cutting and Patching

- a. The Contractor shall do all cutting, fitting, and patching of its work that may be required to make its several parts come together properly and fitted as shown upon or reasonably implied from the Drawings and Specifications for the completed project.
- b. Any cost caused by defective or ill-timed work shall be borne by the Contractor. Except as otherwise expressly provided in the Contract Documents, the Contractor shall not cut or alter the work of any other Contractor or existing work without the consent of the University.
- c. Existing construction, finishes, equipment, wiring, etc., that is to remain and which is damaged or defaced by reason of work done under this contract shall be restored by the Contractor to a condition satisfactory to the University, or replaced with new, at no additional cost.
- d. Existing surfaces, materials, and work shall be prepared as necessary to receive the new installations. Such preparatory work shall be as required by the conditions and in each case shall be subject to approval by the University.
- e. Newly exposed work or surfaces which are presently concealed shall be made to match existing corresponding or adjoining new surfaces as directed, and the materials and methods to be employed shall be subject to approval by the University.
- f. All new, altered, or restored work in the building shall match existing corresponding work in the material, construction finish, etc., unless otherwise specified or required by the drawings.

2. Clean-Up

- a. Periodic Cleaning: The Contractor shall at all times during the progress of the work keep the Site free from accumulation of waste matter or rubbish and shall confine its apparatus, materials and operations of its workmen to limits prescribed by law or by the Contract Limit Lines, except as the latter may be extended with the approval of the University. Cleaning of the structure(s), once enclosed, must be performed daily and removal of waste matter or rubbish must be performed at least once a week.
- b. Final Clean Up: Upon completion of the work covered by the Contract, the Contractor shall leave the completed project ready for use without the need of further cleaning of any kind and with all work in new condition and perfect order. In addition, upon completion of all work, the Contractor shall remove from the vicinity of the work and from the property owned or occupied by the State of New York, the State University of New York or the University, all plant, buildings, rubbish, unused materials, concrete forms and other materials belonging to it or used under its direction during construction or impairing the use or appearance of the property and shall restore such areas affected by the work to their original condition, and, in the event of its failure to do so, the same shall be removed by the University at the expense of the Contractor, and it and its surety shall be liable therefor.

3. Temporary Access and Parking

See supplemental Special Conditions for Construction.

4. Field Meetings

Periodic job meetings will be scheduled by the Consultant and the University during the course of construction. The Contractor, and, upon request of the Consultant and the University, its principal subcontractors and manufacturer's representatives, shall attend such meetings and be prepared to furnish answers to questions on progress, workmanship, or any other subject on which the Consultant and the University might reasonably require information.

5. Operating Instructions and Manuals

The Contractor shall furnish three (3) complete sets of operating instructions and manuals which shall include definite and specific instructions on all mechanical and electrical systems involved in the Project. Said instructions and manuals should set forth: (1) the manner of operation; (2) the necessary precautions and care to be followed; (3) periodic prevention maintenance requirements; and (4) a complete set of spare parts lists, catalogs, service manuals and manufacturing data on said systems. Said instructions and manuals are to be made available by the Contractor for review and comment by the University a minimum of six (6) weeks prior to the scheduled completion of the Project.

6. Utility Shutdowns and Cut Overs

- a. Except as otherwise expressly provided in the Contract Documents, the Contractor shall be responsible for submitting to the University, for its approval, a proposed schedule of all utility shutdowns and Cut overs of all types which will be required to complete the Project; said schedule should contain a minimum of two (2) week's advance notice prior to the time of the proposed shutdown and cut over. Most campuses of the State University of New York are in full operation 12 months of the year, and shutdowns and Cut overs, depending upon their type, generally must be scheduled on weekends, at night, or during holiday periods. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or Cut overs.
- b. Temporary Connections: In the event the Contractor shall disrupt any existing services, the Contractor shall immediately make temporary connection to place such service back into operation and maintain the temporary connection until the Contractor makes the permanent connection. All work must be acceptable to the University.

7. Temporary Power for Construction Activities

Electrical energy will be available at no cost to the Contractor from existing outlets or panels from locations approved by the College. This power may be used for small power tools (not exceeding 1/2 HP), etc., and the Contractor shall not exceed the capacity of the existing circuits being used. The Contractor shall be responsible for providing all necessary connections, cables, etc. and removal of the same at completion of construction with approval from the University. The Contractor shall in no way modify the existing circuits at the panel boards to increase capacities of the circuits. If the required power load exceeds the capacities of the available power sources, the Contractor shall be responsible and pay for furnishing and installing all necessary temporary power poles, cables, fused disconnect switches, transformers and electric meters necessary to provide a temporary power system for the project, and remove the same at completion. Install all temporary wiring and equipment and make all connections in conformity with the National Electrical Code. Make all replacements required by temporary use of the permanent wiring system. Provide ground fault protection.

8. Sanitary Facilities

The Contractor will be permitted to use existing toilet and janitor closet facilities as designated by the College provided the existing facilities are not misused, defaced, or left in an unsanitary condition. If the University deems that the existing facilities have been subject to misuse or left unsanitary, the Contractor shall be informed and caused to install and maintain (at its own cost) temporary, sanitary facilities at approved locations. The Contractor shall also be held responsible for the cost of cleaning and repair of any damage to said existing facilities and adherence to health and sanitary codes of the State of New York.

9. Temporary Heat

- a. In those locations where it is required by the conditions of the work, the Contractor shall provide and pay for all temporary heating, coverings and enclosures necessary to properly protect all work and materials against damage by dampness and cold, dry out the work, and facilitate the completion thereof. Fuel, equipment, materials, operating personnel and the methods used therefor shall be at all times satisfactory to the University and adequate for the purpose intended. The Contractor shall maintain the critical installation temperatures, provided in the technical provisions of the specifications hereof, for all work in those areas where the same is being performed.
- b. Maintenance of proper heating, ventilation and adequate drying out of the work is the responsibility of the Contractor. Any work damaged by dampness, insufficient or abnormal heating shall be replaced to the satisfaction of the University by and at the sole cost and expense of the Contractor.
- c. The Contractor shall provide all necessary, temporary heating for the efficient and effective work by itself and all trades engaged in the work. Unless otherwise specified, the minimum temperature shall be 50 degrees F at all places where work is actually being performed within the project (where enclosed). Before and during the placing of wood finish and the application of other interior finishing, varnishing, painting, etc., and until final acceptance by the University of all work covered by the Contract, the Contractor shall, unless otherwise specified in the Contract Documents, provide sufficient heat to produce a temperature of not less than 68 degrees F nor more than 78 degrees F.

10. Temporary Light

The contractor shall install, maintain and remove Underwriter's Label temporary lighting sockets, light bulbs, and intermittent power sockets as approved by the University. The minimum temporary lighting to be provided is at the rate of 1/4 watt per square foot and be maintained for 24 hours, 7 days per week at stairs and exit corridors; in all other spaces, temporary lighting is to be maintained during working hours. Installation shall be in accordance with the National Electric Code.

11. Temporary Water for Construction Purposes

Water for construction is available through the campus system without charge to the Contractor from location designated by the College. The Contractor shall obtain the necessary permission, make all connections, as required, furnish and install all pipes and fittings, and remove the same at completion of work. The Contractor must provide for waste water discharge and shall take due care to prevent damage to existing structures or site and the waste of water. All pipes and fittings must be maintained in perfect condition at all times.

12. Conducting Work

- a. All work is to be conducted in such a manner as to cause a minimum degree of interference with the College's operation and academic schedule.
- b. Safe and direct entrance to and exiting from the existing buildings shall be maintained at all times during regular hours while construction is in progress.
- c. No construction work will start in any area until the Contractor has all the required materials on-site.
- d. The Contractor and its employees shall comply with College regulations governing conduct, access to the premises, and operation of equipment.
- e. The building shall not be left "open" overnight or during any period of inclement weather.

Temporary weather tight closures shall be provided for/by the Contractor to protect the structure and its contents.

13. Safety and Protective Facilities

- a. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the Staff, students, the work and property at all times, including Saturdays, Sundays, holidays and other times when no work is being done.
- b. The Contractor shall erect, maintain and remove appropriate barriers or other devices, including mechanical ventilation systems, as required by the conditions of the work for the protection of users of the project area, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA and National Fire Prevention Association 241, for safeguarding of structures during construction.

14. Protection of Existing Structures, Vegetation and Utilities

The Contractor, during the course of its work, shall not damage any buildings, structures and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric power and lighting and telephone cables, lawns, curbs, plants and other improvements. Any damage resulting from the Contractor's operations shall be repaired or replaced at its expense.

15. Abbreviations and References

The following abbreviations may be used in these Specifications:

N.A.	Not Applicable
N.I.C	Not in Contract.
Fed. Spec. or F.S.	Federal Specifications
SUCF	State University Construction Fund
University or SUNY	State University of New York
College	A Campus of the State University of New York

16. Use of Elevators

The Contractor shall be permitted to make temporary use of elevators designated by the University and provided such use does not interfere with the normal activities of the College. Large and heavy items shall not be placed in elevators, and suitable padding shall be provided whenever a cab is used for construction purposes. Elevator pits shall be kept free of debris and dust by frequent cleaning out. The elevators shall be restored to original condition satisfactory to the University at the end of construction activities. Use of the top of the elevator may be permitted after obtaining approval of the University.

17. Salvage of Materials

Remove and legally dispose of all debris and other materials resulting from the alterations to State University property. The following items shall remain the property of the University and shall be stored at the site as directed by the University:

NONE

18. Storage of Materials

- a. The Contractor shall store materials and equipment within the contract limits in areas on the site as designated by the University.
- b. All materials shall be stored in a neat and orderly manner, and shall be protected against the weather by raised floored weatherproof temporary storage facility or trailer.
- c. Security for stored materials shall be the responsibility of the Contractor.
- d. Storage of materials is not permitted on the roof of any building.

19. Shop Drawings and Samples - (Refer to Section 2.19 of the Agreement)

- a. The Contractor shall submit to the University for its approval five (5) sets of prints of all shop drawings required by the specifications. Those marked:

"REJECTED" are not in accordance with the Contract Documents and shall be resubmitted.

"REVISE AND RESUBMIT" Contractor shall correct and resubmit.

"MAKE CORRECTIONS NOTED": The contractor shall comply with corrections and may proceed.
Resubmittal is not required.

"APPROVED - NO EXCEPTIONS TAKEN": The contractor may proceed.

- b. All shop drawings and/or submittals used on the construction site must bear the impression of the consultant's review stamp as well as the General Contractor's review stamp, indicating the status of review and the date of review.
- c. All shop drawings shall reflect actual site conditions and accurate field dimensions. Dimensioned shop drawings shall be submitted for all fabricated items. Incomplete submittals will be rejected without review.
- d. All shop drawings, submittals and samples shall include:
 - 1). Date and revision dates.
 - 2). Project title and number.
 - 3). Names of:
 - a). Contractor
 - b). Subcontractor
 - c). Supplier
 - d). Manufacturer
 - 4). Identification of products or materials: Include Department of State (DOS) file number, manufacturers' name and market name of all covered products and applicable materials in accordance with Part 1120 of the Code. This information may be obtained by contacting the DOS, Office of Fire Prevention and Control: 518 474-6746 [voice] and 518 474-3240 [FAX]

20. U.S. Steel

All structural steel, reinforcing steel, or other major steel items to be incorporated in the work shall, if this Contract is in excess of \$100,000, be produced or made in whole or substantial part in the United States, its territories or possessions.

21. Non-Asbestos Products

- a. All materials specified herein shall contain no asbestos.
- b. Provide "Contains No Asbestos" permanent labels applied to the exterior jacket of all pipe insulation at 20 foot intervals with a minimum of one (1) label for each service in each work area.

22. Material Safety Data Sheet

The contractor shall submit MSDS (Material Safety Data Sheet) for all chemicals, solvents, and materials specified or proposed to be used on this project.

23. Architect's/Engineer's Seal

In accordance with Rules and Regulations of the New York State Education Law, Title 8, Part 69.5(b), to all plans, specifications and reports to which the seal of an architect has been applied, there shall also be applied a stamp with appropriate wording warning that it is a violation of the law for any person, unless acting under the direction of a licensed architect, to alter an item in any way. If an item bearing the seal of an architect is altered, the altering architect shall affix to his item the seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration.

24. Construction Permit

The Code Compliance Manager for the State University Campus will, as required by law, issue a Construction Permit for this Project. The project is not subject to any local building code or permit requirements, except for work that the Contractor is to perform on property located outside of the boundaries of the campuses of the State University of New York.

25. Other Contracts

There may be other contracts let for work to be done in adjacent areas and, as such, this Contractor and such other contractors shall coordinate their work to conform with progressive operation of all the work covered by such contracts, and afford each other reasonable opportunities for the introduction and storage of their supplies, materials, equipment, and the execution of their work.

26. Asbestos

If the work to be done under this contract contains the abatement of asbestos the following shall apply:

- a. Applicable Regulations - All work to be done under this Contract shall be in compliance with Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (cited as 12 NYCRR Part 56) as amended effective November 9, 1994.
- b. Applicable Variance - The abatement contractor is responsible for obtaining any variance not issued to date that he feels may be applicable to the policies/procedures as set forth in 12 NYCRR Part 56.
- c. Owner Project Fact Sheet -The Contractor shall complete and submit as much information as possible on the Asbestos Material Fact Sheet to the University in triplicate prior to the project startup. Completion of the Fact Sheet shall be submitted prior to acceptance.

- d. Patent Infringement - The State University of New York and the State University Construction Fund have been given notice by a law firm representing GPAC, Inc. that the use of its process/procedure for asbestos containment and removal constitutes a patent infringement. All potential contractors are hereby notified that they may have to obtain a license to use certain patented Negative Air Containment systems, and that any liability of the University in connection therewith is covered by Section 2.21 of the Agreement. Therefore, all potential contractors are hereby notified that after opening of the bids they must advise the University as to the system they intend to use for Negative Air Containment and provide the University with either a copy of their license to use the same or written documentation, signed by an authorized officer of their surety, that their performance bond guarantees the Contractor's indemnification covering patent claims.
- e. Air Monitoring - The abatement contractor shall be responsible for hiring and paying an independent third party firm to perform the requirements of air monitoring as called for in Subpart 56-17 of 12 NYCRR Part 56.
- f. Testing - The University and Campus reserve the right to employ an independent testing laboratory to perform testing on the work and air sampling. The Contractor shall be required to cooperate with the testing laboratory.
- g. Disposal Procedures - It is the responsibility of the asbestos contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The asbestos contractor must comply fully with these regulations, all appropriate U.S. Department of Transportation, EPA and Federal, State and local entities' regulations, and all other then current legal requirements. Submit originals or copies of all pertinent manifests in triplicate to the University.
- h. Submittals - Prior to commencement of the work on this project, the Contractor must submit the following to the University:
- 1). Copy of original insurance policy.
 - 2). Copy of Department of Labor notification.
 - 3). Owner Fact Sheet.
 - 4). Copy of EPA notification.
- i. Special Requirements -
- 1) Size, location, and quantities of all pipes, joints, ducts, valves, tees, etc. must be field verified by all prospective bidders. Information given on the drawings and specifications is for general orientation and information only.
 - 2) The Contractor shall have at least one English-speaking supervisor on the job site at all times while the project is in progress.
 - 3) Prior to the commencement of work involving asbestos demolition, removal, renovation, the Contractor must submit to the University the name of its on-site asbestos supervisor responsible for such operations, together with documentation that such supervisor has completed an Environmental Protection Agency-approved training course for asbestos supervisors.

27. Wage Rates and Supplements

The rates of wages and supplements determined by the Industrial Commissioner of the State of New York as Prevailing in the locality of the site at which the work will be performed can be found at:

<https://applications.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1473421>

The Prevailing Wage Case Number (PRC#) assigned to this project is: **2019001894**

Special Conditions for Construction

Part 1 – Use of Premise

1.1 General

- A. Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. *For purposes of this provision, "site" shall include all existing structures.*
- B. The Building in which the Work is to be performed is currently occupied by residential areas, offices and/or classrooms. Each Contractor shall have limited use of premises for construction operations, including use of Project site, during the construction period. Each Contractor's use of premises is limited only as outlined in this section and/or any other section of the specifications, or at the College's discretion, to perform work or to retain other contractors on portions of Project.
- C. Coordination with Other Contractors:
 - 1). The Contractor will need to have their portion of the Work coordinated with other Contractors working on the site so that their work conforms to the progressive operation of all the work covered under other contracts that the College has let on this site.
 - 2). Each Contractor shall afford other Contractors reasonable opportunities for the introduction and storage of their supplies, materials, equipment, and execution of their work.
 - 3). If the Contractor or such other contractors contend that their work of the progress thereof is being interfered with by the acts or omissions of the others or that there is a failure to coordinate or properly arrange the sequence of the work on the part of the Contractor or such other contractors, they shall, within five (5) working days of the commencement of such interference or failure of coordination or failure to perform work in proper sequence, give written notification to the College of such contention. Upon receipt of such notification or on its own initiative, the College shall investigate the situation and issue such instructions to the Contractor or such other contractors with respect thereto as it may deem proper. The College shall determine the rights of the Contractor and of such other contractors and the sequence of work necessary to expedite the completion of the work covered by said other contracts.
- D. All work is to be conducted in such a manner as to cause a minimum degree of interference with the College's operations and academic schedule. Contractor is to coordinate their work with the College's classroom schedule.
- E. The Contractor and its employees shall comply with all College regulations governing conduct, access to the premises, and operation of equipment.
- F. Maintain all paths of egress and keep clear of all materials and debris.
- G. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, and other adjacent occupied or used facilities without written permission from College.
- H. Should it become necessary, in the judgment of the College, at any time during the course of the Work to move materials which are stored on the site and equipment which has been temporarily placed thereon, the Contractor upon request of the College shall move them or cause them to be moved at its sole cost and expense; provided, however, if materials and equipment that have been stored or placed by the Contractor at a location on the site expressly approved, in writing, by the College and the same are moved or caused to be moved by the Contractor at the College's request, such removal shall be deemed extra work and the Contractor shall be compensated.

1.2 Campus Regulations

- A. The contractor and his/her employees, subcontractors, etc., will not fraternize with any building or campus occupants. This includes but is not limited to students, faculty, and employees of the State other than those designated, visitors and guests. At no time will it be appropriate to say anything derogatory to the above referenced individuals. Harassment, verbal or otherwise, of the above referenced individuals will **not** be tolerated. If an incident arises, the Contractor will be directed to **permanently remove** the employee from the site.

- B. No drugs are permitted on campus.
- C. No smoking is permitted in the buildings.
- D. The contractor, employees and sub-contractors are required to stay within the construction boundary lines at all times.
- E. The contractor, employees, and sub-contractors must recognize the fact that this is an institute for learning. Flexibility will be required during certain times of the academic year.

1.3 Use of Permanent Utilities

- A. As the building is still under construction, when each permanent utility is operational, it may be used for construction purposes, if acceptable, in writing, by the College. The written request for permission for use of the system from the College shall include, as a minimum, the conditions and reasons for use and provisions for and effect on equipment warranties. In the event that the College accepts the Contractors use of the permanent utility for the balance of the Work, the Contractor shall be fully responsible for it, and shall pay all costs for operation, power, restoration and maintenance of same.
- B. If the existing facilities are not adequate for the Contractor, locate temporary facilities where they will serve Project adequately and result in minimum interference with performance of the Work and disruption to the College. Any temporary facilities location is to be reviewed and approved by College's Representative.

1.4 Storage and Staging of Materials

- A. The following shall apply to this project
 - 1). The Contractor shall store materials and equipment within areas designated by the College.
 - 2). Security for stored equipment and materials shall be the responsibility of the Contractor.
 - 3). No vehicles will be permitted on the Plaza. Any and all materials and/or equipment brought or stored on the Plaza shall not exceed the maximum weight limit of 150 psf.
 - 4). Access to the construction site for delivery of materials and equipment is limited. Temporary parking for the loading and unloading of the same shall be arranged only with prior approval of the College.
 - 5). The Contractor shall at all times keep access routes, and parking and staging areas clean of debris and other obstructions resulting from the work.

1.5 Temporary Power for Construction Activities

- A. Electrical energy, as it exists within the work area, will be available at **no** cost to the Contractor from existing outlets or panels from locations approved by the College. As this site is still under construction, if electrical power is not available in the area of work, it is the Contractor's responsibility to provide necessary power to perform the Work. Typically available power may be used for small power tools (not exceeding ½ HP).

1.6 Temporary Lighting / Heating & Cooling / Water

- A. Electrical lighting, as it exists within the work area, is available to the contractor at **no** cost. As this site is still under construction, if electrical lighting is not available in the area of work, it is the Contractor's responsibility to provide necessary temporary equipment to perform the Work at its cost.

1.7 Temporary Sanitary Facilities

- A. Toilet, Water, and Drinking Water Facilities: The Contractor shall make arrangements with the College for use of the existing toilet, water, and drinking water facilities. It is the Contractor's responsibility to maintain the facility during the construction and restore to original state upon completion of the project.

1.8 Temporary Parking

A. Contractor is to abide to the following:

- 1). The Contractor and its employees shall be subject to all the rules and regulations of the College, including parking regulations. The College is regulated by New York State Vehicle and Traffic Laws.
- 2). The Contractor and its employees shall only park in the designated areas in Lot #W-2. There shall be no parking in other areas of the campus (unless prior written authorization is provided by the College Chief of Police).
- 3). Parking violations are subject to fines and are the sole responsibility of the Contractor or its employees. Vehicles that are parked illegally may be towed at the expense of the owner/driver.
- 4). All vehicles are required at all times to register with the College's Public Safety Unit.
- 5). There is \$35.00 fee for parking permits. The fee is per vehicle and permits need to be display whenever the vehicle is parked on campus.

1.9 Temporary Support Facilities

- A. Construction Aids: Provide all items, such as lifting devices, all scaffolding, staging, platforms, runways, ladders; and all temporary flooring, as required by the various trades for the proper execution of the Work. Provide such construction aids with proper guys, bracing, guards, railings and other safety devices as required by the governing authorities and OSHA.
- B. Elevator and Loading Dock Usage: The Contractor shall make all arrangements with the College's Representative for the use of elevators as required for transporting material and workmen to the work areas and for the disposal of rubbish and waste materials.

1.10 Safety and Protection of Facilities

- A. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the Faculty and Staff, students, the work, and the property at all times, including Saturdays, Sundays, holidays, and other times when no work is being done. The Contractor shall submit a safety plan which shall be certified by a Certified Safety Professional from the Board of Certified Safety Professionals (www.bcspp.org).
- B. The Contractor shall erect, maintain and remove appropriate barriers or other devices, including mechanical ventilation systems, as required by the conditions of the work for the protection of the users of the project area, adjoining areas, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA and National Fire Prevention Association 241, for safeguarding of structures during construction.
- C. Fire safety during construction:
- 1). The Contractor shall provide all temporary equipment, labor and materials required for compliance with the applicable provisions of Chapter 14, Fire Safety during Construction and Demolition, of the Fire Code of New York State.
 - 2). For areas and spaces under their control, the Contractor shall comply with Chapter 14 of the Fire Code of New York State, titled "Fire Safety during Construction and Demolition". Subject to approval by the College's Consultant and the College, the Contractor shall designate one person as the **fire prevention program superintendent**. This superintendent shall be responsible for the fire prevention program required by Section 1408 of the Fire Code of New York State and implementing the minimum safeguards for construction, alteration, and demolition operations that provide reasonable safety to life and property from fire during the Contractor's operations. Responsibilities also include developing and maintaining pre-fire plans per 1408.2, the training of the Contractor's workforce per 1408.3, maintenance of the fire protection equipment per 1408.4, supervising hot work operations per 1408.5, and implementing temporary impairment to existing fire protection systems per 1408.6 & 1408.7. This superintendent shall also provide periodic written reports at the field meetings and respond to questions raised concerning compliance with Chapter 14 of the Fire Code of New York State.

D. Contractor shall comply with Labor Law Section 220-h; provide workers certified as having successfully completed the OSHA 10-hour construction safety and health course; and comply with applicable NYS DOL rules and regulations for monitoring and reporting compliance.

E. Temporary Fire Protection:

- 1). If the existing building is to be partially occupied during the course of the project, all existing exits and fire protection systems shall be continuously maintained in the occupied spaces/phases, or other measures must be taken which in the opinion of the College's Consultant and/or College will provide equal safety. Those portions occupied by the College must be available for their use 24hours a day, seven days a week during the contract period unless otherwise scheduled in these documents. Comply with all applicable State and Federal codes and regulations. The cost of all labor, fire watches, variances, materials, installations, maintenance and removal of such temporary fire protection systems or modifications to the existing systems are the responsibility of the Contractor.

F. Fire Watch Requirements:

- 1). If any of the work of the Contractor;
 - a) Disables any fire suppression systems, standpipes systems, fire alarm systems, fire detection systems, smoke control systems and/or smoke vents as defined in Chapter 9 of the Fire Code of New York State (FCNYS).
 - b) Involves welding, cutting, open torches and other hot work as defined in Chapter 26 of the FCNYS and/or involves demolition activities that are hazardous in nature as defined in Chapter 14 of the FCNYS.

Then the Contractor shall provide a fire watch or perform the work during the hours where the building is scheduled by the College to be closed, in accordance with Section 901.7 of the FCNYS, for structures that have campus occupancy.

- 2). If a fire watch is required, the Contractor shall provide all labor that is required. The Contractor shall:
 - a) Contact the New York State Department of State Office of Fire Prevention and Control (OFPC) at 41 State Street, Albany, NY 12231-0001, Phone: (518) 474-6746, Fax: (518) 474-3240, e-mail: fire@dos.state.ny.us and obtain its currently amended recommendation for fire watch procedures. Review the OFPC recommendations and notify the College's Consultant and/or College Representative if there are significant discrepancies with the requirements of this section.
 - b) Review the fire watch procedures with the College's alarm monitoring staff (University Police – 914-251-6900) and the fire department prior to disabling a fire protection system. Submit a plan for the fire watch for approval by the College's Consultant and/or College Representative, and schedule a pre-system shutdown meeting with the College's Consultant and/or College Representative.
 - c) Employ, instruct and maintain competent fire watch personnel. Provide the sufficient number of dedicated personnel that are required to patrol all portions of the means of egress system in the facility in the period of time required.
 - d) Notify University Police (UPD) prior to and at the conclusion of the fire watch.
 - e) Employ competent personnel to fix the fire protection system (see section 1.11 below).
- 3). Fire Watch Duties: Personnel serving as a fire watch have the following duties:
 - a) Conduct periodic patrols of the entire facility as specified below.
 - b) Identify any fire, life or property hazards.
 - c) Notify the UPD if a fire is discovered by call (914-251-6911), with the exact address and type of emergency.
 - d) Notify occupants of the facility of the need to evacuate. If sirens or public address function of the alarm system are still functional, use them to assist with evacuation of the building.
 - e) Have access to at least one means of direct communication with UPD. A cell phone is acceptable.
 - f) Maintain a written log of fire watch activities.

- g) Have knowledge of the location and use of fire protection equipment, such as fire extinguishers. (Note: The fire watch will not perform fire-fighting duties beyond the scope of the ordinary citizen).
 - h) Perform no other duties that are not directly part of the fire watch duties.
- 4). Frequency of Inspections: Fire watch personnel should patrol the entire facility patrol every 30 minutes except in the following situations, where patrols shall be every 15 minutes:
 - a) The facility has people sleeping.
- 5). Record Keeping: A fire watch log should be maintained at the facility. The log should show the following:
 - a) Address of the facility.
 - b) Times that the patrol has completed each tour of the facility.
 - c) Name of the person(s) conducting the fire watch.
 - d) Records of communication(s) to the University Police.
 - e) Record of other information directed by the College's Consultant and/of the College Representative.

1.11 Modifications / Alterations to Campus Existing Fire Alarm Systems

- A. The Campus standard for its fire alarm is the Edwards Fire Alarm System. Any contractor working on the Campus fire alarm system must be a licensed fire alarm installer. Any contractor working on adding to or modifying the existing fire alarm system's programming, must be certified to work on an Edwards Fire Alarm System and provide proof of that certification.
- B. A Pre-Fire Alarm construction meeting will be required between the Contractor, their fire alarm sub-contractors, and the College's Representative prior to any fire alarm work occurring.
- C. Contractor shall coordinate all modifications and/or alternations to the existing building's fire alarm systems with the College's Representative. If the work shall affect the existing fire alarm system in adjoining areas, the contractor must submit, in writing, their plan to protect and maintain the systems in the adjoining spaces, to the College's Representative for the College's review and approval, at least 72 hours in advance.
- D. Where demolition and dust may impact existing fire alarm smoke heads, the contractor shall protect these heads prior to beginning any work and follow the College's protocol listed below. If smoke heads are protected during the day, while work is occurring, the Contractor must uncover these heads at the end of each work day before leaving the site. The area protected by covered smoke heads must be continuously monitored while the heads are covered. The fire alarm systems must be operational at all times during construction. In the event that there is a need to shut down the system, the Contractor must notify the College in writing at least 72 hours in advance and provide a Fire Watch for all of the areas affected by the shutdown during the times the systems are non-operational.
- E. Where work will impact the existing fire alarm system, the contractor's site supervisor must follow the following protocol:
 - 1) Contractor Supervisor to contact the College's University Police (251-6900) prior to beginning work for the day and let them know where work is occurring and which smoke heads are being covered or device made inoperable.
 - 2) Cover smoke heads and make scheduled devices inoperable. Call University Police once heads are covered.
 - 3) Contractor to perform scheduled work. The area must be continuously monitored while the smoke heads are covered.
 - 4) At the end of the work day, Contractor Supervisor to College's University Police and let them know smoke head covers are being removed. It's strongly recommended that Contractor let's day's dust settle and clean around the devices prior to removing protective covers to avoid unintended activation.

Part 2 – Party Responsibilities

2.1 Information and Services Required of the College

- A. Furnished Information: College shall furnish (if available) surveys, existing plans, or other required information describing physical characteristics, legal limitation and utility locations for the site of the Project, and a legal description of the site. These documents are for information purposes only. They are to be field verified by the Contractor for accuracy. The College will not be responsible if actual conditions vary from what is indicated on the documents. Plans will be released to awarded Bidder in PDF electronic format.
- B. College's Right to Stop the Work: If Contractor fails to correct Work which is not in accordance with the requirements outlined, or fails to carry out Work in accordance with the Contract Documents, the College, by written order signed personally or by an agent specifically so empowered by the College in writing, may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the College to stop the Work shall not give rise to a duty on the part of the College to exercise this right for the benefit of Contractor or any other person or entity.
- C. College's Right to Carry Out the Work: If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten (10) business-day period after receipt of written notice from College to commence and continue correction of such default or neglect with diligence and promptness, College may, without prejudice to other remedies College may have, correct such deficiencies. *College may offset* from payments then or thereafter due Contractor the cost of correcting such deficiencies, including compensation for Consultant's additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall pay the difference to the College.

2.2 Information and Services Required of the Contractor

- A. Review of Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with the information furnished by the College, and shall at once report to the College Representative errors, inconsistencies or omissions discovered.
- B. Review of Field Conditions: Contractor shall, *sufficiently in advance of undertaking the Work*, take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to Contractor with the Contract Documents. Errors, inconsistencies or omissions discovered shall be reported to the College Representative at once. *If Contractor performs any construction activity which involves an error, inconsistency or omission which Contractor knew of or should reasonably have known of, without notice to College, Contractor shall assume responsibility for such performance and shall bear all costs of correction.*
- C. Construction Schedule: Contractor, promptly after being awarded the Contract, shall prepare and submit for College Representative, a Contractor's construction schedule for the Work.

Project Schedule shall include the following:

- 1). Contractor's work plan and/or schedule shall be sufficiently detailed to show clearly, in sequence, all salient features of the work of each trade including: the anticipated time of commencement and completion of such work and the interrelationship between such work, submission of Shop Drawings and Samples for approval, approval of Shop Drawings and Samples, placing of orders of materials, fabrication and delivery of materials, installation and testing of materials, contiguous or related work under other contracts, and other items pertinent to the work. The Notice to Proceed may be withheld until this schedule is received and is deemed responsive to the project requirements.
- 2). The proposed working plan and schedule shall be revised by the Contractor until they are satisfactory to the College and the Consultant, and the same shall be periodically updated bi-weekly thereafter. Whether or not the Consultant and the College have accepted the Project Schedule, submit the Project Schedule to the College and the Consultant for acceptance at such time or times as the College or the Consultant may request.
- 3). The proposed working plan and schedule, including any revision or revisions thereof, when accepted by both the College and the Consultant will become the Schedule of Record (SOR). The SOR, as the same may be revised as stated above by the Contractor and accepted by the College and the Consultant, shall be strictly adhered to by the Contractor.

Milestone Dates & Summary Activities (example)

- 1) Notice to Proceed (Milestone Date)
- 2) Mobilization
- 3) Site Preparation & Foundations
- 5) Natural Gas Piping Installation
- 6) Natural Gas Main Tapping
- 7) Regulator Station Installation
- 8) Gas Pipe Testing
- 9) Backfill
- 10) Restoration
- 11) Substantial Completion (Milestone Date)
- 12) Start of Guarantee Period
- 13) Contract Completion Date (if different from above)
- 14) Final Completion - All punch list/outstanding items satisfied (Milestone Date)

D. Supervision:

- 1). Contractor shall supervise and direct the Work, using Contractor's best skill and attention. Contractor shall be solely responsible for and have control over *construction means*, methods, techniques, sequences and procedures *including safety programs and procedures*, and for coordinating all portions of the Work under the Contract.
- 2). Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Contract. Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.
- 3). Contractor shall be responsible for inspection of related portions of Work already performed, *as well as existing conditions*, to determine that such are in proper condition to receive subsequent Work.

E. Contractor shall be responsible to College for acts and omissions of Contractor's employees, Subcontractors and their agents and employees, and other *persons or entities directly or indirectly employed by them* performing portions of the Work under a contract with Contractor

F. Cutting and Patchwork:

- 1). Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.
- 2). Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying or load-deflection ratio.
- 3). Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety (i.e., mechanical systems, plumbing, fire alarm, etc.).
- 4). Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
- 5). Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
- 6). Dispose of demolished items and materials promptly.
- 7). Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- 8). Existing utilities services to the College must be maintained at all times. If the Contractor is required to affect these services in order to complete the Work, Contractor must obtain written permission from the College prior to this work (also see Special Requirements Section). Any damage or disruption of services shall need to be repaired immediately and at the Contractor's expense.

G. Hot Work Permits:

- 1) If the work requires any Hot Work (including cutting, welding, Thermit welding, brazing, soldering (except soldering electronics or electrical components with an electric soldering iron or gun), grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems or any other similar situation), the

Contractor shall be required to obtain a Hot Work Permit issued by the College. The Contractor shall request this through the College Representative, and be given a copy of the College's "Hot Work Guidelines and Permit Process" and the permit forms to be filled out. The Contractor must request, submit, and be given a permit before any Hot Work begins.

H. Cleaning Up:

- 1). Contractor shall *at all times* keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work Contractor shall remove from and about Project waste materials, rubbish, Contractor's tools, construction equipment, machinery and surplus materials.
- 2). If Contractor fails to clean up as provided in the Contract Documents, College may do so and the cost thereof shall be charged to Contractor.
- 3). If a dispute arises among Contractor, separate contractors and College as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described above, College may clean up and allocate the cost among those responsible

I. Access to Work: Contractor shall provide College access to *all portions of* the Work in preparation and progress wherever located.

J. Contractor's Coordination with the Utility Companies:

- 1). The Contractor shall coordinate and cooperate with utility companies, including scheduling the work of other trades to sequence with the work schedule required by the utility companies.
- 2). The Contractor shall pay all costs associated with the work of the utility companies for extension and connection to their services on both a temporary and permanent basis. For gas services, standard fees and special fees for the specified pressure are required.
- 3). The Contractor shall accept the form of contract proposed by the utility companies without exception.
- 4). The Contractor shall provide any riders, amendments, etc. to its own insurance policies that it deems proper to cover the work of utility companies in accordance with the agreement or to cover other liabilities that may arise from the contractor's relationship with the utility companies on this project.
- 5). The Contractor shall provide prompt payments to utility companies as required to advance their work, but accept payment for such work from the College in accordance with the Agreement.
- 6). This project includes work to be performed by the following utility companies:

NAME	Contact	Telephone number
Con Edison	Steven Bell	914-925-6157

2.3 Communications Protocol for Contract Administration

- A. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, Contractor shall communicate through the College Representative to the College. Communications by and with College's consultants shall be through College Representative. Communications by and with Subcontractors and material suppliers shall be through Contractor.

Part 3 – Construction Administration Management

3.1 Project Meetings

- A. Periodic job meetings will be scheduled by the Consultant and the University during the course of construction. The Contractor, and, upon request of the Consultant and the University, its principal subcontractors and manufacturer's representatives, shall attend such meetings and be prepared to furnish answers to questions on progress, workmanship, or any other subject on which the Consultant and the University might reasonably require information.
- 1) In addition to the requirements of the Agreement, the Contractor shall submit bi-weekly reports to the Consultant summarizing the last two weeks of work and next two weeks of work anticipated, listing the

percent of work complete by trade, tabulating manpower utilized / projected, relevant shop drawing and submittals progress, relevant offsite fabrication progress and providing other information which may be reasonably required to understand the progress of the work.

- 2) In addition to the above referenced meetings, the Contractor shall schedule and manage periodic coordination meetings at the site between it and all its trades, subcontractors, suppliers, manufacturers, etc. to settle the allotment of work per the Agreement and to review progress on submittals and shop drawing, progress on installation of the work, conflicts between work of trades, compliance with the design intent, adherence to the Contractor's schedule, quality control, planning for commissioning and training of campus personnel, and other items which require coordination and sharing of information. Representatives of the Consultant and the University may attend these meetings to observe and make comments. These meetings shall be held a minimum of once per month and more frequently where required to effectively coordinate the construction. The Contractor shall prepare and distribute summary minutes of these meetings within (5) five working days of the meeting, in accordance with the "Document Tracking and Change Control Paragraph" of this section. Distribution of the coordination meeting minutes shall be to all attendees with copies to the University and Consultant whether they are in attendance or not.
- 3) The personnel representing the Contractor and its principal subcontractors shall have the authority to make decisions directly affecting the work.
- 4) In addition to the above meetings, meet to review fire safety periodically during the work and, starting approximately (16) sixteen weeks prior to the scheduled date of substantial completion, the Contractor's principals, project manager and those of its significant subcontractors shall attend additional weekly meetings with the Owner and its consultant(s) to review the progress on preparing close out deliverables, including those in Sections Operating Instructions and Manuals, Warranties, and Training of Campus Personnel.

3.2 Requests for Information

- A. In the event that the Contractor determines that some portion of the Drawings and Project Manual for the project requires clarification or interpretation by the Consultant, the Contractor shall submit a Request for Information (RFI) in writing to the Consultant. The Contractor shall create an RFI log in a format approved by the Consultant. Submit the RFI log to the consultant prior to each periodic Field Meeting. Update the RFI log to reflect comments received at the Field Meetings. The Contractor shall define the issue that requires clarification or interpretation in clear and concise language as follows:
 - 1) The Contractor shall customize RFI forms and logs for this project and submit them to the Consultant for review and approval prior to submission of any RFIs.
 - 2) Forms should include provisions for the Consultant's response, Contractor acceptance of response or rephrasing of question, and the Consultant's additional response if requested.
 - 3) Forms should include provisions for locating the issue within the building, by room number, name and nearest columns.
 - 4) RFIs shall confirm that reasonable locations for the information required have been reviewed and document those locations by specific references to the Drawings and Project Manual on the RFI.
 - 5) The Contractor shall review the RFI for systemic or global implications, including review of other pending RFIs and work of other phases, so that the final RFI submitted represents a reasonable consolidation of similar requests.
 - 6) The Contractor shall coordinate and review the RFIs originating from its trades, subcontractors, suppliers, manufacturers, etc. for compliance with this process, including polling them and meeting with them onsite to review the issue prior to its submission as an RFI. The Consultant may attend such meetings.
 - 7) Contractor to coordinate response from Consultant with subcontractors.

- 8) The RFI shall contain a description of what the Contractor believes to be the intent of the design documents, with due regard to the Agreement, along with reasons why the RFI is required.
 - 9) RFIs shall only be submitted on the approved forms.
 - 10) RFIs that do not comply with the above requirements will be returned to the Contractor for revision and resubmission.
- B. The Consultant will review all RFIs to determine whether they are RFIs within the meaning of this term as defined above. If the Consultant determines that the document submitted is not an RFI, it will be returned to the Contractor un-reviewed as to content, for resubmission in the proper manner and it will be removed from the RFI log.
- C. The Consultant will respond to all RFIs within (10) ten business days of its receipt, unless the Consultant determines that a longer time is required for an adequate, coordinated response. If the longer response time is deemed necessary, the Consultant will notify the Contractor of that necessity and indicate when the response will be completed within (10) ten business days of its original receipt.
- D. Based on projects of similar complexity, it is anticipated that there may be up to (15) fifteen RFIs on this project and that multiple responses may be required to adequately answer each RFI.
- E. Responses to RFIs shall not change any requirements of the documents.

3.3 Notice of Non-Compliance

- A. In the event the Consultant views the work or some portion thereof and finds that it has not been performed in accordance with the requirements of the contract documents, a Notice of Non-Compliance will be issued to the Contractor for action. Payment shall not be made for any portion of the work for which a Non-Compliance Notice has been issued and the work not corrected to the satisfaction of the Consultant.
- B. Upon receipt of a Non-Compliance Notice the Contractor shall provide a written response to the Notice within ten (10) working days after receipt of the Notice. The Contractor's response shall detail either:
- 1) Why they believe that the work was performed in accordance with the contract documents, or,
 - 2) What corrective action they intend to take, at their sole expense, to correct the non-conforming work.
- C. Refer to the Agreement for Contractors contention to the decision.

3.4 Warranties

- A. Provide warranties for products, equipment, systems and installations required by other technical sections of Contract Documents for duration indicated. Warranties shall be individually listed in the project specific submittal log required by Shop Drawings and Samples.
- 1) All warranties required by Contract Documents shall commence on date of Substantial Completion shown on Page a-1 of the Agreement.
 - a). At no additional cost to the College, for products, equipment, systems and installations completed prior to the date of Substantial Completion, obtain and pay for warranty extensions that cover the additional time between the earlier date of their completion and the date of Substantial Completion.

- 2) Provide a list of all Contractor provided warranties that are specified in Divisions 1 through 48, inclusive, and list who will inspect the work covered by the warranty (if applicable), when it will be done, who witnessed it and when, results (pass/fail), follow up action, comments and other information requested by the Consultant.
 - a) Unless otherwise approved by the College, all inspections must be witnessed and signed off by the Consultant prior to acceptance of Contractor provided warranties that are specified in Divisions 1 through 48, inclusive.
 - b) The Consultant will reject a Warranty issued prior to or without the manufacturer's field inspection of the work, if required in Divisions 1 through 48, inclusive.
- 3) Unless otherwise approved by the Consultant and if required in Divisions 1 through 48, inclusive, the scheduled value of a Contractor provided warranty in the Contract Breakdown required by the Agreement shall be 5% of the amount of the work being warrantied.
- 4) Furnish and organize original warranties in a separate binder with a durable plastic cover. Organize the binder into separate sections by CSI number based on the table of contents of the project manual. Internally subdivide the binder contents with permanent page dividers, logically organized as described below, with tab titles clearly printed under reinforced laminated plastic tabs. Provide a printed Table of Contents.
 - a) Warranties shall be in the form required by the applicable technical sections of Contract Documents. Include procedures to follow and required notifications for warranty claims.
 - b) Warranty Certification: Written certification from the warrantor that the warranty is in effect and non-retractable due to any of the specified conditions. Warranties submitted without warranty certification will not be accepted.
 - c) Deliver the binder to the Consultant with the written notice of Substantial Completion required by the Agreement.
- 5). For uncompleted work delayed beyond date of Substantial Completion, provide updated binder submittal within (10) ten days after acceptance, indicating date of acceptance as start of warranty period for any work delayed beyond date of Substantial Completion.

Applications for payment after the date of Substantial Completion may not be approved until the warranty certification and warranty documents are delivered to the Consultant.

End of Special Conditions for Construction

State University of New York AGREEMENT

Contract No. _____

This Agreement made as of the _____ day of _____, 20____, for Contract Number _____ by and between STATE UNIVERSITY OF NEW YORK, a corporation organized and existing under the laws of the State of New York, with its principal office located at State University Plaza, Albany, New York 12246, on behalf of State University of New York at Purchase College located at 735 Anderson Hill Road, Purchase, New York 10577 hereinafter referred to as "University" and _____ having its principal office located at _____, hereinafter referred to as "Contractor".

Federal ID or
Social Security No. _____

The University and the Contractor agree as follows:

1. The Contractor shall (a) furnish and perform all work of every kind required, and all other things necessary to complete, in the most substantial and workmanlike manner, the construction of Project Number **SU-021919**, titled **New Natural Gas Pipeline Installation Project**, in strict accordance with the Contract Documents; (b) complete all work necessary for substantial completion within **100** days of contract award, or within the time to which such completion may have been extended in accordance with the Contract Documents; (c) in the event it fails to substantially complete all the work on time, the Contractor agrees to pay to the University liquidated damages in accordance with paragraph 1 of the Proposal for each calendar day of delay in substantially completing the work; and (d) do everything required by the contract; subject however to the terms, provisions and conditions listed hereinafter
2. The University shall pay and the Contractor shall accept for the performance of work of the above referenced Project, the total contract compensation of \$_____, (in figures), _____ (in word)s.

ARTICLE I

General Provisions

Section 1.01 Definitions

Where the following words and expressions are used in the Contract Documents it is understood that they have the meaning set forth as follows:

CONSULTANT	The Architect, Engineer, Landscape Architect, or Surveyor named in the Notice to Bidders or such other person or firm designated by the University to provide general administration of the Contract and inspection of the work.
BIDDING DOCUMENTS	Notices to Bidders, Information for Bidders, and Proposal
BONDS	Performance Bond and Labor and Material Bond
CONTRACT OR CONTRACT DOCUMENTS	The Agreement, Project Manual, Proposal, Bonds, Specifications, Contract Drawings, Addenda issued prior to the opening of bids and Change Orders issued after the award of the Contract.
UNIVERSITY	State University of New York
NOTICE OF AWARD	Letter of Intent
PROJECT	The facility or facilities to be constructed including all usual, appropriate and necessary attendant work shown on, described in or mentioned in the Contract.
SITE	The area within the Contract limit lines, as shown on the Drawings, and all other areas upon which the Contractor is to perform work.
WORK	The using, performing, installing, furnishing and supplying of all materials, equipment, labor and incidentals necessary or proper for or incidental to the successful completion of the Project and the carrying out of all duties and obligations imposed upon the Contractor by the Contract.
NOT IN CONTRACT, "N.I.C."	Indicates equipment furnished by the Owner and installed under another construction contract or by

another contractor, or operations at the site not included as part of this Contract.

PROVIDE, PROVIDED

Mean that the Contractor shall furnish and install all materials and labor for the item so specified.

Section 1.02 Captions

The titles or captions of Articles and Sections of the Contract are intended for convenience and reference purposes only and in no way define, limit or describe the scope or intent thereof or of the Contract or in any way affect the Contract.

Section 1.03 Nomenclature

Materials, equipment or other work described in words which have a well-known, technical or trade meaning shall be interpreted as having such meaning in connection with the Contract.

Section 1.04 Contract Documents

- (1) This agreement
- (2) Exhibit A and A-1
- (3) Here the list of the remaining contract exhibits and appendix should be cited.

The Contract, together with all exhibits thereto, constitutes the entire agreement between the parties hereto and no statement, promise, condition, understanding, inducement or representation, oral or written, expressed or implied, which is not contained herein shall be binding or valid and the Contract shall not be changed, modified, or altered in any manner except by an instrument in writing executed by the parties hereto.

Section 1.05 Successors and Assigns

To the extent allowed by the terms of "Exhibit A", the Contract shall bind the successors, assigns and representatives of the parties hereto. The University reserves the right to have the State University Construction Fund (Fund) act on its behalf at any time or duration of this Agreement. Such designation of the Fund to act on the behalf of the University shall be in writing and addressed to the Contractor and signed by the University.

Section 1.06 Accuracy and Completeness of Contract Documents

- (1) The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. The intention of the Documents is to include all materials, plant, equipment, tools, skill and labor of every kind necessary for the proper execution of the work and also those things which may be reasonably inferable from the Contract Documents as being necessary to produce the intended results.
- (2) The Contract Documents contemplate a finished piece of work of such character and quality as is reasonably inferable from them. The Contractor acknowledges that the contract consideration includes sufficient money allowance to make its work complete and operational and in compliance with good practice and it agrees that inadvertent minor discrepancies or omissions or the failure to show details or to repeat on any part of the Contract Documents the figures or notes given on another shall not be the cause for additional charges or claims. In case of a conflict between any part or parts of the Contract Documents with any other part or parts thereof, as contrasted with an omission or failure to show details or to repeat on any part of the Contract Documents the figures or notes given on another part thereof, the following shall be given preference, in the order hereinafter set forth, to determine what work the Contractor is required to perform: (a) Addenda (later dates to take preference over earlier dates); (b) Amendments to Agreement; (c) Agreement; (d) Specifications; (e) Schedules; (f) Large scale detail Drawings (detail drawings having a scale of 3/4" and over); (g) Large scale plan and section Drawings (plan and section drawings having a scale equal to or larger than that used for the basic floor or site plan, as the case may be); (h) Small scale detail Drawings (detail drawings having a scale of less than 3/4"); and (i) Small scale plan and section Drawings (plan and section drawings having a scale less than that used for the basic floor or site plan, as the case may be). In the event of such a conflict between or among parts of the Contract Documents that are entitled to equal preference, the more expensive way of doing the work, the better quality or greater quantity of material shall govern unless the University otherwise directs.

Section 1.07 Organization of Contract Documents

The Specifications and Drawings are generally divided into trade sections for the purpose of ready references, but such division is arbitrary and such sections shall not be construed as the prescription by the Consultant or the University of the limits of the work of any subcontractor or as a determination of the class of labor or trade necessary for the fabrication, erection, installation or finishing of the work required. The Contractor will be permitted to allot the work of subcontractors at its own discretion regardless of the grouping of the Specifications and Drawings. It shall be the Contractor's responsibility to settle definitively with each subcontractor the portions of the work which the latter will be required to do. The University and the Consultant assume no responsibility whatever for any jurisdiction claimed by any of the trades involved in the work.

Section 1.08 Furnishing of Contract Documents

The Contractor shall be furnished, free of charge, with as many copies of the Specifications and Drawings as it may reasonably request, in the judgment of the University, within fifteen (15) working days after the Notice of Award. Any other copies of the Specifications and Drawings which the Contractor may desire can be obtained by it from the Consultant at the latter's cost of duplication thereof.

Section 1.09 Examination of Contract Documents and Site

By executing the Contract, the Contractor agrees: that it has carefully examined the Contract Documents together with the site of the proposed work as well as its surrounding territory; that it is fully informed regarding all the conditions affecting the work to be done and the labor and materials to be furnished for the completion of the Contract; and that its information has been acquired by personal investigation and research and not in the estimates and records of the University.

Section 1.10 Invalid Provisions

If any term or provision of the Contract Documents or the application thereof to any person, firm or corporation or circumstance shall, to any extent, be invalid or unenforceable, the remainder of the Contract Documents, or the application of such terms or provisions to persons, firms or corporations or circumstances other than those to which it is held invalid or unenforceable, shall not be affected thereby and each term or provision of the Contract Documents shall be valid and be enforced to the fullest extent permitted by law.

Section 1.11 No Collusion or Fraud

Reference "Exhibit A" which is attached to and made a part of this Agreement.

Section 1.12 Notices

Any notice to either party hereunder must be in writing signed by the party giving it and shall be served either personally, by facsimile or registered mail of the United State Post Office and individuals indicated below:

TO THE UNIVERSITY: To the Director of Purchasing at the campus where the project is located.

and a copy to: Vice Chancellor for Capital Facilities
State University of New York
State University Plaza
Albany, New York 12246

TO THE CONTRACTOR: At the address indicated on page 1 of this Agreement
Or to such other addressee as may be hereafter designated by notice. All notices become effective only when received by the addressee.

Section 1.13 Singular-Plural; Male-Female

As used in the Contract Documents, the singular of any word or designation, whenever necessary or appropriate, shall include the plural and vice versa, and the masculine gender shall include the female and neuter genders and vice versa.

ARTICLE II

Contract Administration and Conduct

Section 2.01 Consultant's Status

- (1) The Consultant, as the University's representative, shall provide general administration of the Contract and inspection of the work. The Consultant will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the work, and it will not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents. The Consultant's duties, services and work shall in no way supersede or dilute the Contractor's obligation to perform the work in conformance with all Contract requirements, but it is empowered by the University to act on its behalf with respect to the proper execution of the work and to give instructions when necessary to require such corrective measures as may be necessary, in its professional opinion, to insure the proper execution of the Contract or to otherwise protect the University's interest.
- (2) The Consultant shall have the authority to stop the work or to require the prompt execution thereof whenever such action may be necessary, in its professional opinion, to insure the proper execution of the Contract or to otherwise protect the interests of the University.
- (3) Except as otherwise provided in the Contract, the Consultant shall determine the amount, quality, acceptability, fitness and progress of the work covered by the Contract and shall decide all questions of fact which may arise in relation to the interpretation of the plans and Specifications, the performance of the work and the fulfillment by the Contractor of the provisions of the Contract. The Consultant shall in the first instance be the interpreter of the provisions of the Contract and the judge of its performance and it shall use its power under the Contract to enforce its faithful performance.

Section 2.02 Finality of Decisions

- (1) Any decision or determination of the Consultant under the provisions of the Contract shall be final, conclusive and binding on the Contractor unless the Contractor shall, within ten (10) working days after such decision, make and deliver to the University a verified written statement of its contention that the decision of the Consultant is contrary to a provision of the Contract. The University shall thereupon determine the validity of the Contractor's contention. Pending decision by the University, the Contractor shall proceed in accordance with the Consultant's decision.
- (2) Wherever it is provided in the Contract Documents that an application must be made to the University and/or determination made by the University, the University's decision on such application and/or its determination under the Contract Documents shall be final, conclusive and binding upon the Contractor unless the same shall be determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary or so grossly erroneous as necessarily to imply bad faith and unless the Contractor, within ten (10) working days after receiving notice of the University's decision or determination, files a written statement with the University and the Consultant that it reserves its rights in connection with the matters covered by said decision or determination.

Section 2.03 Claims and Disputes

- (1) If the Contractor claims (i) that any work it has been ordered to do is extra work or (ii) that it has performed or is going to perform extra work or (iii) that any action or omission of the University or the Consultant is contrary to the terms and provisions of the Contract, it shall:

- a. Promptly comply with such order;
 - b. File with the University and the Consultant, within five (5) working days after being ordered to perform the work claimed by it to be extra work or within five (5) working days after commencing performance of the extra work, whichever date shall be the earlier, or within five (5) working days after the said action or omission on the part of the University or the Consultant occurred, a written notice of the basis of its claim and request a determination thereof;
 - c. File with the University and the Consultant, within thirty (30) calendar days after said alleged extra work was required to be performed or said alleged extra work was commenced, whichever date shall be the earlier, or said alleged action or omission by the University or the Consultant occurred, a verified detailed statement, with documentary evidence, of the items and basis of its claim;
 - d. Produce for the University's examination, upon notice from the University, all its books of account, bills, invoices, payrolls, subcontracts, time books, progress records, daily reports, bank deposit books, bank statements, checkbooks and canceled checks, showing all of its actions and transactions in connection with or relating to or arising by reason of its claim, and submit persons in its employment and in its subcontractors' employment for examination under oath by any person designated by the University to investigate any claims made against the University under the Contract, such examination to be made at the offices of the Contractor; and
 - e. Proceed diligently, pending and subsequent to the determination of the University with respect to any such disputed matter, with the performance of the Contract and in accordance with all instructions of the University and the Consultant.
- (2) The Contractor's failure to comply with any or all parts of subdivision b of paragraph (1) of this Section shall be deemed to be (i) a conclusive and binding determination on its part that said order, work, action or omission does not involve extra work and is not contrary to the terms and provisions of the Contract; and (ii) a waiver by the Contractor of all claims for additional compensation or damages as a result of said order, work, action or omission. The provisions of subdivision b of paragraph (1) of this Section are for the purpose of enabling the University to avoid waste of public funds by affording it promptly the opportunity to cancel or revise any order, change its plans, mitigate or remedy the effects of circumstances giving rise to a claim or take such other action as may seem desirable and to verify any claimed expenses or circumstances as they occur. Compliance with such provisions is essential whether or not the University is aware of the circumstances of any order or other circumstances which might constitute a basis for a claim and whether or not the University has indicated it will consider a claim in connection therewith.
 - (3) No person has power to waive or modify any of the foregoing provisions and, in any action against the University to recover any sum in excess of the sum certified by the University to be due under or by reason of the Contract, the Contractor must allege in its complaint and prove at the trial compliance with the provisions of this Section.
 - (4) Nothing in this Section shall in any way affect the University's right to obtain an examination before trial or a discovery and inspection in any action that might be instituted by or against the University or the Contractor.

Section 2.04 Omitted Work

The University reserves the right at any time during the progress of the work to delete, modify or change the work covered by the Contract, by a Change Order thereto providing for either a reduction or omission of any portion of the work, without constituting grounds for any claim by the Contractor for allowances for damages or for loss of anticipated profits and in such event a deduction shall be made from the Contract consideration, the amount of which is to be determined in accordance with the provisions of Section 4.02 of the Agreement.

Section 2.05 Extra Work

- (1) The University reserves the right at any time during the progress of the work to add, modify or change the work covered by the Contract by a Change Order thereto providing for extra work of either a qualitative or quantitative nature and in such event the Contract consideration shall be increased by an amount to be determined in accordance with the provisions of Section 4.02 of the Agreement and the completion date for all or any part of the work shall be extended for such period of time as may be determined by the University as necessary, because of the extra work, to complete the work or any part thereof.
- (2) Nothing in the Contract Documents shall excuse the Contractor from proceeding with the extra work as directed and, except as otherwise specifically provided for in a Change Order, the terms and conditions of the Contract Documents shall be fully applicable to all extra work.
- (3) The Contractor shall have no claim for extra work if the performance of such work, in the judgment of the Consultant, is made necessary or desirable because of any act or omission of the Contractor which is not in accordance with the Contract.
- (4) Notwithstanding the provisions of Section 2.02 of the Agreement and any other provisions of the Contract Documents to the contrary, the University, after conferring with the Consultant, shall have the right to overrule a determination or decision of the Consultant, that relates to whether certain work is included in the Contract Documents or is extra work, which he or she believes is incorrect; in the event an officer exercises such right, his or her determination or decision shall be final, conclusive and binding upon the Contractor and the University unless the same shall be determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary or so grossly erroneous as necessarily to imply bad faith.

Section 2.06 Contractor to Give Personal Attention

- (1) The Contractor shall give its constant personal attention to all the work while it is in progress and shall place the working charge of a competent and reliable full-time superintendent acceptable to the Consultant and the University who shall have authority to act for the Contractor and who shall be accountable to the Consultant to the extent provided in the Contract. Unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in its employ, such superintendent shall not be changed without the written permission of the Consultant and the University.

- (2) When the Contractor and its superintendent are temporarily absent from the site of the work, the Contractor or its superintendent shall designate a responsible supervisory employee to receive such orders as the Consultant or its representative may give. At no time shall any work be conducted on the site in the absence of an individual present who has been so designated by the Contractor or its superintendent as having authority to receive and execute instructions given by the Consultant or its representative.

Section 2.07 Employment of Workers

The Contractor shall at all times employ competent and suitable workers and equipment which shall be sufficient to prosecute all the work to full completion in the manner and time specified. All workers engaged in specially or skilled work shall have had sufficient experience in such work to properly and satisfactorily perform the same. Should the Consultant deem any employee of the Contractor or any subcontractor incompetent, careless, insubordinate or otherwise objectionable or whose continued employment on the work is deemed by the Consultant to be contrary to the public interest, it shall so advise the Contractor and the latter shall dismiss or shall cause the subcontractor, if such employee is employed by the latter, to dismiss such employee and such employee shall not again be employed on the work to be performed under the Contract without obtaining the prior written approval of the Consultant.

Section 2.08 Detailed Drawings and Instructions

Upon timely notice by the Contractor that supplementary information is required, the Consultant shall furnish additional instructions, by means of Drawings or otherwise, necessary for the proper execution of the work. All such Drawings and instructions shall be consistent with the Contract Documents, true developments thereof and reasonably inferable therefrom. The work shall be executed in conformity therewith and the Contractor shall do no work without proper Drawings and/or instructions.

Section 2.09 Contract Documents to Be Kept at Site

The Contractor shall keep at the site of the work a copy of the Drawings and Specifications and shall at all times give the Consultant and the University access thereto.

Section 2.10 Permits and Building Codes

The Contractor shall obtain from the proper authorities all permits legally required to carry on its work, pay any and all taxes and fees legally required and shall be responsible for conducting its operations in accordance with the provisions of such permits. Except as otherwise expressly provided in the Contract Documents, all of the work covered by this Contract which is to be performed on property owned by the State University of New York is not subject to the building code of any city, county or other political subdivision of the State of New York. It is, however, subject to the provisions of the New York State Uniform Fire Prevention and Building Code and the applicable Federal and State health and labor laws and regulations. The building permit for the work shall be issued by the Campus Code Compliance Officer.

Section 2.11 Surveys

- (1) From the data shown on the Drawings and identified at the site by the Consultant, a licensed surveyor, to be designated and paid for by the University, shall establish one (1) fixed bench mark and one (1) fixed base line at the site. The Contractor shall work from the bench marks and base lines shown on the Drawings, identified at the site by the Consultant and established at the site by the aforesaid surveyor and shall establish such supplementary bench marks and base lines that are required in order for it to lay out the work. The Contractor shall be responsible for all measurements that may be required for execution of the work to the exact position and elevation as prescribed in the Specifications, shown on the Drawings, or as the same may be modified at the direction of the Consultant to meet changed conditions or as a result of modifications to the work covered by the Contract.
- (2) The Contractor shall furnish at its own expense such stakes and other required equipment, tools and materials, and all labor as may be required in laying out any part of the work. If, for any reason, monuments are disturbed, it shall be the responsibility of the Contractor to reestablish them, without cost to the University, as directed by the Consultant. The Consultant may require that construction work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed work or the work in progress.
- (3) In all multiple-story construction, the Contractor shall establish and maintain line marks at each floor level and grade marks four (4) feet above the finished floor at each floor level.

Section 2.12 Site Conditions

- (1) The Contractor acknowledges that it has assumed the risk and that the Contract consideration includes such provision as it deems proper for all physical conditions and subsurface conditions as it could reasonably anticipate encountering from the provisions of the Contract Documents, borings, rock cores, topographical maps and such other information as the University or the Consultant made available to it prior to the University's receipt of bids or from its own inspection and examination of the site prior to the University's receipt of bids.
- (2) In the event that the Contractor encounters subsurface physical conditions or other latent physical conditions at the site differing substantially from those shown on or described or indicated in the Contract Documents and which could not have been reasonably anticipated from the aforesaid information made available by the University or the Consultant or from the Contractor's aforesaid inspection and examination of the site, it shall give immediate notice to the Consultant of such conditions before they are disturbed. The Consultant will thereupon promptly investigate the conditions and, if it finds that they do substantially differ from that which should have been reasonably anticipated by the Contractor, it shall make such changes in the Drawings and Specifications as may be necessary and a Change Order shall be issued, the amount of which shall be determined in accordance with the provisions of Section 4.02, to reflect any increase or decrease in the cost of, or the time required for, performance of the Contract as a result of any of the aforesaid changes made by the Consultant and/or as a result of such unanticipated subsurface conditions.

Section 2.13 Right to Change Location

When additional information regarding the subsurface conditions becomes available to the University as a result of the excavation work, further testing or otherwise, it may be found desirable to change the location, alignment, dimensions or grades to conform to such conditions. The University reserves the right to make such reasonable changes in the work as, in its opinion, may be considered necessary or desirable, such changes and any adjustments in the Contract consideration as a result thereof are to be made in accordance with the provisions of Sections 2.04, 2.05 and 4.02 of the Agreement.

Section 2.14 Unforeseen Difficulties

Except as otherwise expressly provided in Section 2.12 of the Agreement and in other Sections of the Contract Documents, the Contractor acknowledges that it has assumed the risk and that the Contract consideration includes such provisions as it deems proper for any unforeseen obstacles or difficulties which it may encounter in the performance of the work.

Section 2.15 Moving Materials and Equipment

Should it become necessary, in the judgment of the Consultant, at any time during the course of the work to move materials which are stored on the site and equipment which has been temporarily placed thereon, the Contractor upon request of the Consultant shall move them or cause them to be moved at its sole cost and expense; provided, however, if materials and equipment have been stored or placed by the Contractor at a location on the site expressly approved, in writing, by the consultant and the same are moved or caused to be moved by the Contractor at the Consultant's request, such removal shall be deemed extra work and the Contractor shall be compensated therefore in accordance with the provisions of Section 4.02 of the Agreement.

Section 2.16 Other Contracts

- (1) Prior to and during the progress of the work hereunder the University reserves the right to let other contracts relating to the Project or in connection with work on sites within the Contract limit lines or adjoining or adjacent to that on which the work covered by this Contract is to be performed. In the event such other contracts are let, or have previously been let, the Contractor and such other contractors shall coordinate their work with each other, arrange the sequence of their work to conform with the progressive operation of all the work covered by such contracts and afford each other reasonable opportunities for the introduction and storage of their materials, supplies and equipment and the execution of their work. If the Contractor or such other contractors contend that their work or the progress thereof is being interfered with by the acts or omissions of the other or others or that there is a failure to coordinate or properly arrange the sequence of the work on the part of the Contractor or such other contractors, they shall, within five (5) working days of the commencement of such interference or failure of coordination or failure to perform work in proper sequence, give written notification to the University and the Consultant of such contention. Upon receipt of such notification or on its own initiative, the Consultant shall investigate the situation and issue such instructions to the Contractor or such other contractors with respect thereto as it may deem proper. The Consultant shall determine the rights of the Contractor and of such other contractors and the sequence of work necessary to expedite the completion of all work covered by this Contract in relation to the work covered by said other contracts.
- (2) The Contractor agrees that it has and will make no claim for damages against the University by reason of any act or omission to act by any other contractor or party or in connection with the Consultant's or University's acts or omissions to act in connection with such other contractor, but the Contractor shall have a right to recover such damages from the other contractors under a provision similar to the following provision which has been or will be inserted in the Contract with such other contractors.
- (3) Should any other contractor, having or who shall hereafter have a contract with the University relating to the Project or in connection with the work on sites adjoining or adjacent to that on which the work covered by this Contract is to be performed, sustain any damage, during the progress of the work hereunder, through any act or omission of the Contractor, the Contractor agrees to reimburse such other contractor for all such damages and it further agrees to indemnify and save harmless the University and the State of New York from all claims for such damages.
- (4) If the proper and accurate performance of the work covered by the Contract depends upon the proper performance and execution of work not included herein or depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the Consultant any defects in such work that render it unsuitable for proper execution and results. Its failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the execution of the work covered by the Contract, except as to latent defects which may be discovered thereafter.

Section 2.17 Inspection and Testing

- (1) All materials and workmanship shall be subject to inspection, examination and testing by the Consultant and the University at all times during the performance of the work and at all places where the work is carried on. Except as otherwise herein specified, the University shall pay for the cost of inspection, examination and testing by the Consultant or the University. If, however, the tests and any attendant re-inspection or re-examination prove that the materials and/or work tested do not meet the requirements of the Contract, then the entire cost of such tests is to be borne by the Contractor. The Consultant will have the right to reject defective material and workmanship furnished by the Contractor or require its correction. The Contractor, without charge therefore, shall satisfactorily and promptly correct all rejected work and replace all rejected material with proper material.
- (2) The Contractor shall promptly segregate and remove from the site of the work all rejected material and work. If the Contractor shall fail to proceed at once with the replacing of rejected material and/or correction of defective workmanship, the University may, by contract or otherwise, replace such material and/or correct such workmanship, and charge the costs thereof to the Contractor and/or it may cancel the Contract and terminate the Contractor's employment as provided in the Agreement.
- (3) The Contractor, without additional charge therefore, shall promptly furnish all reasonable facilities, labor and materials necessary for the safe and convenient inspection and testing that may be required by the Consultant or the University.
- (4) If the Contract Documents or the Consultant's instructions or the applicable laws, ordinances or regulations of any governmental authority

require any part of the work covered by the Contract to be specially tested or inspected, the Contractor shall give the Consultant timely notice of its readiness for such testing or inspection or, if the same is to be performed by a governmental authority, of the date fixed therefore. If any such work, without the written permission of the Consultant, should be covered up prior to such testing or inspection, the Contractor, at its sole cost and expense, must, if directed by the Consultant, uncover the same for testing or inspection and reconstruct the same after the tests or inspection are conducted. All certificates of inspection or testing, involving the Contractor's work, required to be obtained from governmental authorities are to be secured by the Contractor at its sole cost and expense.

- (5) Should it be considered necessary or advisable by the Consultant at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out same, the Contractor, upon request, shall furnish all necessary facilities, labor and material to perform such examination. If the work subject to such examination is found to be defective or nonconforming in any manner due to the fault of the Contractor or any of its subcontractors, such uncovering or destruction and necessary reconstruction, even though such includes work not covered in the Contract, shall be at the expense of the Contractor. If, however, such work after testing and examination is found to be satisfactory, the University will pay the Contractor the cost of such uncovering or destruction and reconstruction, such cost to be determined as in the case of extra work as provided in Section 4.02.
- (6) Inspection of material and furnished articles to be incorporated in the work may be made at the place of production, manufacture or shipment unless otherwise stated herein. The inspection of material and workmanship for final acceptance as a whole or in part will be made at the site of the work.

Section 2.18 Subcontractors

- (1) Except for subcontractors designated by the University, or required to be named at any earlier date, pursuant to the provisions of the Information for Bidders, within thirty (30) calendar days after Notice of Award, the Contractor must submit a written statement to the Consultant giving the name and address of all proposed subcontractors. Said statement must contain a description of the portion of the work and materials which the proposed subcontractors are to perform and furnish and any other information tending to prove that the proposed subcontractors have the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and provisions of the Contract Documents.
- (2) If the Consultant finds that the proposed subcontractors are qualified, it will so notify the Contractor within ten (10) working days after receipt of the aforesaid information. If the determination is to the contrary, however, the Consultant within such period will notify the Contractor of such determination and the latter, unless it decides to do such work itself and is qualified, in the Consultant's opinion, to do such work, must, within ten (10) working days thereafter, submit similar information with respect to other proposed subcontractors.
- (3) The Consultant's approval of a subcontractor and/or the University's designation of a subcontractor pursuant to the provisions of the Contract Documents shall not relieve the Contractor of any of its responsibilities, duties and liabilities hereunder. The Contractor shall be solely responsible to the University for the acts or defaults of such subcontractors and of such subcontractors' officers, agents and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the Contractor to the extent of its subcontract.
- (4) The Contractor shall be fully responsible for the administration, integration, coordination, direction and supervision of all of its subcontractors and of all work and it shall check all space requirements of the work and coordinate and adjust the same so that conflicts in space do not occur in the work being performed by it with its own employees and with the work being performed by its subcontractors and so that all equipment, piping, wiring, etc., can be installed, where possible, in the spaces allowed for the same.
- (5) No subcontractor shall be permitted to work at the site until (a) it has furnished satisfactory evidence to the Consultant of the insurance required by law; (b) in the case of a Project involving a federal grant, it has furnished satisfactory evidence to the Consultant of the same type and amount of liability insurance as that required of the Contractor by Section 5.06 of the Agreement; and (c) except for subcontractors designated by the University pursuant to the provisions of the Information for bidders, it has been approved by the Consultant.
- (6) Within seven (7) working days after the Contractor receives payment from the University on account of a progress payment application for the percentage of the work done, it shall pay each of its subcontractors the sum contained in said payment for the percentage of said subcontractor's work, less the same amount retained therefrom by the University under the terms of the Contract Documents or in consequence of any legal proceedings or statutory liens, and less any amounts due the Contractor under the subcontract for work not performed or not properly or timely performed by the subcontractor. In the event any subcontractor is not paid by the Contractor, the former should immediately notify the University of such fact. Notwithstanding the foregoing, no retention or withholding of payment by the university shall affect the Contractor's obligation to pay all subcontractors, agents, employees or other parties for goods or services provided in connection with the work.
- (7) The Contractor shall execute with each of its subcontractors and shall require all subcontractors to execute with their sub-subcontractors a written agreement which shall bind the latter to the terms and provisions of this Contract insofar as such terms and provisions are applicable to the work to be performed by such subcontractors. The Contractor shall require all subcontractors and sub-subcontractors to promptly, upon request, file with the Consultant and the University a copy of such agreements, from which the price and terms of payment may be deleted.
- (8) If for sufficient reason, at any time during the progress of the work to be performed hereunder, the Consultant determines that any subcontractor or sub-subcontractor is incompetent, careless or uncooperative, the Consultant will notify the Contractor accordingly and immediate steps will be taken by the Contractor for cancellation of such subcontract or sub-subcontract. Such termination, however, shall not give rise to any claim by the Contractor or by such subcontractor or sub-subcontractor for loss of prospective profits on work unperformed and/or work unfurnished and a provision to that effect shall be contained in all subcontracts and sub-subcontracts.
- (9) No provisions of this Contract shall create or be construed as creating any contractual relation between the University and any subcontractor or sub-subcontractor or with any person, firm or corporation employed by, contracted with or whose services are utilized by the Contractor.

Section 2.19 Shop Drawings and Samples

- (1) The Contractor, in accordance with the approved Shop Drawing and Sample schedule and with such promptness and in such sequence as to cause no delay in the work, shall submit for the Consultant's approval all Shop Drawings and Samples called for under the Contract or

requested by the Consultant.

- (2) Shop Drawings shall establish the actual detail of the work, indicate proper relation to adjoining work, amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.
- (3) All Shop Drawings and Samples shall be thoroughly checked by the Contractor for compliance with the Contract Documents before submitting them to the Consultant for approval and all Shop Drawings shall bear the Contractor's recommendation for approval certifying that they have been so checked. Any Shop Drawings submitted without this stamp of approval and certification, and Shop Drawings which, in the Consultant's opinion, are incomplete, contain numerous errors or have not been checked or only checked superficially, will be returned unchecked by the Consultant for resubmission by the Contractor. In checking Shop Drawings, the Contractor shall verify all dimensions and field conditions and shall check and coordinate the Shop Drawings of any section or trade with the requirements of all other sections or trades whose work is related thereto, as required for proper and complete installation of the work.
- (4) Samples must be of sufficient size or number to show the quality, type, range of color, finish and texture of the material. Each Sample shall be properly labeled to show the nature of the material, trade name of manufacturer, name and location of the work where the material represented by the Sample is to be used and the name of the Contractor submitting the Sample. Transportation charges to the Consultant must be prepaid on Samples forwarded to it.
- (5) Shop Drawings and Samples, submitted by the Contractor in accordance with the approved Shop Drawing and Sample schedule, will be reviewed by the Consultant within fifteen (15) working days and if satisfactory will be approved. A Shop Drawing, when approved, will be returned to the Contractor. If not satisfactory, the Drawings and Samples will be appropriately marked and returned to the Contractor for correction thereof, in which event the Contractor shall resubmit to the Consultant a corrected copy of the Shop Drawing or a new Sample, as the case may be. The Contractor shall make any correction required by the Consultant and shall appropriately note any changes or revisions on the Shop Drawing, dated to correspond with the date of the Consultant's request for the change. Upon approval of the Shop Drawing by the Consultant, the Contractor shall promptly furnish to the Consultant as many copies thereof as the Consultant may reasonably request.
- (6) At the time of submission of a Shop Drawing or Sample, the Contractor shall inform the Consultant and the University in writing of any deviation in the Shop Drawing or Sample from the requirements of the Contract Documents. Unless such deviation is specifically noted by the Contractor with a notation that such deviation will result in extra work for which the Contractor requests payment or requires additional time, the Contractor shall be deemed to have waived any claim for extra work, additional compensation or payment or an extension of time with respect to all work shown on, described in or related to the Shop Drawing or Sample.
- (7) The Consultant's approval of Shop Drawings or Samples is for design only and is not a complete check on the method of assembly, erection or construction. Approval shall in no way be construed as: (a) permitting any departure whatsoever from the Contract Documents, except where the Contractor, in accordance with the provisions of paragraph 6 of this Section, has previously notified the University and the Consultant of such departure; (b) relieving the Contractor of full responsibility for any error in quality of materials, details, dimensions, omissions or otherwise that may exist; (c) relieving the Contractor of full responsibility for adequate field connections, erection techniques, bracing or deficiencies in strength; (d) relieving the Contractor of full responsibility for satisfactory performance of all work and coordination with the work of all subcontractors and other contractors; or (e) permitting departure from additional details or instructions previously furnished by the Consultant.
- (8) No work requiring a Shop Drawing or Sample shall be commenced until a Shop Drawing or Sample is approved in writing by the Consultant and all such work shall be: (a) in accordance with the approved Shop Drawing, provided the latter conforms in all respects to the Contract Documents or to such deviations therefrom as have been previously noted by the Contractor in accordance with the provisions of paragraph 6 of this Section; and (b) in conformance in all respects to the sample furnished to and approved by the Consultant and, unless otherwise specified, as new and of good quality.

Section 2.20 Equivalents - Approved Equal

A. EQUIVALENTS OR APPROVALS - GENERAL

- (1) The words "similar and equal to", "or equal", "equivalent", and such other words of similar content and meaning shall, for the purposes of this Contract, be deemed to mean similar and equivalent to one of the named products. For the purposes of subdivisions A and B of this Section and for purposes of the Bidding Documents, the word "products" shall be deemed to include the words "articles", "materials", "items", "equipment" and "methods". Whenever in the Contract Documents one or more products are specified, the words "similar and equal to" shall be deemed inserted.
- (2) Whenever any product is specified in the Contract Documents by a reference to the name, trade name, make or catalog number of any manufacturer or supplier, the intent is not to limit competition, but to establish a standard of quality which the Consultant has determined is necessary for the Project. A Contractor may at its option use any product other than that specified in the Contract Documents provided the same is approved by the Consultant in accordance with the procedures set forth in subdivision B of this Section. In all cases the Consultant shall be the sole judge as to whether a proposed product is to be approved and the Contractor shall have the burden of proving, at its own cost and expense, to the satisfaction of the Consultant, that the proposed product is similar and equal to the named product. In making such determination the Consultant may establish such objective and appearance criteria as it may deem proper that the proposed product must meet in order for it to be approved.
- (3) Nothing in the Contract Document shall be construed as representing, expressly or implicitly, that the named product is available or that there is or there is not a product similar and equal to any of the named products and the Contractor shall have and make no claim by reason of the availability or lack of availability of the named product or of a product similar and equal to any named product.
- (4) The Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Consultant in considering a product proposed by the Contractor or by reason of the failure of the Consultant to approve a product proposed by the Contractor.

- (5) Requests for approval of proposed equivalents will be received by the Consultant only from the Contractor.

B. EQUIVALENTS OR APPROVALS AFTER BIDDING

- (1) Requests for approval of proposed equivalents will be considered by the Consultant after bidding only in the following cases: (a) the named product cannot be obtained by the Contractor because of strikes, lockouts, bankruptcies or discontinuance of manufacture and the Contractor makes a written request to the Consultant for consideration of the proposed equivalent within ten (10) calendar days of the date it ascertains it cannot obtain the named product; or (b) the proposed equivalent is superior, in the opinion of the Consultant, to the named product; or (c) the proposed equivalent, in the opinion of the Consultant, is equal to the named product and its use is to the advantage of the University, e.g., the University receives an equitable credit, acceptable to it, as a result of the estimated cost savings to the Contractor from the use of the proposed equivalent or the University determines that the Contractor has not failed to act diligently in placing the necessary purchase orders and a savings in the time required for the completion of the construction of the Project should result from the use of the proposed equivalent; or (d) the proposed equivalent, in the opinion of the Consultant, is equal to the named product and less than ninety (90) calendar days have elapsed since the Notice of Award of the Contract.
- (2) Where the Consultant pursuant to the provisions of the subdivision approves a product proposed by a Contractor and such proposed product requires a revision or redesign of any part of the work covered by this Contract, all such revision and redesign and all new Drawings and details required therefore shall be subject to the approval of the Consultant and shall be provided by the Contractor at its own cost and expense.
- (3) Where the Consultant pursuant to the provisions of this Section approves a product proposed by a Contractor and such proposed product requires a different quantity and/or arrangement of duct work, piping, wiring, conduit or any other part of the work from that specified, detailed or indicated in the Contract Documents, the Contractor shall provide the same at its own cost and expense.

Section 2.21 Patents, Trademarks and Copyrights

The Contractor acknowledges that the Contract consideration includes all royalties, license fees and costs arising from patents or trademarks in any way involved in the work, provided, however, that the Contract consideration shall not be deemed to have included therein any royalty, license fee or cost arising from a patent or trademark for a design prepared by the Consultant and neither the Contractor nor the University shall have any liability in connection therewith. Where the Contractor is required or desires to use any product, device, material or process covered by patent or trademark, the Contractor shall indemnify and save harmless the University and the State of New York from any and all claims, actions, causes of action or demands, for infringement by reason of the use of such patented product, device, material or process, and shall indemnify the University and the State of New York from any cost, liability, damage and expense, including reasonable attorneys' fees and court costs, which it may be obligated to incur or pay by reason of any claim or infringement at anytime both before or after the University's final acceptance of all the work to be performed under the Contract.

Section 2.22 Possession Prior to Completion

If before the final completion of all the work it shall be deemed advisable or necessary by the University to take over, use, occupy or operate any part of the completed or partly completed work or to place or install therein equipment and furnishings, the University, upon reasonable written notice to the Contractor, shall have the right to do so and the Contractor will not in any way interfere therewith or object to the same. Such action by the University shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract Documents and the Contractor acknowledges that such action by the University does not in any way evidence the completion of the work or any part thereof or in any way signify the University's acceptance of the work or any part thereof, provided, however, that the period for the Contractor's warranties and guarantees under the Contract for the work so occupied or operated shall be deemed to commence on the date said work is occupied or operated. The Contractor agrees to continue the performance of all work covered by the Contract in a manner which will not unreasonably interfere with such takeover, use, occupancy, operation, placement or installation.

Section 2.23 Completion and Acceptance

A. PARTIAL COMPLETION AND ACCEPTANCE

If before the final completion of all the work any portion of the permanent construction has been satisfactorily completed and the same will be immediately useful to the University, the latter may, by written notice, advise the Contractor that it accepts such portion of the work. Such actions by the University shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract with respect to any work not so completed and accepted.

B. SUBSTANTIAL COMPLETION

When all the work covered by the Contract is substantially completed, i.e., has reached such point of completion that the Project can be fully occupied and used for the purposes for which it was intended, the Contractor shall give written notice thereof to the University and the Consultant. The latter will then promptly make an inspection of the work and, if they shall determine that all the work is substantially completed, they shall so advise the Contractor. Such action shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract with respect to any uncompleted (including untested or deferred work), unaccepted or corrective work or in any way affect, limit or preclude the issuance by the Consultant, from time to time thereafter, of "Punch Lists", i.e., lists of uncompleted or corrective work which the Contractor is to promptly complete and/or correct.

C. FULL COMPLETION AND ACCEPTANCE

After the completion of all the work the Contractor shall give written notice to the University and the Consultant that all the work is ready for inspection and final acceptance. The University and the Consultant shall promptly make such inspection and, if they shall determine that all the work has been satisfactorily completed, the University shall thereupon by written notice advise the Contractor that it accepts such work.

Section 2.24 Record Drawings

- (1) Prior to acceptance by the University of all work covered by the Contract, the Contractor shall furnish to the Consultant one (1) set of current Contract Drawings on which the Contractor has recorded, using colored pencil, in a neat and workmanlike manner, all instances where actual field construction differs from work as indicated on the Contract Drawings. These "Record" Drawings shall show the following information: (a) all significant changes in plans, sections, elevations and details, such as shifts in location of walls, doors, windows, stairs and the like made during construction; (b) all significant changes in foundations, columns, beams, openings, concrete reinforcing, lintels, concealed anchorage and "knock-out" panels made during construction; (c) final location of electric panels, final arrangement of electric circuits and any significant changes made in electrical design as a result of Change Orders or job conditions; (d) final location and arrangement of all mechanical equipment and major concealed plumbing, including, but not limited to, supply and circulating mains, vent stacks, sanitary and storm water drainage; and (e) final location and arrangement of all underground utilities, connections to building and/or rerouting of existing utilities, including, but not limited to, sanitary, storm, heating, electric, signal gas, water and telephone.
- (2) Shop Drawings shall not be acceptable as "Record" Drawings.
- (3) The Contractor agrees to provide Record Drawings on "electronic media" or "hard copy" at the discretion of the University at no extra cost.

Section 2.25 Guarantees

- (1) The Contractor, at the convenience of the University, shall remove, replace and/or repair at its own cost and expense any defects in workmanship, materials, ratings, capacities or characteristics occurring in or to the work covered by the Contract within one (1) year or within such longer period as may otherwise be provided in the Contract, the period of such guarantee to commence with the University's final acceptance of all work covered under the Contract or at such other date or dates as the University may specify prior to that time, and the Contractor, upon demand, shall pay for all damage to all other work resulting from such defects and all expenses necessary to remove, replace and/or repair such other work which may be damaged in removing, replacing or repairing the said defects. The obligations of the Contractor under the provisions of this paragraph or any other guarantee provisions of the Contract Documents are not limited to the monies retained by the University under the Contract.
- (2) Unless such removal, replacement and/or repair shall be performed by the Contractor within ten (10) working days after it receives written notice from the University specifying such defect, or if such defect is of such a nature that it cannot be completely removed, repaired and/or replaced within said ten (10) day period and the Contractor shall not have diligently commenced removing, repairing and/or replacing such defect within said ten (10) day period and shall not thereafter with reasonable diligence and in good faith proceed to do such work, the University may employ such other person, firm or corporation as it may choose to perform such removal, replacement and/or repair and the Contractor agrees, upon demand, to pay to the University all amounts which it expends for such work.

Section 2.26 Default of Contractor

- (1) In addition to those instances specifically referred to in other Sections hereof, the University shall have the right to declare the Contractor in default of the whole or any part of the work if:
 - a. The Contractor makes an assignment for the benefit of creditors pursuant to the statutes of the State of New York; or if
 - b. A voluntary or involuntary petition in bankruptcy is filed by or against the Contractor; or if
 - c. A receiver or receivers are appointed to take charge of the Contractor's property or affairs; or if
 - d. The Contractor shall sublet, assign, transfer, convey, or otherwise dispose of the Contract other than as herein specified; or if
- (2) Before the University shall exercise its right to declare the Contractor in default by reason of the conditions set forth in this subsection, it shall give the Contractor three (3) working days' notice of its intention to declare the Contractor in default and unless, within such three (3) day period, the Contractor shall make arrangements, satisfactory to the University, to correct and/or eliminate the conditions set forth in the University's aforesaid notice, the Contractor may be declared in default at the expiration of such three (3) day period or at the expiration of such longer period of time as the University may determine. In addition to those instances specifically referred to above, the University shall have the right to declare the Contractor in default of the whole or any part of the work if, in the sole opinion of the University:
 - a. The Contractor becomes insolvent; or if
 - b. The Contractor fails to commence work when notified to do so by the Consultant; or if
 - c. The Contractor shall abandon the work; or if
 - d. The Contractor shall refuse to proceed with the work when and as directed by the Consultant; or if
 - e. The Contractor shall without just cause reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the University, to complete the work in accordance with the approved time progress schedule, and shall fail or refuse to sufficiently increase such working force when ordered to do so by the Consultant; or if
 - f. The Contractor is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the work, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if
 - g. The work cannot be completed within the time herein provided therefore or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the University's opinion, attributable to conditions within the Contractor's control; or if

- h. The work is not completed within the time herein provided therefore or within the time to which the Contractor may be entitled to have such completed extended; or if
 - i. The Contractor is or has been willfully or in bad faith violating any of the provisions of this Contract; or if
 - j. The Contractor is not or has not been executing the Contract in good faith and in accordance with its terms.
- (3) The right to declare in default for any of the grounds specified or referred to shall be exercised by the University sending the Contractor a written notice setting forth the ground or grounds upon which such default is declared. Upon receipt of notice that it has been declared in default, the Contractor shall immediately discontinue all further operations under the Contract and shall immediately quit the site, leaving untouched all plant, materials, equipment, tools and supplies then on site.
 - (4) The University, after declaring the Contractor in default, may then have the work completed by such means and in such manner, by contract, with or without public letting, or otherwise, as it may deem advisable, utilizing for such purpose such of the Contractor's plant, materials, equipment, tools and supplies remaining on the site, and also such subcontractors as it may deem advisable, or it may call upon the Contractor's surety at its own expense to do so.
 - (5) In the event that the University declared the Contractor in default of the work or any part of the work, the Contractor, in addition to any other liability to the University hereunder or otherwise provided for or allowed by law, shall be liable to the University for any costs it incurs for additional architectural and engineering services necessary, in its opinion, because of the default and the total amount of liquidated damages from the date when the work should have been completed by the Contractor in accordance with the terms hereof to the date of actual completion of the work, both of which items shall be considered as expenses incurred by the University in completing the work and the amount of which may be charged against and deducted out of such monies as would have been payable to the Contractor or its surety if the work had been completed without a default.
 - (6) If the University completes the work, the Consultant shall issue a certificate stating the expenses incurred in such completion, including the cost of re-letting. Such certificates shall be final, binding and conclusive upon the Contractor, its surety, and any person claiming under or through the Contractor, as to the amount thereof.
 - (7) The expense of such completion, as so certified by the Consultant, shall be charged against and deducted out of such monies as would have been payable to the Contractor if it had completed the work; the balance of such monies, if any, subject to the other provisions of the Contract, to be paid to the Contractor without interest after such completion. Should the expense of such completion, so certified by the Consultant, exceed the total sum which would have been payable under the Contract if the same had been completed by the Contractor, any such excess shall be paid by the Contractor to the University upon demand.
 - (8) In the event the University shall determine to complete the work without calling upon the Contractor's surety to do so, the Contractor shall not be entitled, from and after the effective date of the declaration of the default, to receive any further payment under the Contract until the said work shall be wholly completed and accepted by the University.
 - (9) In case the University shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractors or persons whom the University may engage to complete the work as to which the Contractor was declared in default.
 - (10) The provisions relating to declaring the Contractor in default as to the entire work shall be equally applicable to a declaration of partial default, except that the University shall be entitled to utilize for completion of the part of the work as to which the Contractor was declared in default only such plant, materials, equipment, tools and supplies as had been previously used by the Contractor on such part.
 - (11) In completing the whole or any part of the work, the Consultant and the University shall have the power to depart from, change or vary the terms and provisions of the Contract; provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variations, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the Consultant's certificate of the cost of completion, nor shall it constitute a defense to any action to recover the amount by which such certificate exceeds the amount which would have been payable to the Contractor hereunder but for its default.
 - (12) The provisions of this Section shall be in addition to any and all other legal or equitable remedies provided by this Agreement and otherwise available by law.

Section 2.27 Termination

- (1) The performance of work under this Contract may be terminated by the University, in whole or in part, whenever the University shall determine that such termination is in the best interest of the University; or in the event the State Finance Law Sections 139-j and 139-k certifications are found to be intentionally false or intentionally incomplete; or in the event the information provided in Sales Tax Certifications ST-220TD and/or ST-220CA is found to be false or incomplete. Any such termination shall be effected by a notice in writing to the Contractor specifying the date upon which such termination shall become effective and the extent to which performance of the Contract shall be terminated. Such termination shall be effective on the date and to the extent specified in said notice.
- (2) Upon receipt of a notice of termination, and except as otherwise directed in writing by the University, the Contractor shall:
 - a. Discontinue all work and the placing of all orders for materials and facilities otherwise required for the performance thereof;
 - b. Cancel all existing orders and subcontracts to the extent such orders and subcontracts relate to the performance of work terminated by the notice of termination;
 - c. Take such actions as may be necessary to secure to the University the benefits of any rights of the Contractor under orders or

subcontracts which relate to the performance of work terminated by the notice of termination, including, but not limited to, the assignment to the University, in the manner and to the extent directed by the University, all the right, title and interest of the Contractor under the orders or subcontracts so terminated and canceled. In the event of such assignment, the University shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination and cancellation of such orders and subcontracts;

- d. Transfer title and deliver to the University, in accordance with the direction of the University, all materials, supplies, work in process, facilities, equipment, machines or tools produced as a part of or acquired by the Contractor in connection with the work terminated by said notice, and all plans, Drawings, Working Drawings, sketches, Specifications and information for use in connection therewith; provided, however, that the Contractor may retain any of the foregoing if it so elects and forgoes reimbursement therefore;
 - e. Take such action as may be necessary or as the Consultant or the University may prescribe for the protection and preservation of all property in the possession or control of the Contractor in which the University, under the provisions of the Contract, has or may acquire an interest.
- (3) Notwithstanding the foregoing, should the notice of termination relate to only a portion of the work covered by the Contract, the Contractor will proceed with the completion of such portions of the work as are not terminated.
- (4) The University will pay and the Contractor shall accept, in full consideration for the performance and completion of the portions of the work as are not terminated, a sum calculated by determining the percentage the portions of the work not terminated bear to the total amount of the work covered by the Contract, and by multiplying the Contract consideration by such percentage the product thereof being the amount to be paid to the Contractor. The University shall determine the amount of such consideration in accordance with the foregoing.
- (5) Upon compliance by the Contractor with the foregoing provisions of this Section and subject to deductions for payments previously made, the University, for the portions of the work terminated, shall compensate the Contractor as follows:
- a. By reimbursing the Contractor for actual expenditures made with respect to such work, including expenditures made in connection with any portion thereof which may have been completed prior to termination, as well as expenditures made after termination in completing those portions of the work covered by the Contract which the Contractor may have been required by the notice of termination to complete. The University shall determine the allocability and amount of such expenditures.
 - b. By reimbursing the Contractor for all actual expenditures made, with the prior written approval of the University or pursuant to a court judgment, in settling or discharging any outstanding contractual obligations or commitments incurred or entered into by the Contractor in good faith with respect to the Contract and resulting from the termination thereof.
 - c. By reimbursing the Contractor for all actual expenditures made after the effective date of the notice of termination resulting from or caused by the Contractor taking necessary action or action prescribed by the Consultant or the University for the protection and preservation of all property in the possession or control of the Contractor in which the University, under the provisions of the Contract, has or may acquire an interest.
 - d. By paying the Contractor a markup, which is to be calculated in the same manner as that provided for in subdivision c of paragraph (1) of Section 4.02 for extra work, on the foregoing expenditures, which markup is to cover the Contractor's overhead and profit; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, said markup shall be reduced by one-third.
- (6) The sum of all amounts payable under this Section, plus the sum of all amounts previously paid by the University under the provisions of the Contract, shall not exceed the amount of the Contract consideration. In no event shall the Contractor be entitled to any payment for loss of anticipated profits on uncompleted work and the University shall not be liable for the same.
- (7) Termination by the University under the provisions of this Section shall be without prejudice to any claims or rights which the University may have against the Contractor. The University may retain from the amount due to the Contractor under the provisions of this Section such monies as may be necessary to satisfy any claim which the University may have against the Contractor in connection with the Contract; provided, however, that the University's failure to retain such monies shall not be deemed a waiver of any of its rights or claims against the Contractor.
- (8) Notwithstanding the foregoing, where the Contractor and the Consultant can agree upon another method of determining the amount of the consideration to be paid to the Contractor under the provisions of the Section, such method, subject to the approval of the University, may, at the option of the University, be substituted for the method set forth above.

ARTICLE III

Time of Performance

Section 3.01 Commencement, Prosecution and Completion of Work

- (1) The Contractor agrees that it will begin the work upon receipt of a fully executed contract, unless the University consents in writing to begin on a different date, and that it will prosecute the same with such diligence that all work covered by the Contract shall be entirely completed and performed on or before the time specified on page one of the Agreement.
- (2) The Contractor further agrees that time is of the essence in this Contract and that the work shall be prosecuted in such manner and with sufficient plant and forces to complete all the work by the specified completion date.

Section 3.02 Time Progress Schedule

- (1) To show compliance with the requirements of Section 3.01 of the Agreement, provide and maintain a time progress schedule. After Contract

Award, but before processing second progress payment application, the Contractor, unless otherwise directed by the University, shall submit to the University and the Consultant for their acceptance its proposed working plan and time progress schedule for all the work covered by the Contract, and shall include activities for preparation and submission of all Shop Drawings and Samples.

- (2) The working plan and time progress schedule shall be in the form of suitable charts, diagrams or bar graphs and shall be based on the Contractor's logic and time estimates. Such plan and schedule shall be sufficiently detailed to show clearly, in sequence, all salient features of the work of each trade including: the anticipated time of commencement and completion of such work and the interrelationship between such work, submission of Shop Drawings and Samples for approval, approval of Shop Drawings and Samples, placing of orders of materials, fabrication and delivery of materials, installation and testing of materials, contiguous or related work under other contracts, and other items pertinent to the work.
- (3) Phases of work shall include time in the schedule for training crews, acclimating trades to the sequence and apportionment of activities, additional meetings with the owner, consultant, Contractor and the significant subcontractors, and re-sequencing activities to recover from start-up delays typically caused by normal activities associated with the start-up of field work.
- (4) The aforesaid proposed working plan and schedule shall be revised by the Contractor until they are satisfactory to the University and the Consultant, and the same shall be periodically revised thereafter and submitted by the Contractor to the University and the Consultant for approval at such time or times as the University or the Consultant may request.
- (5) The proposed working plan and schedule, including any revision or revisions thereof, when approved by both the University and the Consultant shall be known as the Schedule of Record. The Schedule of Record, as the same may be revised from time to time by the Contractor and approved by the University and the Consultant, shall be strictly adhered to by the Contractor.
- (6) If through the fault of the Contractor or any subcontractor the Contractor shall fail to adhere to the time progress schedule, it must promptly adopt such other and additional means and methods of construction as will make up for the time lost and will assure completion in accordance with such schedule.
- (7) The failure of the Contractor to submit a Time Progress Schedule, the University's or the Consultant's acceptance of the Contractor's time progress schedule or lack of such acceptance, the means and/or methods of construction employed by the Contractor, including any revisions thereof, and/or its failure to revise the same shall not relieve the Contractor of its obligation to accomplish the result required by the Contract in the time specified on page 1 of the Agreement, nor shall the exercise of such right to reject, create or give rise to any claim, action or cause of action, legal, equitable or otherwise, against the Consultant or the University.

Section 3.03 Time Schedule for Shop Drawings and Samples

- (1) The Contractor shall include activities for the preparation and submission of all Shop Drawings and Samples in the Time Progress Schedule in Section 3.02.

Section 3.04 Notice of Conditions Causing Delay

- (1) Within ten (10) working days after the commencement of any condition which is causing or may cause delay in completion, the Contractor must notify the Consultant and the University in writing of the effect, if any, of such condition upon the time progress schedule, and must state why and in what respects, if any, the condition is causing or may cause such delay.
- (2) Failure to strictly comply with this requirement may, in the discretion of the University, be deemed sufficient cause to deny any extension of time on account of delay in completion arising out of or resulting from any change, extra work, suspension, or other condition.

Section 3.05 Extension of Time

- (1) An extension or extensions of time for the completion of the work may be granted by the University subject to the provisions of this Section, but only upon written application therefore by the Contractor to the University and the Consultant.
- (2) An application for an extension of time must set forth in detail the source and the nature of each alleged cause of delay in the completion of the work, the date upon which each such cause of delay began and ended and the number of days of delay attributable to each of such causes. It must be submitted prior to completion of the work.
- (3) If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the work caused solely: (a) by the acts or omissions of the University, its trustees, officers, agents or employees; or (b) by the acts or omissions of other contractors, not including subcontractors of the Contractor, on this Project; or (c) by unforeseeable supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes).
- (4) The Contractor shall, however, be entitled to an extension of time for such causes only for the number of calendar days of delay which the University may determine to be due solely to such causes, and then only if the Contractor shall have strictly complied with all of the requirements of this Section and Section 3.04. The University shall make such determination within ninety (90) calendar days after receipt of the Contractor's application for an extension of time; provided, however, said application complies with the requirements of this Section.
- (5) The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently, but, if at all, only for the actual period of delay in completion of the work as determined by the University, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the Contractor or of its subcontractors or materialmen, and would of itself (irrespective of the concurrent causes) have delayed the work, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.
- (6) The granting of an application for an extension of time for causes of delay other than those herein referred to shall be entirely within the

discretion of the University.

- (7) If the Contractor shall claim to have sustained any damages by reason of delays, extraordinary or otherwise, or hindrances which it claims to be due to any action, omission, direction or order by the University or the Consultant, the Contractor shall be entitled only to an extension of time as hereinabove provided and shall not have or assert any claim or prosecute any suit, action, cause of action or proceeding against the University based upon such delays or hindrances, unless such delays or hindrances were caused by the University's bad faith or its willful, malicious, or grossly negligent conduct, or un contemplated delays, or delays so unreasonable that they constitute an intentional abandonment of the contract by the University, or delays resulting from the University's breach of a fundamental obligation of the contract.

Section 3.06 Contractor's Progress Reports

After commencement of the work the Contractor shall furnish the Consultant with written monthly reports setting forth the condition and general progress of the work, the percentage of each part of the work that has been finished, those parts of the work which have been completed within the scheduled time and those parts of the work which have not been finished within the scheduled time, and the general progress of the work that is being performed away from the site and the approximate date when such work will be finished and delivered to the site.

ARTICLE IV

Payment

Section 4.01 Compensation to Be Paid Contractor

The University shall pay to the Contractor and the latter shall accept as full and complete payment for the performance of this Contract, subject to additions or deductions as provided herein, the sum indicated on page 1 of this Agreement which sum is the amount of the total contract compensation. The Contractor shall provide complete and accurate billing invoices to the University in order to receive payment for its services. Billing invoices submitted to the University must contain all information and supporting documentation required by the University and the Office of the State Comptroller (OSC). **Payment for invoices submitted by the Contractor shall only be rendered electronically** unless payment by paper check is expressly authorized by the Vice President for Administration or designee, in her/his sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary New York State procedures and practices. The Contractor shall comply with the OSC procedures to authorize electronic payments. Authorization forms are available at the OSC website at www.osc.state.ny.us/epay/index.htm, by email at epunit@osc.state.ny.us or by telephone at 518-474-4032. The Contractor acknowledges that it will not receive payment on any invoices submitted under this contract if it does not comply with the OSC's electronic payment procedures, except where the Vice President or designee has expressly authorized payment by paper check as set forth above.

Section 4.02 Value of Omitted and Extra Work

- (1) The amount by which the Contract consideration is to be increased or decreased by any Change Order shall be determined by the University by one or more of the following methods:
- By accepting an amount agreed upon by both parties, which amount is to be calculated in a manner similar to that provided in subdivision c hereof.
 - By applying the applicable price or prices set forth in the attached Schedule "I" of this Agreement or by applying a unit price agreed to by both parties. Subject to the provisions of Sections 4.04, this method must be used if the Contract Documents contain applicable unit prices.
 - By estimating the fair and reasonable cost of: (i) labor, including all wages, required wage supplements and insurance required by law (workers' compensation, social security, disability, unemployment, etc.) paid to or on behalf of foremen, workers and other employees below the rank of superintendent directly employed at the site of the Project; (ii) materials; and (iii) equipment, excluding hand tools, which, in the judgment of the University, would have been or will be employed exclusively and directly on the omitted work or extra work, as the case may be; and, in the case of extra work, where the same is performed directly by the Contractor, by adding to the total of such estimated costs a sum equal to 15 percent thereof, but, where the extra work is performed by a subcontractor, by adding a sum equal to 15 percent of said costs for the benefit of such subcontractor, and by adding, for the benefit of the Contractor (no further allowance will be made where extra work is performed by the sub-subcontractor), an additional sum equal to 10 percent of the first \$10,000 of the above-estimated costs, including the subcontractor's percentage override, plus 5 percent of the next \$90,000 of the total of said items, plus 3 percent of any sum in excess of \$100,000 of the total of said items. For the purposes of the aforesaid percentage overrides, the words "extra work" shall be defined as a complete item of added, modified or changed work as described in the Consultant's written instructions to the Contractor. Such "extra work" may include the work of one or more trades and/or subcontractors or sub-subcontractors and shall include all labor, materials, plant, equipment, tools and all incidentals directly and/or indirectly necessary, related, involved in or convenient to the successful completion of the extra work item. Where the Consultant's aforesaid written instructions to the Contractor involve both an increase and a reduction in similar or related work, the above percentage overrides will be applied only on the amount, if any, the cost of the increased work exceeds the cost of the reduced work.
- All profit, overhead and expense of whatsoever kind and nature, other than those set forth above in items (i) through (iii), of the Contractor, its subcontractors and sub-subcontractors, are covered by the aforesaid percentage overrides and no additional payment therefore will be made by the University. The University may make such cost estimate either before or after the extra work is completed by the Contractor.
- By determining the actual cost of the extra work in the same manner as in the above subdivision c except that actual costs of the Contractor shall be utilized in lieu of estimated costs. The University shall have the option of utilizing this method provided it notifies the Contractor of its intent to do so prior to the time the Contractor commences performance of such extra work.

- (2) Irrespective of the method used or to be used by the University in determining the value of a Change Order, the Contractor, within fifteen (15)

working days after a request for the same, must submit to the University and the Consultant a detailed breakdown of the Contractor's estimate of the value of the omitted and/or extra work.

- (3) For the purposes of paragraph (1) hereof, the cost of equipment shall be determined, irrespective of the actual price for any rental or actual cost associated with such equipment and irrespective of whether the equipment is or is not owned by the Contractor, as follows: (a) for the first 40 hours of use by taking the monthly rate listed in the "Green Book" (the publication of the Associated Equipment Distributors of Oakbrook, Illinois) and dividing the same by 176 hours to establish an hourly rate and then multiplying such hourly rate by the actual number of hours that the equipment was used; and (b) for any period of time in excess of the first 40 hours of use by taking 50 percent of the hourly rate established in accordance with the above for equipment used for periods of less than 40 hours, and then multiplying such rate by the actual number of hours in excess of 40 hours that the equipment was used. In the event that the "Green Book" does not list the item of equipment used, the applicable rate shall be determined in the same manner as that set forth above except that the monthly rate shall be that set forth in the "Blue Book" (published by Equipment Guidebook Co. of Palo Alto, California). If no listing or rates for an item of equipment is contained in either the "Green Book" or the "Blue Book", the University shall determine the reasonable rate of rental of the particular item of equipment by such other means as it finds appropriate. The editions of the "Green Book" and the "Blue Book" to be used shall be those in effect on the date of the receipt of bids for this Contract. None of the provisions of the "Green Book" or the "Blue Book" shall be deemed referred to or included in this Contract excepting only the aforesaid monthly rates. To the cost of equipment as determined above, there is to be added the actual cost of gasoline, oil, grease and maintenance required for operation of such equipment and, in the case of equipment utilized only for extra work when, in the opinion of the Consultant, suitable equipment therefore was not available on the site, the reasonable cost of transporting said equipment to and from the site. Notwithstanding the foregoing, if the Consultant should determine that the nature or size of the equipment used by the Contractor in connection with the extra work is larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the Consultant to be suitable for the extra work, the cost of equipment will not be based upon the equipment used by the Contractor but instead will be based on the smallest or least elaborate equipment determined by the Consultant to have been suitable for the performance of the extra work.
- (4) Unless otherwise specifically provided for in a Change Order, the compensation specified therein for extra work includes full payment for both the extra work covered thereby and for any damage or expense caused the Contractor by any delays to other work to be done under the Contract resulting from or on account of said extra work, and the Contractor waives all rights to any other compensation for said extra work, damage or expense.

Section 4.03 Adjustment for Bond and Insurance Premiums

Upon final acceptance of the work to be performed under this Contract, the University shall adjust the Contract consideration to reflect any changes in the cost of all required Bonds and liability and builder's risk insurance premiums which the Contractor had to pay for on all extra work and would have had to furnish and pay for on all omitted work. Unless such cost is agreed upon by the University and the Contractor, the University shall calculate and determine the amount of the adjustment in the Contract consideration by estimating such cost.

Section 4.04 Unit Prices

- (1) Except as otherwise provided in the second paragraph of this Section, the unit prices, set forth in the attached Schedule I will be binding upon both the University and the Contractor in determining the value of omitted and/or extra work, and, in the case of extra work, such unit prices shall be deemed to include all profit, overhead and expenses of whatever kind and nature of the Contractor, its subcontractors and sub-subcontractors, and the Contractor agrees that it shall make no claim for any profit, overhead, expense or percentage override in connection therewith.
- (2) Where Schedule I sets forth a unit price for added and/or deducted work, the University shall have the option, whenever it is found that the quantity of changed work varies by more than 15 percent from the quantity that is stated or that can be determined by the Contract Documents at the time of execution thereof, to accept or reject such unit price for the quantity that the changed work varies by more than 15 percent from the stated or determinable quantity. Where a quantity is not specifically stated in the Contract Documents, the University's determination of the amount of said quantity included in the Contract Documents shall determine the applicability of this paragraph. Where the University, pursuant to the foregoing provisions, exercises its aforesaid option, the amount of the increase or decrease in the Contract consideration for the quantity of work which varies by more than 15 percent from the stated or determinable quantity shall be determined in accordance with the provisions of Section 4.02 of the Agreement as if there was no unit price therefore set forth in said Proposal.

Section 4.05 Allowances

- (1) The Contractor acknowledges that the Contract consideration includes the allowances set forth in the attached Schedule I and, except for quantitative allowances, it agrees to cause the work covered thereby to be done by such contractors for such sums as the University may direct. Where cash allowances are provided, the allowances shall be deemed to include the purchase of the materials and/or equipment and the delivery of the same to the job site. Unless otherwise specified in the Contract Documents, cash allowances do not include the proper installation of the materials and/or equipment or the connection for final utilities thereto; the cost of said installation and/or connection having been included in the amount of the Contract consideration.
- (2) The Contractor acknowledges that the Contract consideration includes such sums for expenses and profit on account of cash allowances as it deems proper and that it shall make no claim for expenses or profit or any percentage override in addition thereto; said items having been included in the amount of the Contract consideration.
- (3) In the event any cash allowance listed below is either higher or lower than the cost of having the work done in accordance herewith, the Contract consideration shall be adjusted to reflect such variance, the amount of said adjustment to be the difference between the amount of the allowance and the actual cost of performing the work covered thereby.
- (4) When quantitative allowances are provided, progress payments thereof to the Contractor will be based upon the applicable unit prices set forth in the attached Schedule I, subject, however to the provisions of paragraph (2) of Section 4.04. In the event any of said quantitative allowances are more than or less than the actual quantity of work performed, the Contract consideration shall be adjusted to reflect such variance, the amount of said adjustment to be determined in accordance with the provisions of Section 4.02 and Section 4.04 of the

Section 4.06 Deductions for Unperformed and/or Uncorrected Work

- (1) Without prejudice to any other rights, remedies or claims of the University, in the event that the Contractor at any time fails or neglects to supply working forces and materials of the proper quantity and quality necessary, in the opinion of the Consultant or the University, to comply with the approved time progress schedule, or fails in any respect to prosecute the work with promptness and diligence or causes by any action or omission the stoppage or delay of or interference with the work of any other contractor having a contract with the University, or fails in the performance of any obligations and responsibilities under this Contract, then, and in that event, the University, acting itself or through the Consultant, may, upon three (3) working days' notice to the Contractor, either itself provide or have any other contractor provide any and all labor or materials or both necessary, in its opinion, to correct any aforesaid deficiency of the Contractor, and the University will thereafter back charge the Contractor by issuing a Change Order reducing the amount of the Contract consideration for all costs and expenses it incurs in connection with the correction of such deficiency.
- (2) Notwithstanding any provisions in the Contract Documents to the contrary, if the University deems it inexpedient to correct work not done in accordance with the Contract or any work damaged as a result thereof, it shall notify the Contractor of such fact and the latter shall not remedy or correct the same. In such event, however, the amount of the Contract consideration shall be decreased by an amount, determined by the University, which is equal to the difference in value of the work as performed by the Contractor and the value of the work had it been satisfactorily performed in accordance with the Contract or which is equal to the cost of performing the corrective work, whichever shall be the higher amount.

Section 4.07 Liquidated Damages

In the event that the Contractor shall fail to substantially complete all the work within the time fixed for such completion on page one of this Agreement, or within the time to which such completion may have been extended, or in the event that the Contractor abandons the work and the same is not substantially completed within the aforesaid time for such completion, the Contractor must pay to the University as damages for each calendar day of delay in completing the work the amount set forth on page one of this Agreement. In view of the difficulty of accurately ascertaining the loss which the University will suffer by reason of delay in completion of the work hereunder, said sum is hereby fixed and agreed as liquidated damages which the University will suffer by reason of such delay and not as a penalty. The University may deduct and retain out of the monies which may become due hereunder to the Contractor the amount of any such liquidated damages and, in case the amount which may become due to the Contractor under the provisions of the Contract may be less than the liquidated damages suffered by the University, the Contractor shall pay the difference, upon demand, to the University.

Section 4.08 Contract Breakdown

Prior to the submission of its first application for a progress payment, the Contractor shall present to the University and the Consultant for their approval a detailed schedule showing the breakdown of the Contract consideration. Such schedule must contain the amount estimated for each part of the work and quantity survey for each part of the work. It shall also list the estimated value of the Contractor's guarantee obligations under the provisions of the Contract Documents, which is hereby fixed at \$5,000 or one-half of one percent (1/2%) of the Contract award amount, whichever is the lesser sum. Such schedule shall be revised by the Contractor until the same shall be satisfactory to the University and the Consultant and shall not be changed after the University and the Consultant have approved the same. The amounts set forth in the schedule will not be considered as fixing the basis for additions to or deductions from the Contract consideration.

Section 4.09 Prompt Payment Requirements

- (1) For the purposes of Article XI-A of the State Finance Law, the campus for which the work is being performed is the University's designated payment office. Applications for payment must contain the approval of the Consultant before being submitted to the University.
- (2) Whenever the Consultant's approval of an application for payment is required under the Contract, the Consultant shall have fifteen (15) calendar days after receipt of such application to inspect the work before acting on the application.
- (3) This Contract is subject to the approval of the Comptroller of the State of New York. Until such approval is given, the thirty (30) day period referred to in Article XI-A of the State Finance Law for the payment of invoices without interest shall not begin.

Section 4.10 Progress Payments

- (1) Unless otherwise provided in the Contract, progress payments will be made as the work progresses upon applications submitted by the Contractor and approved by the Consultant and the University. Payment of such approved applications shall be made by the University within thirty (30) days after such approval has been given.
- (2) The University shall make progress payments to the Contractor on the basis of such approved applications, less an amount equal to 5 percent thereof, plus an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged, which it shall reserve from each such payment until all of the work covered by the Contract has been completed.
- (3) When the University and the Consultant have determined that all the work is substantially completed, or that a substantial portion of the permanent construction has been completed and accepted, the University shall make a progress payment to the Contractor, on the basis of an application submitted by the Contractor and approved by the Consultant and the University, which shall reduce the unpaid amount due to the Contractor under the terms of the Contract, including all monies retained by the University from previous progress payments to the Contractor, to an amount equal to two (2) times the cost, estimated by the Consultant, of performing, in accordance with the Contract, all uncompleted, unaccepted and corrective work, plus an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. As the remaining items of work are satisfactorily completed or corrected, the University shall make progress payments to the Contractor, on the basis of applications submitted by the Contractor and approved by the University and the Consultant, covering said items of work less an amount necessary, in the University's judgment, to satisfy

any claims, liens or judgments against the Contractor which have not been suitably discharged.

Section 4.11 Applications for Progress Payments

The Contractor shall prepare all applications for progress payments for work performed, together with supporting data and computations as are deemed necessary by the Consultant to determine the accuracy of the application. The application for payment shall be submitted on the form prescribed by the University. Failure of the Contractor to submit applications for progress payments, or lack of complete and accurate supporting data, shall be sufficient reason for withholding payment until such omissions or errors are rectified. Unless otherwise directed, such applications, signed and certified as correct by the Contractor, shall be delivered by the Contractor to the Consultant once each month showing the total value of work completed and in place on the last day of the payment period covered by the application.

Section 4.12 Progress Payments for Materials Delivered to Site

- (1) Progress payments made in accordance with Section 4.10 shall include a payment for materials and equipment to be furnished and installed under the Contract, after such materials and equipment have been delivered and accepted at the site of the work.
- (2) Materials and equipment for which such progress payment has been made shall not be removed from the site, shall be stored until incorporated into the work in a location approved by the Consultant and shall be adequately protected from fire, theft and vandalism, the effects of the elements and any other damage whatsoever, and shall at all times be available for inspection by the Consultant and the University.

Section 4.13 Transfer of Title to Materials Delivered to Site

Title to all supplies and materials to be furnished or provided by the Contractor to the University pursuant to the provisions of the Contract Documents shall immediately vest in and become the sole property of the University upon delivery of such supplies and materials to the site. Notwithstanding such transfer of title, the Contractor shall have the full continuing responsibility to install such materials and supplies, protect them, maintain them in proper condition and forthwith repair, replace and make good any damage thereto without cost to the University until such time as the work covered by the Contract is fully accepted by the University. Such transfer of title shall in no way affect any of the Contractor's obligations under the Contract. In the event that, after title has passed to the University, any of such supplies and materials are rejected as being defective or otherwise unsatisfactory, title to all such supplies and materials shall be deemed to have been transferred back to the Contractor.

Section 4.14 Progress Payments for Materials Stored Off Site

- (1) Progress payments made in accordance with Section 4.10 shall include a payment for materials and equipment which are in short and/or critical supply or have been specially fabricated for the Project. Materials and equipment, for which a progress payment is made pursuant to the preceding sentence, shall be stored by the Contractor, after fabrication, until such time as their delivery to the site is required, at a facility and location approved by the Consultant; shall be adequately protected from fire, theft and vandalism, the effects of the elements and any other damage whatsoever; and shall at all times be available for inspection by the Consultant and the University. No progress payment shall, however, be made for said materials and equipment until:
 - a. The Contractor furnishes to the University a bill of sale listing quantity and costs of said materials and equipment f.o.b. point of origin;
 - b. The Consultant shall have inspected said materials and equipment and recommended payment therefore; and
 - c. The Contractor furnishes to the University a builder's risk insurance policy, with the broad form extended coverage endorsement, for said materials and equipment, in an amount equal to 100 percent of the value thereof, which policy shall be maintained, at the sole cost and expense of the Contractor, until said materials and equipment have been incorporated into the Project. The said insurance policy shall contain a provision that the loss, if any, is to be made adjustable with and payable to the University as trustee for the insured, i.e., the University and the Contractor, and a provision that it shall not be changed or canceled and that it will be automatically renewed upon expiration and continued in force unless the University is given fifteen (15) days' written notice to the contrary.
- (2) Materials and equipment for which a progress payment has been made by the University pursuant to this Section shall be, become and remain the sole property of the University; provided, however, that the Contractor shall have the full continuing responsibility to install such materials and equipment, to deliver it to the site, to protect it, to maintain it in proper condition and to forthwith repair, replace and make good any damage thereto without cost to the University until such time as the work covered by the Contract is fully accepted by the University. Such transfer of title shall in no way affect any of the Contractor's obligations under the Contract.

Section 4.15 Withholding of Progress Payments

Notwithstanding anything contained in the Contract to the contrary, the University may withhold payment of all or any part of a progress, final or guarantee payment, in such an amount as it may deem proper to enforce the provisions of the Contract and to satisfy the claims of third parties, when:

- a. The University shall learn of any claim, of whatever nature or kind, against the University or the Contractor, which in any way arises or is alleged to arise out of or as a result of or in connection with the performance by the Contractor of the work covered by the Contract or out of or in connection with the Contractor's operations or performance at or in the vicinity of the construction site, that, in the opinion of the University, may not be adequately covered by insurance.

If an action on such claim is timely commenced and the liability of the University and/or the Contractor shall have been established therein by a final judgment of a court of competent jurisdiction, or if such claim shall have been admitted by the Contractor to be valid, the University shall pay such judgment or admitted claim out of the monies retained by it under the provisions of the Contract and return the balance, if any, without interest, to the Contractor.

The University may withhold from the Contractor any payments retained by it until such time as all such claims are either satisfied or

barred by law from being presented. At such time the University, upon written demand by the Contractor, shall return to the Contractor the amount so withheld, without interest.

- b. The Contractor has not complied with any lawful or proper direction of the Consultant or the University or their representatives concerning the work covered by the Contract or the performance of the Contract or the production of records as required under the provisions of the Contract.
- c. There exists any of the conditions, listed in Section 2.26, which would allow the University to declare the Contractor in default of the whole or any part of the work.
- d. The Contractor is a foreign contractor and has not furnished satisfactory proof that all taxes due by such Contractor under the provisions of the Tax Law have been paid. The Certificate of the New York State Tax Commission to the effect that all such taxes have been paid shall be conclusive proof of the payment of such taxes. The term "foreign contractor" as used herein means, in the case of an individual, a person who is not a resident of the State of New York; in the case of a partnership, one having one or more partners not a resident of the State; and in the case of a corporation, one not organized under the laws of the State of New York.
- e. The Contractor, upon request of the University at any time after the initial progress payment by the University to the Contractor, fails to furnish the University with such documentary evidence that the University may deem necessary to prove to it that material and labor paid for by the University under previous applications for payment submitted have been paid for by the Contractor and that there are no outstanding claims or liens in connection therewith or fails to satisfy the University that the Contractor, with good cause, has sufficiently provided for the payment and/or satisfaction of claims for said material and labor.

Section 4.16 Lien Law

The attention of the Contractor is specifically called to the provisions of the Lien Law of the State of New York, wherein funds received by a Contractor for a public improvement are declared to constitute trust funds in the hands of such Contractor to be applied first to the payment of certain claims.

Section 4.17 Substitution of Securities for Retainage

Any time after 50 percent of all the work has been completed, the University, if the progress and performance of the work is satisfactory to it, on request of the Contractor, will allow the Contractor to withdraw up to 50 percent of the aforesaid amount retained by the University by depositing with the Comptroller of the State of New York government securities, of the type and kind specified in Section 139 of the State Finance Law, having a market value not exceeding par, at the time of deposit, equal to the amount so withdrawn. The Comptroller of the State of New York shall, from time to time, collect all interest or income on the obligations so deposited, and shall pay the same, when and as collected, to the Contractor. If the deposit is in the form of coupon bonds, the coupons as they respectively become due shall be delivered to the Contractor; provided, however, that the Contractor shall not be entitled to interest or coupons or income on any of the deposited securities, the proceeds of which have or will be used or applied by the University. In the event that the Contractor does not, in accordance with the terms and provisions of the Contract, comply with and fulfill all of its obligations and responsibilities thereunder, the Comptroller of the State of New York shall have the right to sell, assign, transfer or otherwise dispose of the aforesaid securities and the University shall have the right to use and apply all or any part of the monies obtained by the Comptroller of the State of New York from such a sale, assignment, transfer or disposition or from the collection of interest or income from said securities to the performance and fulfillment of said obligations and responsibilities. Notwithstanding the foregoing, when the University makes a payment under Section 4.10 (3) of the Agreement, it will return to the Contractor, as part of such payment, its substituted securities, and thereafter all retention of the University shall be in funds and not in substituted securities.

Section 4.18 Final Payment

Upon acceptance of all the work, except for the Contractor's guarantee obligations under Section 2.25 of the Agreement and the Contractor's guarantee obligations under any provision of the Specifications, the contractor shall prepare and submit to the University and the Consultant, for their approval, a final application for payment, which the University, within thirty (30) days after its approval of the same, shall pay. Such application and payment shall be in an amount equal to 100 percent of the Contract consideration, excluding the Contractor's guarantee obligations (reference Section 4.08), less:

- a. All previous payments by the University to the Contractor;
- b. All deductions authorized to be made by the University under the Contract; and
- c. An amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

Section 4.19 Acceptance of Final Payment

- (1) The acceptance by the Contractor, or by anyone claiming by or through it, of the final payment shall, except with respect to the amount retained by the University pursuant to the provisions of subdivisions b and c of Section 4.18 of the Agreement, constitute and operate as a release to the University from any and all claims of any liability for anything theretofore done or furnished for or relating to or arising out of the work covered by the Contract and for any prior act, neglect or default on the part of the University or any of its trustees, officers, agents or employees in connection therewith.
- (2) Should the Contractor refuse to accept the final payment as tendered by the University or should the Contractor refuse to execute the final application for payment without protest and without reserving any rights or claims against the University, it shall constitute a waiver of any right to interest on the amount of the payment so tendered and/or on the amount set forth in said final application for payment.

Section 4.20 Guarantee Payment

- (1) Subject to the provisions of the second paragraph of this Section, at the expiration of one (1) year after the University has accepted all the work covered by the Contract, the Contractor shall prepare and submit to the University and the Consultant, for their approval, a guarantee application for payment, which the University, within thirty (30) days after its approval of the same, shall pay. Such application and payment shall be in an amount equal to the monies retained by the University for the Contractor's guarantee obligations under the Agreement, less any monies deducted by the University under this Section. The Contractor shall not be entitled to any interest on the monies retained by the University pursuant to subdivision c of Section 4.18 of the Agreement.
- (2) In the event the Contractor does not, in accordance with the terms and provisions of the Contract, complete all corrective work or comply with and fulfill its contractual obligations, the University may use and apply all or any part of the monies retained by it to have such work or obligations performed or fulfilled by a person, firm or corporation other than the Contractor. The obligations of the Contractor, under the terms and provisions of the Contract, shall not, however, be limited to the monies retained by the University pursuant to the provisions of the Contract.
- (3) No payments may be made under this agreement for work completed more than 365 days after

{Insert Contract Closing Date}

Unless the date/duration listed on page one of this Agreement, is extended in writing by the University.

Section 4.21 Acceptance of Guarantee Payment

The acceptance by the Contractor, or by anyone claiming by or through it, of the guarantee payment shall constitute and operate as a release to the University from any and all claims in connection with monies retained by the University. Should the Contractor refuse to accept the guarantee payment as tendered by the University or should the Contractor refuse to execute the guarantee application for payment without protest and without reserving any rights or claims against the University, it shall constitute a waiver of any right to interest on the amount of the payment so tendered and/or on the amount set forth in said guarantee application for payment.

Section 4.22 Contractor Limited to Money Damages

Inasmuch as the Contractor can be compensated adequately by money damages for any breach of the Contract which may be committed by the University, the Contractor agrees that no default, act or omission of the University shall constitute a material breach of the Contract entitling it to cancel or rescind the same or to suspend or abandon performance thereof; and it hereby waives any and all rights and remedies to which it might otherwise be or become entitled to because of any wrongful act or omission of the University or its representatives, saving only its right to money damages.

Section 4.23 No Estoppel or Waiver

- (1) The University shall not be precluded or estopped by any inspection, acceptance, application for payment or payment, final or otherwise, issued or made under the Contract or otherwise issued or made by it, the Consultant, or any trustee, officer, agent or employee of the University, from showing at any time the true amount and character of the work performed, or from showing that any such inspection, acceptance, application for payment or payment is incorrect or was improperly issued or made; and the University shall not be precluded or estopped, notwithstanding any such inspection, acceptance, application for payment or payment, from recovering from the Contractor any damages which it may sustain by reason of any failure on its part to comply strictly with the Contract and any monies which may be paid to it or for its account in excess of those to which it is lawfully entitled.
- (2) Neither the acceptance of all or any part of the work covered by the Contract; nor any payment therefore; nor any order or application for payment issued under the Contract or otherwise issued by the University, the Consultant, or any trustee, officer, agent or employee of the University; nor any permission or direction to continue with the performance of the Contract before or after its specified completion date; nor any performance by the University of any of the Contractor's duties or obligations; nor any aid lent to the Contractor by the University in its performance of such duties or obligations; nor any delay or omission by the University to exercise any right or remedy accruing to it under the terms of the Contract or existing at law or in equity or by statute or otherwise; nor any other thing done or omitted to be done by the University, its trustees, officers, agents or employees; shall be deemed to be a release to the Contractor or its sureties from any obligations, liabilities or undertakings in connection with the Contract or the Performance Bond or a waiver of any provision of the Contract or of any rights or remedies to which the University may be entitled because of any breach thereof, excepting only a written instrument expressly providing for such release or waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Contract, because of any breach hereof, shall be deemed a waiver of any money damages to which the University may be entitled because of such breach. No waiver by the University of any breach of the Contract shall be deemed to be a waiver of any other or any subsequent breach.

Section 4.24 Limitation of Actions

- (1) No action or proceeding shall be maintained by the Contractor, or anyone claiming under or through the Contractor, against the University, or its trustees, officers, agents or employees, upon any claim arising out of or based upon the Contract or any breach thereof or by reason of any act or omission or requirement of the University, or its trustees, officers agents or employees, unless:
 - a. Such action or proceeding is instituted in the Court of Claims for the State of New York;
 - b. The Contractor or the person claiming under or through it shall have strictly complied with all requirements relating to the giving of notices and information with respect to such claims; and
 - c. Such action or proceeding shall be commenced within one (1) year after the submission to the University of the final application for payment or, if the claim is based upon monies required to be retained for any period after the date of the final application for payment, such action is commenced within six (6) months after such monies become due and payable under the terms of the Contract; or

- d. If the Contract is terminated or the Contractor declared in default by the University, such action is commenced within six (6) months after the date of such termination or declaration of default by the University.
- (2) Notwithstanding anything in the laws of the State of New York to the contrary, the Contractor, or anyone claiming under or through the Contractor, shall not be entitled to any additional time to begin anew any other action if an action commenced within the times herein specified is dismissed or discontinued for any reason whatsoever.

ARTICLE V

Protection of Rights and Property

Section 5.01 Accidents and Accident Prevention

The Contractor shall at all times take reasonable precautions for the safety of persons engaged in the performance of the work. The Contractor shall comply fully with all applicable provisions of the laws of the State of New York, OSHA, and with all valid rules and regulations adopted or promulgated by the agencies of the State of New York pursuant thereto. The Contractor's attention is specifically called to the applicable rules and regulations, codes and bulletins of the New York State Department of Labor.

Section 5.02 Adjoining Property

The Contractor shall be required to protect all the adjoining property and to repair or replace any such properties damaged or destroyed by it, its employees or subcontractors through, by reason of or as a result of activities under, for or related to the Contract.

Section 5.03 Emergencies

- (1) In case of an emergency which threatens loss or injury to persons or property, the Contractor will be allowed to act, without previous instructions from the Consultant or the University, in a diligent manner, to the extent required to avoid or limit such loss or injury, and it shall notify the Consultant and the University immediately thereafter of the action taken by it and of such emergency. Where the Contractor has not taken action but has notified the Consultant or the University of an emergency which threatens loss or injury to persons or property, it shall act in accordance with the instructions and/or authorization by the Consultant or the University.
- (2) In the event that the Contractor performs extra work in accordance with the preceding paragraph, it will be compensated therefore in accordance with the provisions of Section 4.02.

Section 5.04 Fire Safety

- (1) In the event that a municipal fire alarm box is not located within 300 feet from the site of the Project, the Contractor will be required to provide at the site of the Project, at a location approved by the Consultant, a private unlisted telephone reserved for fire calls only. The phone must be in addition to regular business phones and a rule prohibiting its use for purposes other than alarm for fire or other emergencies must be strictly enforced. The phone itself should be colored red and be located at a point quickly available to all employees, including watchmen. Clear instructions for the sending of a fire alarm should be conspicuously posted by the phone and all personnel customarily at work near the phone shall be acquainted with the procedure. If such a phone is required, the Contractor, at its sole cost and expense, must provide the same from the time the University first approves the Contract breakdown to be submitted by the Contractor pursuant to the provisions of Section 4.08 up until the time the University accepts all the work covered by the Contract.
- (2) All solid fuel salamanders and U. L. approved heaters used by the Contractor or any of its subcontractors shall be arranged in a standard manner. All other salamanders used by the Contractor or any of its subcontractors shall require constant attendance of competent persons on each floor where in use.
- (3) All temporary fabric used by the Contractor or any of its subcontractors for curtains or awnings shall be either non-combustible or flame retarded so that it will not burn or propagate flame.

Section 5.05 Risks Assumed by Contractor

- (1) The Contractor solely assumes the following distinct several risks whether they arise from acts or omissions (whether negligent or not and whether supervisory or otherwise) of the Contractor, of the University, of third persons or from any other cause, including unforeseen obstacles and difficulties which may be encountered in the prosecution of the work covered by the Contract, whether such risks are within or beyond the control of the Contractor and whether such risks involve a legal duty, primary or otherwise, imposed upon the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York, excepting only risks which arise from defects in maps, plans, designs or Specifications prepared, acquired or used by the Consultant or the University, from the negligence of the University, its agents or employees or from affirmative acts of the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York or their trustees, officers, agents or employees committed with intent to cause the loss, damage and injuries herein below set forth:
 - a. The risk of loss or damage, direct or indirect, to the work covered by the Contract or to any plant, equipment, tools, materials or property furnished, used, installed or received by the University or by the Contractor or any subcontractor, materialman or worker performing services or furnishing materials for the work covered hereunder.

The Contractor shall bear such risk of loss or damage until the work covered by the Contract has been fully accepted by the University or until completion of removal of such plant, equipment, tools, materials or property from the construction site and the vicinity thereof, whichever event occurs last. In the event of such loss or damage, the Contractor shall forthwith repair, replace and/or make good any such loss or damage without cost to the University.

- b. The risk of claims, just or unjust, by third persons against the Contractor, the State University Construction Fund, the Dormitory

Authority of the State of New York, the State of New York, or the State University of New York on account of wrongful death, bodily injuries and property damage, direct or consequential, loss or damage of any kind whatsoever arising or alleged to arise out of or as a result of or in connection with the performance by the Contractor of the work covered by the Contract (whether actually caused by or resulting from the performance of the Contract) or out of or in connection with the Contractor's operations or presence at or in the vicinity of the construction site. The Contractor shall bear such risk for all such deaths, injuries, damages or losses sustained or alleged to have been sustained prior to the final acceptance by the University of all work covered by the Contract. The Contractor shall also bear the risk of claims for wrongful death occurring subsequent to said final acceptance provided such death is caused, contributed to or is a consequence of bodily injuries sustained or alleged to have been sustained prior to said final acceptance.

- (2) The Contractor shall indemnify and save harmless the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, their trustees, officers, agents or employees against all claims described above and for all costs and expenses incurred by them in the defense, settlement or satisfaction thereof, including attorneys' fees and court costs. If so directed, the Contractor shall at its own expense defend against such claims, in which event it shall not, without obtaining express advance permission from Counsel of the University, raise any defense involving in any way jurisdiction of the tribunal over the University, governmental nature of the University or the provisions of any statutes respecting suits against the University.
- (3) Neither the University's final acceptance of the work to be performed hereunder nor the making of any payment shall release the Contractor from its obligations under this Section. The enumeration elsewhere in the Contract of particular risks assumed by the Contractor or of particular claims for which it is responsible shall not be deemed to limit the effect of the provision of this Section or to imply that it assumes or is responsible for only risks or claims of the type enumerated.

Section 5.06 Insurance

(1) General Requirements

- a. Prior to the commencement of the work to be performed by the Contractor, the Contractor shall procure at its sole cost and expense, and maintain in force at all times during this Agreement until Final Payment and as further required by the contract, policies of insurance as herein set forth below. All insurance shall be written by insurance carriers approved by the University licensed to do business in the State of New York ("admitted" carriers), and rated at least "A-" by A.M. Best Company.
- b. Prior to the commencement of the work, the Contractor shall submit to the University, certificates of insurance, in a form acceptable to the University, showing evidence of compliance with all insurance requirements contained in this Agreement. Certificates of Insurance (with the exception of Workers' Compensation and Disability) must be provided on an ACORD 25 Certificate of Insurance, or an equivalent form. Certificates of Insurance shall disclose any deductible, self insured retention, aggregate limit or any exclusion to the policy that materially changes the coverage required by the contract; specify the additional insureds and named insureds as required herein; and be signed by an authorized representative of the insurance carrier or producer. Deductibles or self-insured retentions above \$25,000 are subject to approval by the University and additional security may be required. Certificates shall reference the Contract number. Only original documents will be accepted.
- c. All insurance shall provide that the required coverage apply on a primary and not on an excess or contributing basis as to any other insurance that may be available to the University for any claim arising from the Contractor's work under this Agreement, or as a result of Contractor's activities. Any other insurance maintained by the University shall be in excess of and shall not contribute with the Contractor's insurance, regardless of the "other insurance" clause contained in the University's own policy of insurance. A copy of the endorsement reflecting this requirement may be requested by the University.
- d. Not less than thirty days prior to the expiration date or renewal date, the Contractor shall supply the University with updated replacement certificates of insurance and endorsements. The Contractor shall advise the University of any letter or notification that cancels, materially changes, or non- renews the policy and Contractor shall require the insurance carrier(s) to copy the University on any letter or notification that cancels, materially changes, or non- renews the policy. If, at any time during the period of the Agreement, insurance as required is not in effect, or proof thereof is not provided to the University, the University shall have the options to (i) direct the Contractor to stop work with no additional cost or extension of time due on account thereof; or (ii) treat such failure as an event of default under Section 2.26 of the Agreement. At any time the coverage provisions and limits of the policies required herein do not meet the provisions and limits set forth in the Agreement the Contractor shall immediately cease Work on the Project. The Contractor shall not resume Work on the Project until authorized to do so by the University. Any delay or time lost as a result of the Contractor not having insurance required by the Agreement shall not give rise to a delay claim or any other claim against the University. If required by the University, Contractor shall deliver to the University within forty-five (45) days of such request, a copy of any or all policies of insurance not previously provided, certified by the insurance carrier as true and complete.
- e. Should the Contractor engage a subcontractor, the Contractor shall impose the insurance requirements of this document on those entities, as applicable. Required insurance limits should be determined commensurate with the work of the subcontractor. Contractor shall keep the subcontractor certificates of insurance on file and produce them upon the demand of the University.
- f. The aggregate insurance limits set forth herein shall apply separately to each contract for which a certificate of insurance and/or policy is issued.
- g. Unless otherwise agreed to in writing by the University, policies must be endorsed to provide that there shall be no right of subrogation against the University. To the extent that any of the policies of insurance prohibit such a waiver of subrogation, Contractor shall secure the necessary permission to make this waiver.
- h. Except as otherwise specifically provided herein or agreed in writing, policies must be written on an occurrence basis. The insurance policy(ies) shall name the State University Construction Fund, State University of New York, State of New York, its officers, agents, and employees as additional insureds thereunder. The additional insured requirement does not apply to Workers' Compensation or Disability coverage. Include ISO Endorsement CG 20 10 11 85 or its equivalent.

(2) Specific Coverage and Limits

The Contractor shall obtain and maintain in full force and effect, the following insurance with limits not less than those described below and as required by the terms of the contract, or as required by law, whichever is greater. The Commercial General Liability policy, and any umbrella/excess policies used to meet the "Each occurrence" limits specified below, must be endorsed to be primary with respects to the coverage afforded the Additional Insureds.

- a. Commercial General Liability Insurance. A Commercial General Liability insurance policy with coverage that shall include, but not be limited to coverage for bodily injury, property damage, personal/advertising injury, premises liability, independent contractors, blanket contractual liability including tort liability of another assumed in contract, liability arising from all work and operations under this Agreement, defense and indemnification obligations, including those assumed under contract, cross liability coverage for additional insureds, products/completed operations for a term no less than three years commencing upon acceptance of the work, explosion, collapse, and underground hazards, contractor means and methods, and liability resulting from Section 240 or Section 241 of the NYS Labor Law. The limits under such policy shall not be less than \$2,000,000 each occurrence; \$2,000,000 general aggregate; and products/completed operations with an aggregate limit of \$2,000,000.
- b. Workers Compensation and Disability Benefits as required by New York State for the life of this Agreement for the benefit of employees required to be covered by the New York State Workers Compensation Law and the New York State Disability Benefits Law. Evidence of coverage must be provided on forms specified by the Chairman of the Workers Compensation Board.
- c. Comprehensive Business Automobile Liability Insurance. A policy with a combined single limit for bodily injury and property damage of no less than \$1,000,000 covering liability arising out of the use of any motor vehicle in connection with the work, including owned, leased, hired, and non owned vehicles bearing, or, under the circumstances under which they are being used, required by the Motor Vehicle Laws of the State of New York to bear license plates and shall name the State of New York, State University of New York, and the State University Construction Fund as additional insureds. If the contract involves the removal of hazardous waste from the project site or otherwise transporting hazardous materials, pollution liability coverage for covered autos shall be provided by form CA 99 48 03 06 or CA 00 12 03 06 and the Motor Carrier Act Endorsement (MCS90) shall be attached.
- d. Umbrella and Excess Liability. When the limits of the Commercial General Liability, Auto, and/or Employers Liability policies procured are insufficient to meet the limits specified, the Contractor shall procure and maintain Commercial Umbrella and/or Excess Liability policies with limits in excess of the primary, provided, however, that the total amount of insurance coverage is at least equal to the requirements set forth above. Such policies shall follow the same form as the primary. Any insurance maintained by the University or additional insured shall be considered excess of and shall not contribute with any other insurance procured or maintained by the Contractor including primary, umbrella and excess liability regardless of the "other insurance" clause contained in either party's policy.
- e. Owner's Protective Liability Insurance. A policy issued to and covering the liability for damages imposed by law upon the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and The State University of New York, its trustees, officers, agents and employees, , with respect to all operations under this Contract by the Contractor and its subcontractors, and/or their interest in the Project and the property upon which work under the Contract is to be performed, including in such coverage any omissions and supervisory acts of the State University Construction Fund, the Dormitory Authority and the State University of New York, its trustees, officers, agents and employees. The State University of New York shall be the named insured in the OCP Policy. OCP policy limits shall be no less than \$1,000,000 each occurrence and \$2,000,000 general aggregate.
- f. Asbestos Abatement Insurance. A liability insurance policy issued to and covering the liability, of the Contractor and/or subcontractor engaged in the removal, handling or wrapping of asbestos, if any of such work is to be performed under the Contract, for bodily injury, illness, sickness or property damage caused by exposure to asbestos in an amount not less than \$1,000,000 per occurrence and \$2,000,000 aggregate. The Contractor and/or its aforesaid subcontractor shall either obtain an endorsement to the aforesaid required insurance policy adding the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, their trustees, officers, agents or employees, as additional parties insured thereunder or shall obtain a separate owner's protective liability insurance policy for such parties with coverage similar to that required by the first sentence of this subdivision. In addition, any Contractor or subcontractor engaged in the removal, handling, or wrapping of asbestos shall, to the fullest extent permitted by law, hold harmless and indemnify the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, their trustees, officers, agents or employees, for any claims or liabilities in connection with illness or sickness arising from work performed, not performed, or which should have been performed. The Contractor shall have said hold-harmless and indemnification conditions stipulated in all Contracts with subcontractors.

Section 5.07 Builder's Risk Insurance

- (1) The Contractor shall procure and maintain, at its own cost and expense, until final acceptance of all work covered by this Contract or until the Project has been turned over for use by the State University of New York, whichever event occurs earlier, a builder's risk insurance policy covering all risks, with fire, extended coverage, vandalism and malicious mischief coverage. The policy shall cover the cost of removing debris, including demolition as may be legally necessary by operation of any law, ordinance, or regulation, and property of the State held in their care, custody and/or control.
- (2) The policy shall be in an amount equal to the Project's insurable value, i.e., the Contract consideration less the cost of the Contractor's Performance and Labor and Material Bonds; the cost of trees, shrubbery, lawn grass, plants and the maintenance of the same; the cost of demolition; the cost of excavation; the cost of foundations, piers or other supports which are below the undersurface of the lowest basement floor, or where there is no basement, which are below the surface of the ground, concrete and masonry work; the cost of underground flues,

pipes or wiring; the cost of earthmoving, grading and the cost of paving, roads, walks, parking lots or athletic fields; and the cost of bridges, tunnels, dams, piers, wharves, docks, retaining walls and radio and/or television towers and antennas.

- (3) The policy may contain a provision for a \$500 deductible for each loss to a Project having an insurable value of less than \$1,500,000 and a \$1,000 deductible for each loss to a Project having an insurable value of \$1,500,000 or more.
- (4) The Builders' Risk policy shall contain an endorsement to provide that The State of New York, The University, the Contractor and its subcontractors shall be named as loss payee for the Work in order of precedence, as their interests may appear in said policy.
- (5) The Builders' Risk policy shall contain an endorsement to provide that in the event the loss occurs at an occupied facility, occupancy shall be permitted without the consent of the insurance company.
- (6) The Contractor shall have the sole responsibility to promptly report any loss to the insurer and/or its representatives and to furnish the latter with all necessary details relating to the occurrence of the loss and the amount thereof. The University, the Contractor and all subcontractors of the Contractor waive all rights, each against the others, for damages caused by fire or other perils covered by insurance provided under the terms of this Section, except such rights as they may have to the proceeds of insurance received; provided, however, this waiver shall not apply to any manufacturer, supplier or similar agent under any guarantee or warranty.
- (7) The Contractor shall not violate or permit to be violated any condition of such policy and shall at all times satisfy the fire safety requirements of the University and the insurance company issuing the same.
- (8) The procurement and maintenance of said policy shall in no way be construed or be deemed to relieve the Contractor from any of the obligations and risks imposed upon it by this Contract or to be a limitation on the nature or extent of such obligations and risks.
- (9) Not less than thirty days prior to the expiration date or renewal date, the Contractor shall supply the University with an updated replacement certificate of insurance and endorsements. The Contractor shall advise the University of any letter or notification that cancels, materially changes, or non- renews the policy and Contractor shall require the insurance carrier(s) to copy the University on any letter or notification that cancels, materially changes, or non- renews the policy. Before the Contractor shall be entitled to have any progress payment rendered on account of the work which is to be insured pursuant to this Section, it shall furnish to the University a certificate in duplicate of the insurance herein required. Such insurance must be procured from an insurance carrier approved by the University, licensed to do business in the State of New York ("admitted" carrier), and rated at least "A-" by A.M. Best Company.
- (10) In the event that the Builders' Risk policy has been issued by a mutual insurance company, the following language shall be included: "The State University of New York is not liable for any premium or assessment under this policy of insurance. The First Named Insured is solely liable therefore."

Section 5.08 Effect of Procurement of Insurance

Neither the procurement nor the maintenance of such insurance shall in any way affect or limit the obligations, responsibilities or liabilities of the Contractor hereunder.

Section 5.09 No Third Party Rights

Nothing in the Contract shall create or give to third parties, except the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, any claim or right of action against the Contractor, the Consultant, the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York beyond such as may legally exist irrespective of the Contract.

ARTICLE VI

Affirmative Action

The State University's requirements for affirmative action are set forth in "Exhibit A-1" which is attached hereto and made a part hereof, and shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein and, in the event any such provision is not inserted or is not correctly inserted, then, upon the application of either party, this Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE VII

Provisions Required by Law

Section 7.01 Provisions Deemed Inserted

Each and every provision required by law to be inserted in the Contract, including, but not limited to, the provisions set forth in Exhibit "A" which is attached hereto and made a part hereof, shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein and, in the event any such provision is not inserted or is not correctly inserted, then, upon the application of either party, this Contract shall forthwith be physically amended to make such insertion or correction.

Section 7.02 Entire Agreement

This Agreement consists of 1) the IFB; 2) the contractor's proposal; and 3) Exhibits A and A-1. This Agreement supersedes all previous understandings and agreements with respect to the Project or any of the provisions thereof. No statement, promise, condition, understanding,

inducement, or representation, oral or written, expressed or implied, which is not contained herein shall be binding or valid and this Agreement shall not be changed, modified or altered in any manner except by an instrument in writing executed by the parties hereto.

Section 7.03 Hierarchy of Precedent

In the event of any controversy regarding the provisions of this Agreement, the terms of Exhibits A and A1 shall take precedence followed by this Agreement, the IFB and the contractor's proposal.

Section 7.04 Wage Rates

The Contractor shall post the appropriate prevailing wage schedules in a conspicuous place at the construction site. The Department of Labor shall provide the Contractor with posters relating to prevailing wage rates and the same shall be displayed by the Contractor in a conspicuous place at the construction site. The Contractor shall also distribute wallet cards, to be provided by the Department of Labor, to all workers engaged at the construction site containing information relating to wage rates and telephone numbers to call if a worker believes his or her rights are being violated. The Contractor shall provide each worker with a written notice, informing them of the applicable prevailing wage requirements, and the Contractor must obtain a signed statement or declaration from such worker attesting to the fact that he or she has been given this information. Further, the Contractor is required to keep certified copies of its payrolls at the construction site.

Section 7.05 Contractor Responsibility

(a) *General Responsibility.* The Contractor shall at all times during the term of this Agreement remain responsible. The Contractor agrees, if requested by the SUNY Chancellor or his or her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity. (b) *Suspension of Work for Non-Responsibility.* The SUNY Chancellor, in his or her sole discretion, reserves the right to suspend any or all activities under this Agreement at any time when he or she discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Activity under this Agreement may resume at such time as the SUNY Chancellor or his or her designee issues a written notice authorizing a resumption of performance under the Agreement. (c) *Termination for Non-Responsibility.* Upon written notice to the Contractor and a reasonable opportunity to be heard with appropriate SUNY officials or staff, this Agreement may be terminated by the SUNY Chancellor or his or her designee at the Contractor's expense, where the Contractor is determined by the SUNY Chancellor or his or her designee to be non-responsible. In such event, the SUNY Chancellor or his or her designee may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach.

Section 7.06 – Governing Law

This Agreement shall be governed, construed and enforced in accordance with the laws of New York State, excluding New York State's choice of law principles, and all claims relating to or arising out of this Agreement or the breach thereof, whether sounding in contract, tort or otherwise, shall likewise be governed by the laws of New York State, excluding the New York choice of law principles. Consultant agrees to submit itself to such courts' jurisdiction.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

Agency Certification: "In addition to the acceptance of this Contract, it is certified that an originally executed copy of this signature page will be attached to an exact copy of the Contract Documents, and forwarded to the Contractor".

STATE UNIVERSITY OF NEW YORK

By: _____ Date ____/____/____ Agency Code **28260**
(campus official)

CONTRACTOR

(If Corporation, Affix Seal)

By: _____ Date ____/____/____

(If Corporation, Affix Seal)

ACKNOWLEDGMENTS
(ACKNOWLEDGMENT BY AN INDIVIDUAL)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20_____, before me personally came

_____, to me known and known to me to be the person(s) described in and
who executed the foregoing instrument and he/she acknowledged to me that he/she executed the same.

Notary Public

(ACKNOWLEDGMENT BY A PARTNERSHIP)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20_____, before me personally
came _____

_____, to me known and known to me to be the person who executed the above instrument,

who, being duly sworn by me, did for themself depose and say that they are a member of the firm of _____

_____, consisting of themself and

_____, that he/she executed the foregoing instrument in the firm name _____

_____, and that he/she had authority to sign the same, and that he/she did duly
acknowledge to me that he/she executed the same as the act and deed of the aforementioned firm for the purposes mentioned therein.

Notary Public

(ACKNOWLEDGMENT BY A CORPORATION)

STATE OF)
) ss.:
COUNTY OF)

On this _____ day of _____, 20_____, before me personally
came _____

_____, to me known, who, being duly sworn, did depose and say that he/she reside in
_____; that he/she is the

of the _____, the corporation described in and
which executed the foregoing instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument was such
corporate seal; that it was affixed by the order of the Board of Directors of said corporation, and that he/she signed their name thereto by
like order.

Notary Public

Attach Exhibit A and Exhibit A-1

SCHEDULE I

The following Unit Prices shall apply for additional work authorized by Change Order:

UNIT PRICES

<u>Description of Unit Price</u>	<u>Amount of Unit Price</u>
----------------------------------	-----------------------------

None	
------	--

The total bid includes the following Allowances:

ALLOWANCES

None

The parties to the attached contract, license, lease, amendment or other agreement of any kind (hereinafter, "contract") agree to be bound by the following clauses which are hereby made a part of the contract (the word "Contractor" herein refers to any party other than the State, whether a Contractor, licensor, licensee, lessor, lessee or any other party):

1. EXECUTORY CLAUSE. In accordance with Section 41 of the State Finance Law, the State shall have no liability under this contract to the Contractor or to anyone else beyond funds appropriated and available for this contract.

2. PROHIBITION AGAINST ASSIGNMENT Except for the assignment of its right to receive payments subject to Article 5-A of the State Finance Law, the Contractor selected to perform the services herein are prohibited in accordance with Section 138 of the State Finance Law from assigning, transferring, conveying, subletting or otherwise disposing of its rights, title or interest in the contract without the prior written consent of SUNY and attempts to do so are null and void. Notwithstanding the foregoing, SUNY may, with the concurrence of the New York Office of State Comptroller, waive prior written consent of the assignment, transfer, conveyance, sublease or other disposition of a contract let pursuant to Article XI of the State Finance Law if the assignment, transfer, conveyance, sublease or other disposition is due to a reorganization, merger or consolidation of Contractor's its business entity or enterprise and Contractor so certifies to SUNY. SUNY retains the right, as provided in Section 138 of the State Finance Law, to accept or reject an assignment, transfer, conveyance, sublease or other disposition of the contract, and to require that any Contractor demonstrate its responsibility to do business with SUNY.

3. COMPTROLLER'S APPROVAL. (a) In accordance with Section 112 of the State Finance Law, Section 355 of New York State Education Law, and 8 NYCRR 316, Comptroller's approval is not required for the following contracts: (i) materials; (ii) equipment and supplies, including computer equipment; (iii) motor vehicles; (iv) construction; (v) construction-related services; (vi) printing; and (vii) goods for State University health care facilities, including contracts for goods made with joint or group purchasing arrangements.

(b) Comptroller's approval is required for the following contracts: (i) contracts for services not listed in Paragraph (3)(a) above made by a State University campus or health care facility certified by the Vice Chancellor and Chief Financial Officer, if the contract value exceeds \$250,000; (ii) contracts for services not listed in Paragraph (3)(a) above made by a State University campus not certified by the Vice Chancellor and Chief Financial Officer, if the contract value exceeds \$50,000; (iii) contracts for services not listed in Paragraph (3)(a) above made by health care facilities not certified by the Vice Chancellor and Chief Financial Officer, if the contract value exceeds \$75,000; (iv) contracts whereby the State University agrees to give something other than money, when the value or reasonably estimated value of such consideration exceeds \$10,000; (v) contracts for real property transactions if the contract value exceeds \$50,000; (vi) all other contracts not listed in Paragraph 3(a) above, if the contract value exceeds \$50,000, e.g. SUNY acquisition of a business and New York State Finance Article 11-B contracts and (vii) amendments for any amount to contracts not listed in Paragraph (3)(a) above, when as so amended, the contract exceeds the threshold amounts stated in Paragraph (b) herein. However, such pre-approval shall not be required for any contract established as a centralized contract through the Office of General Services or for a purchase order or other transaction issued under such centralized contract.

(c) Any contract that requires Comptroller

approval shall not be valid, effective or binding upon the State University until it has been approved by the Comptroller and filed in the Comptroller's office.

4. WORKERS' COMPENSATION BENEFITS. In accordance with Section 142 of the State Finance Law, this contract shall be void and of no force and effect unless the Contractor shall provide and maintain coverage during the life of this contract for the benefit of such employees as are required to be covered by the provisions of the Workers' Compensation Law.

5. NON-DISCRIMINATION REQUIREMENTS. To the extent required by Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, (including gender identity or expression), national origin, sexual orientation, military status, age, disability, predisposing genetic characteristics, marital status or domestic violence victim status. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this contract shall be performed within the State of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex, or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 thereof, Contractor agrees that neither it nor its subcontractors shall by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. Contractor is subject to fines of \$50.00 per person per day for any violation of Section 220-e or Section 239 as well as possible termination of this contract and forfeiture of all moneys due hereunder for a second or subsequent violation

6. WAGE AND HOURS PROVISIONS. If this is a public work contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, neither Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. Additionally, effective April 28, 2008, if this is a public work contract covered by Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by SUNY of any SUNY-approved sums due and owing for work done upon the project.

7. NON-COLLUSIVE BIDDING CERTIFICATION. In accordance with Section 139-d of the State Finance Law, if this contract was awarded based on the submission of competitive bids, Contractor affirms, under penalty of perjury, and each person signing on behalf of Contractor, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that its bid was arrived at independently and without collusion aimed at restricting competition. Contractor further affirms that, at the time Contractor submitted its bid, an authorized and responsible person executed and delivered to SUNY a non-collusive bidding certification on Contractor's behalf.

8. INTERNATIONAL BOYCOTT PROHIBITION. In accordance with Section 220-f of the Labor Law and Section 139-h of the State Finance Law, if this contract exceeds \$5,000, the Contractor agrees, as a material condition of the contract, that neither the Contractor nor any substantially owned or affiliated person, firm, partnership or corporation has participated, is participating, or shall participate in an international boycott in violation of the federal Export Administration Act of 1979 (50 USC App. Sections 2401 *et seq.*) or regulations thereunder. If such Contractor, or any of the aforesaid affiliates of Contractor, is convicted or is otherwise found to have violated said laws or regulations upon the final determination of the United States Commerce Department or any other appropriate agency of the United States subsequent to the contract's execution, such contract, amendment or modification thereto shall be rendered forfeit and void. The Contractor shall so notify the State Comptroller within five (5) business days of such conviction, determination or disposition of appeal (2 NYCRR 105.4).

9. SET-OFF RIGHTS. The State shall have all of its common law, equitable and statutory rights of set-off. These rights shall include, but not be limited to, the State's option to withhold for the purposes of set-off any moneys due to the Contractor under this contract up to any amounts due and owing to the State with regard to this contract, any other contract with any State department or agency, including any contract for a term commencing prior to the term of this contract, plus any amounts due and owing to the State for any other reason including, without limitation, tax delinquencies or monetary penalties relative thereto. The State shall exercise its set-off rights in accordance with normal State practices including, in cases of set-off pursuant to an audit, the finalization of such audit by the State, its representatives, or the State Comptroller.

10. RECORDS. The Contractor shall establish and maintain complete and accurate books, records, documents, accounts and other evidence directly pertinent to performance under this contract (hereinafter, collectively, "the Records"). The Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The State Comptroller, the Attorney General and any other person or entity authorized to conduct an examination, as SUNY and its representatives and entities involved in this contract, shall have access to the Records during normal business hours at an office of the Contractor within the State of New York or, if no such office is available, at a mutually agreeable and reasonable venue within the State, for the term specified above for the purposes of inspection, auditing and copying. SUNY shall take reasonable steps to protect from

public disclosure any of the Records which are exempt from disclosure under Section 87 of the Public Officers Law (the "Statute") provided that: (i) the Contractor shall timely inform an appropriate SUNY official, in writing, that said Records should not be disclosed; and (ii) said Records shall be sufficiently identified; and (iii) designation of said Records as exempt under the Statute is reasonable. Nothing contained herein shall diminish, or in any way adversely affect, SUNY's or the State's right to discovery in any pending or future litigation.

11. IDENTIFYING INFORMATION AND PRIVACY NOTIFICATION.

Identification Number(s). Every invoice or New York State Claim for Payment submitted to the State University of New York by a payee, for payment for the sale of goods or services or for transactions (e.g., leases, easements, licenses, etc.) related to real or personal property must include the payee's identification number. The number is any or all of the following: (i) the payee's Federal employer identification number, (ii) the payee's Federal social security number, and/or (iii) the payee's Vendor Identification Number assigned by the Statewide Financial System. Failure to include such number or numbers may delay payment. Where the payee does not have such number or numbers, the payee, on its invoice or Claim for Payment, must give the reason or reasons why the payee does not have such number or numbers.

(b) Privacy Notification. (1) The authority to request the above personal information from a seller of goods or services or a lessor of real or personal property, and the authority to maintain such information, is found in Section 5 of the State Tax Law. Disclosure of this information by the seller or lessor to the State University of New York is mandatory. The principal purpose for which the information is collected is to enable the State to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their tax liabilities and to generally identify persons affected by the taxes administered by the Commissioner of Taxation and Finance. The information will be used for tax administration purposes and for any other purpose authorized by law. (2) The personal information is requested by the purchasing unit of the State University of New York contracting to purchase the goods or services or lease the real or personal property covered by this contract or lease. The information is maintained in the Statewide Financial System by the Vendor Management Unit within the Bureau of State Expenditures, Office of the State Comptroller, 110 State Street, Albany, New York 12236.

12. EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITIES AND WOMEN.

(a) In accordance with Section 312 of the Executive Law and 5 NYCRR 143, if this contract is: (i) a written agreement or purchase order instrument, providing for a total expenditure in excess of \$25,000.00, whereby a contracting agency is committed to expend or does expend funds in return for labor, services, supplies, equipment, materials or any combination of the foregoing, to be performed for, or rendered or furnished to the contracting agency; or (ii) a written agreement in excess of \$100,000.00 whereby a contracting agency is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; or (iii) a written agreement in excess of \$100,000.00 whereby the owner of a State assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project, then the following shall apply and by signing this agreement the Contractor certifies and affirms that it is Contractor's equal employment opportunity policy that:

(1) The Contractor will not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age,

disability or marital status, and will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. Affirmative action shall mean recruitment, employment, job assignment, promotion, upgradings, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation;

(2) at SUNY's request, Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein; and

(3) Contractor shall state, in all solicitations or advertisements for employees, that, in the performance of the State contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

(b) Contractor will include the provisions of "1", "2" and "3", above, in every subcontract over \$25,000.00 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (the "Work") except where the Work is for the beneficial use of the Contractor. Section 312 does not apply to: (i) work, goods or services unrelated to this contract; or (ii) employment outside New York State. The State shall consider compliance by a Contractor or sub-contractor with the requirements of any federal law concerning equal employment opportunity which effectuates the purpose of this section. SUNY shall determine whether the imposition of the requirements of the provisions hereof duplicate or conflict with any such federal law and if such duplication or conflict exists, SUNY shall waive the applicability of Section 312 to the extent of such duplication or conflict. Contractor will comply with all duly promulgated and lawful rules and regulations of the Department of Economic Development's Division of Minority and Women's Business Development pertaining hereto.

13. **CONFLICTING TERMS.** In the event of a conflict between the terms of the contract (including any and all attachments thereto and amendments thereof) and the terms of this Exhibit A, the terms of this Exhibit A shall control.

14. **GOVERNING LAW.** This contract shall be governed by the laws of the State of New York except where the Federal supremacy clause requires otherwise.

15. **LATE PAYMENT.** Timeliness of payment and any interest to be paid to Contractor for late payment shall be governed by Article 11-A of the State Finance Law to the extent required by law.

16. **NO ARBITRATION.** Disputes involving this contract, including the breach or alleged breach thereof, may not be submitted to binding arbitration (except where statutorily authorized) but must, instead, be heard in a court of competent jurisdiction of the State of New York.

17. **SERVICE OF PROCESS.** In addition to the methods of service allowed by the State Civil Practice Law & Rules ("CPLR"), Contractor hereby consents to service of process upon it by registered or certified mail, return receipt requested. Service hereunder shall be complete upon Contractor's actual receipt of process or upon the State's receipt of the return thereof by the United States Postal Service as refused or undeliverable. Contractor must promptly notify the State, in writing, of each and every change of address to which service of process can be made. Service by the State to the last known address shall be sufficient. Contractor will have thirty (30)

calendar days after service hereunder is complete in which to respond.

18. **PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS.** The Contractor certifies and warrants that all wood products to be used under this contract award will be in accordance with, but not limited to, the specifications and provisions of State Finance Law §165 (Use of Tropical Hardwoods), which prohibits purchase and use of tropical hardwoods, unless specifically exempted, by the State or any governmental agency or political subdivision or public benefit corporation. Qualification for an exemption under this law will be the responsibility of the contractor to establish to meet with the approval of the State. In addition, when any portion of this contract involving the use of woods, whether supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid proposal that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in Section 165 of the State Finance Law. Any such use must meet with the approval of the State, otherwise, the bid may not be considered responsive. Under bidder certification, proof of qualification for exemption will be the responsibility of the Contractor to meet with the approval of the State.

19. **MacBRIDE FAIR EMPLOYMENT PRINCIPLES.** In accordance with the MacBride Fair Employment Principles (Chapter 807 of the Laws of 1992), the Contractor hereby stipulates that Contractor and any individual or legal entity in which the Contractor holds a ten percent or greater ownership interest and any individual or legal entity that holds a ten percent or greater ownership interest in the Contractor either (a) have no business operations in Northern Ireland, or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles (as described in Section 165(5) of the State Finance Law), and shall permit independent monitoring of compliance with such principles.

20. OMNIBUS PROCUREMENT ACT OF 1992.

It is the policy of New York State to maximize opportunities for the participation of New York State business enterprises, including minority and women-owned business enterprises as bidders, subcontractors and suppliers on its procurement contracts.

Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development
Division for Small Business
30 South Pearl St., 7th Floor
Albany, NY 12245
Tel: 518-292-5100
Fax: 518-292-5884
email: opa@esd.ny.gov

A directory of certified minority and women-owned business enterprises is available from:

NYS Department of Economic Development
Division of Minority and Women's Business Development
633 Third Avenue
New York, NY 10017
212-803-2414

email: mwbecertification@esd.ny.gov
<https://ny.newnycontracts.com/FrontEnd/VendorSearchPublic.asp>

The Omnibus Procurement Act of 1992 requires that by signing this bid proposal or contract, as applicable, Contractors certify that whenever the total bid amount is greater than \$1 million:

(a) The Contractor has made reasonable efforts to encourage the participation of New York State Business Enterprises as suppliers and subcontractors, including certified minority and women-owned business enterprises, on this

project, and has retained the documentation of these efforts to be provided upon request to SUNY;

(b) The Contractor has complied with the Federal Equal Employment Opportunity Act of 1972 (P.L. 92-261), as amended;

(c) The Contractor agrees to make reasonable efforts to provide notification to New York State residents of employment opportunities on this project through listing any such positions with the Job Search Division of the New York State Department of Labor, or providing such notification in such manner as is consistent with existing collective bargaining contracts or agreements. The contractor agrees to document these efforts and to provide said documentation to the State upon request; and

(d) The Contractor acknowledges notice that SUNY may seek to obtain offset credits from foreign countries as a result of this contract and agrees to cooperate with SUNY in these efforts.

21. RECIPROCITY AND SANCTIONS

PROVISIONS. Bidders are hereby notified that if their principal place of business is located in a country, nation, province, state or political subdivision that penalizes New York State vendors, and if the goods or services they offer will be substantially produced or performed outside New York State, the Omnibus Procurement Act of 1994 and 2000 amendments (Chapter 684 and Chapter 383, respectively) require that they be denied contracts which they would otherwise obtain. Contact the NYS Department of Economic Development, Division for Small Business, 30 South Pearl Street, Albany, New York 12245, for a current list of jurisdictions subject to this provision.

22. COMPLIANCE WITH NEW YORK STATE INFORMATION SECURITY BREACH AND NOTIFICATION ACT. Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa; State Technology Law Section 208).

23. COMPLIANCE WITH CONSULTANT DISCLOSURE LAW If this is a contract for consulting services, defined for purposes of this requirement to include analysis, evaluation, research, training, data processing, computer

programming, engineering, environmental health and mental health services, accounting, auditing, paralegal, legal or similar services, then in accordance with Section 163(4-g) of the State Finance Law, the Contractor shall timely, accurately and properly comply with the requirement to submit an annual employment report for the contract to SUNY, the Department of Civil Service and the State Comptroller.

24. PURCHASES OF APPAREL AND SPORTS EQUIPMENT. In accordance with State Finance Law Section 165(7), SUNY may determine that a bidder on a contract for the purchase of apparel or sports equipment is not a responsible bidder as defined in State Finance Law Section 163 based on (a) the labor standards applicable to the manufacture of the apparel or sports equipment, including employee compensation, working conditions, employee rights to form unions and the use of child labor; or (b) bidder's failure to provide information sufficient for SUNY to determine the labor conditions applicable to the manufacture of the apparel or sports equipment.

25. PROCUREMENT LOBBYING. To the extent this agreement is a "procurement contract" as defined by State Finance Law Sections 139-j and 139-k, by signing this agreement the contractor certifies and affirms that all disclosures made in accordance with State Finance Law Sections 139-j and 139-k are complete, true and accurate. In the event such certification is found to be intentionally false or intentionally incomplete, the State may terminate the agreement by providing written notification to the Contractor in accordance with the terms of the agreement.

26. CERTIFICATION OF REGISTRATION TO COLLECT SALES AND COMPENSATING TAX BY CERTAIN STATE CONTRACTORS, AFFILIATES AND SUBCONTRACTORS. To the extent this agreement is a contract as defined by Tax Law Section 5-a, if the Contractor fails to make the certification required by Tax Law Section 5-a or if during the term of the contract, the Department of Taxation and Finance or SUNY discovers that the certification, made under penalty of perjury, is false, then such failure to file or false certification shall be a material breach of this contract and this contract may be terminated, by providing written notification to the Contractor

in accordance with the terms of the agreement, if SUNY determines that such action is in the best interests of the State.

27. IRAN DIVESTMENT ACT. By entering into this Agreement, Contractor certifies in accordance with State Finance Law §165-a that it is not on the "Entities Determined to be Non-Responsive Bidders/Offerers pursuant to the New York State Iran Divestment Act of 2012" ("Prohibited Entities List") posted at: <http://www.oqs.ny.gov/about/regs/docs/ListofEntities.pdf>

Contractor further certifies that it will not utilize on this Contract any subcontractor that is identified on the Prohibited Entities List. Contractor agrees that should it seek to renew or extend this Contract, it must provide the same certification at the time the Contract is renewed or extended. Contractor also agrees that any proposed Assignee of this Contract will be required to certify that it is not on the Prohibited Entities List before the contract assignment will be approved by the State.

During the term of the Contract, should the state agency receive information that a person (as defined in State Finance Law §165-a) is in violation of the above-referenced certifications, the state agency will review such information and offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment activity which is in violation of the Act within 90 days after the determination of such violation, then the state agency shall take such action as may be appropriate and provided for by law, rule, or contract, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

The state agency reserves the right to reject any bid, request for assignment, renewal or extension for an entity that appears on the Prohibited Entities List prior to the award, assignment, renewal or extension of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the Prohibited Entities list after contract award.

THE FOLLOWING PROVISIONS SHALL APPLY ONLY TO THOSE CONTRACTS TO WHICH A HOSPITAL OR OTHER HEALTH SERVICE FACILITY IS A PARTY

28. Notwithstanding any other provision in this contract, the hospital or other health service facility remains responsible for insuring that any service provided pursuant to this contract complies with all pertinent provisions of Federal, state and local statutes, rules and regulations. In the foregoing sentence, the word "service" shall be construed to refer to the health care service rendered by the hospital or other health service facility.

29. (a) In accordance with the 1980 Omnibus Reconciliation Act (Public Law 96-499), Contractor hereby agrees that until the expiration of four years after the furnishing of services under this agreement, Contractor shall make available upon written request to the Secretary of Health and Human Services, or upon request, to the Comptroller General of the United States or any of their duly authorized representatives, copies of this contract, books, documents and records of the Contractor that are necessary to certify the nature and extent of the costs hereunder.

(b) If Contractor carries out any of the duties of the contract hereunder, through a subcontract having a value or cost of \$10,000 or more over a twelve-month period, such subcontract shall contain a clause to the effect that, until the expiration of four years after the furnishing of such services pursuant to such subcontract, the subcontractor shall make available upon written request to the Secretary of Health and Human Services or upon request to the Comptroller General of the United States, or any of their duly authorized representatives, copies of the subcontract and books, documents and records of the subcontractor that are necessary to verify the nature and extent of the costs of such subcontract.

(c) The provisions of this section shall apply only to such contracts as are within the definition established by the Health Care Financing Administration, as may be amended or modified from time to time.

1. DEFINITIONS. The following terms shall be defined in accordance with Section 310 of the Executive Law:

STATE CONTRACT herein referred to as "State Contract", shall mean: (a) a written agreement or purchase order instrument, providing for a total expenditure in excess of twenty-five thousand dollars (\$25,000.00), whereby the State University of New York ("University") is committed to expend or does expend funds in return for labor, services including but not limited to legal, financial and other professional services, supplies, equipment, materials or an combination of the foregoing, to be performed for, or rendered or furnished to the University; (b) a written agreement in excess of one hundred thousand dollars (\$100,000.00) whereby the University is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; and (c) a written agreement in excess of one hundred thousand dollars (\$100,000.00) whereby the University as an owner of a state assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project.

SUBCONTRACT herein referred to as "Subcontract", shall mean any agreement for a total expenditure in excess of \$25,000 providing for services, including non-staffing expenditures, supplies or materials of any kind between a State agency and a prime contractor, in which a portion of the prime contractor's obligation under the State contract is undertaken or assumed by a business enterprise not controlled by the prime contractor.

WOMEN-OWNED BUSINESS ENTERPRISE herein referred to as "WBE", shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (a) at least fifty-one percent (51%) owned by one or more United States citizens or permanent resident aliens who are women; (b) an enterprise in which the ownership interest of such women is real, substantial and continuing; (c) an enterprise in which such women ownership has and exercises the authority to control independently the day-to-day business decisions of the enterprise; (d) an enterprise authorized to do business in this state and independently owned and operated; (e) an enterprise owned by an individual or individuals, whose ownership, control and operation are relied upon for certification, with a personal net worth that does not exceed three million five hundred thousand dollars (\$3,500,000), as adjusted annually on the first of January for inflation according to the consumer price index of the previous year; and (f) an enterprise that is a small business pursuant to subdivision twenty of this section.

A firm owned by a minority group member who is also a woman may be certified as a minority-owned business enterprise, a women-owned business enterprise, or both, and may be counted towards either a minority-owned business enterprise goal or a women-owned business enterprise goal, in regard to any Contract or any goal, set by an agency or authority, but such participation may not be counted towards both such goals. Such an enterprise's participation in a Contract may not be divided between the minority-owned business enterprise goal and the women-owned business enterprise goal.

MINORITY-OWNED BUSINESS ENTERPRISE herein referred to as

"MBE", shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (a) at least fifty-one percent (51%) owned by one or more minority group members; (b) an enterprise in which such minority ownership is real, substantial and continuing; (c) an enterprise in which such minority ownership has and exercises the authority to control independently the day-to-day business decisions of the enterprise; (d) an enterprise authorized to do business in this state and independently owned and operated; (e) an enterprise owned by an individual or individuals, whose ownership, control and operation are relied upon for certification, with a personal net worth that does not exceed three million five hundred thousand dollars (\$3,500,000.00), as adjusted annually on the first of January for inflation according to the consumer price index of the previous year; and (f) an enterprise that is a small business pursuant to subdivision twenty of this section.

MINORITY GROUP MEMBER shall mean a United States citizen or permanent resident alien who is and can demonstrate membership in one of the following groups: (a) Black persons having origins in any of the Black African racial groups; (b) Hispanic persons of Mexican, Puerto Rican, Dominican, Cuban, Central or South American of either Indian or Hispanic origin, regardless of race; (c) Native American or Alaskan native persons having origins in any of the original peoples of North America. (d) Asian and Pacific Islander persons having origins in any of the Far East countries, South East Asia, the Indian Subcontinent or Pacific Islands.

CERTIFIED ENTERPRISE OR BUSINESS shall mean a business verified as a minority or women-owned business enterprise pursuant to section 314 of the Executive Law.

A business enterprise which has been approved by the New York Division of Minority & Women Business Development ("DMWBD") for minority or women-owned enterprise status subsequent to verification that the business enterprise is owned, operated, and controlled by minority group members or women, and that also meets the financial requirements set forth in the regulations.

2. TERMS. The parties to the attached State Contract agree to be bound by the following provisions which are made a part hereof (the word "Contractor" herein refers to any party other than the University:

1(a) Contractor and its Subcontractors shall undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. For these purposes, affirmative action shall apply in the areas of recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.

(b) Prior to the award of a State Contract, the Contractor shall submit an equal employment opportunity (EEO) policy statement to the University within the time frame established by the University.

(c) As part of the Contractor's EEO policy statement, the Contractor, as a precondition to entering into a valid and binding State Contract, shall agree to the following in the performance of the State Contract: (i) The Contractor will not discriminate against any employee or applicant for employment, will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on State Contracts;(ii) The Contractor

shall state in all solicitations or advertisements for employees that, in the performance of the State Contract, all qualified applicants will be afforded equal employment opportunities without discrimination; (iii) At the request of the University the Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate, and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein.

(d) Form 108 - Staffing Plan To ensure compliance with this Section, the Contractor shall submit a staffing plan to document the composition of the proposed workforce to be utilized in the performance of the Contract by the specified categories listed, including ethnic background, gender, and Federal occupational categories. Contractors shall complete the Staffing plan form and submit it as part of their bid or proposal or within a reasonable time, but no later than the time of award of the contract.

(e) Form 112 - Workforce Employment Utilization Report ("Workforce Report")

(i) Once a contract has been awarded and during the term of Contract, Contractor is responsible for updating and providing notice to SUNY of any changes to the previously submitted Staffing Plan. This information is to be submitted on a quarterly basis during the term of the contract to report the actual workforce utilized in the performance of the contract by the specified categories listed including ethnic background, gender, and Federal occupational categories. The Workforce Report must be submitted to report this information.

(ii) Separate forms shall be completed by Contractor and any subcontractor performing work on the Contract.

(iii) In limited instances, Contractor

may not be able to separate out the workforce utilized in the performance of the Contract from Contractor's and/or subcontractor's total workforce. When a separation can be made, Contractor shall submit the Workforce Report and indicate that the information provided related to the actual workforce utilized on the Contract. When the workforce to be utilized on the contract cannot be separated out from Contractor's and/or subcontractor's total workforce, Contractor shall submit the Workforce Report and indicate that the information provided is Contractor's total workforce during the subject time frame, not limited to work specifically under the contract.

(f) Contractor shall comply with the provisions of the Human Rights Law, all other State and Federal statutory and constitutional non-discrimination provisions. Contractor and subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.

(g) The Contractor shall include the provisions of this section in every Subcontract in such a manner that the requirements of the provisions will be binding upon each Subcontractor as to work in connection with the State Contract, including the requirement that Subcontractors shall undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and, when requested, provide to the Contractor information on the ethnic background, gender, and Federal occupational categories of the

employees to be utilized on the State Contract.

(h) To ensure compliance with the requirements of this paragraph, the University shall inquire of a Contractor whether the work force to be utilized in the performance of the State Contract can be separated out from the Contractor's and/or Subcontractors' total work force and where the work of the State Contract is to be performed. For Contractors who are unable to separate the portion of their work force which will be utilized for the performance of this State Contract, Contractor shall provide reports describing its entire work force by the specified ethnic background, gender, and Federal Occupational Categories, or other appropriate categories which the agency may specify.

(i) The University may require the Contractor and any Subcontractor to submit compliance reports, pursuant to the regulations relating to their operations and implementation of their affirmative action or equal employment opportunity program in effect as of the date the State Contract is executed.

(j) If a Contractor or Subcontractor does not have an existing affirmative action program, the University may provide to the Contractor or Subcontractor a model plan of an affirmative action program. Upon request, the Director of DMWBD shall provide a contracting agency with a model plan of an affirmative action program.

(k) Upon request, DMWBD shall provide the University with information on specific recruitment sources for minority group members and woman, and contracting agencies shall make such information available to Contractors

3. Contractor must provide the names, addresses and federal identification numbers of certified minority- and women-owned business enterprises which the Contractor intends to use to perform the State Contract and a description of the Contract scope of work which the Contractor intends to structure to

increase the participation by Certified minority- and/or women-owned business enterprises on the State Contract, and the estimated or, if known, actual dollar amounts to be paid to and performance dates of each component of a State Contract which the Contractor intends to be performed by a certified minority- or woman-owned business enterprise. In the event the Contractor responding to University solicitation is joint venture, teaming agreement, or other similar arrangement that includes a minority- and women owned business enterprise, the Contractor must submit for review and approval: i. the name, address, telephone number and federal identification of each partner or party to the agreement; ii. the federal identification number of the joint venture or entity established to respond to the solicitation, if applicable; iii. A copy of the joint venture, teaming or other similar arrangement which describes the percentage of interest owned by each party to the agreement and the value added by each party; iv. A copy of the mentor-protégé agreement between the parties, if applicable, and if not described in the joint venture, teaming agreement, or other similar arrangement.

4. PARTICIPATION BY MINORITY GROUP MEMBERS AND WOMEN. The University shall determine whether Contractor has made conscientious and active efforts to employ and utilize minority group members and women to perform this State Contract based upon an analysis of the following factors:

(a) Whether Contractor established and maintained a current list of recruitment sources for minority group members and women, and whether Contractor provided written notification to such recruitment sources that contractor had employment opportunities at the time such opportunities became available.

(b) Whether Contractor sent letters to recruiting sources, labor unions, or authorized representatives of workers with which contractor has

a collective bargaining or other agreement or understanding requesting assistance in locating minority group members and women for employment.

(c) Whether Contractor disseminated its EEO policy by including it in any advertising in the news media, and in particular, in minority and women news media.

(d) Whether Contractor has attempted to provide information concerning its EEO policy to Subcontractors with which it does business or had anticipated doing business.

(e) Whether internal procedures exist for, at a minimum, annual dissemination of the EEO policy to employees, specifically to employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions. Such dissemination may occur through distribution of employee policy manuals and handbooks, annual reports, staff meetings and public postings.

(f) Whether Contractor encourages and utilizes minority group members and women employees to assist in recruiting other employees.

(g) Whether Contractor has apprentice training programs approved by the N.Y.S. Department of Labor which provides for training and hiring of minority group members and women.

(h) Whether the terms of this section have been incorporated into each Subcontract which is entered into by the Contractor.

5. PARTICIPATION BY MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES. Based upon an analysis of the following factors, the University shall determine whether Contractor has made good faith efforts to provide for meaningful participation by minority-owned and women-owned business enterprises which have been certified by DMWBD:

(a) Whether Contractor has actively solicited bids for Subcontracts from qualified

M/WBEs, including those firms listed on the Directory of Certified Minority and Women-Owned Business Enterprises, and has documented its good faith efforts towards meeting minority and women owned business enterprise utilization plans by providing, copies of solicitations, copies of any advertisements for participation by certified minority- and women-owned business enterprises timely published in appropriate general circulation, trade and minority- or women-oriented publications, together with the listing(s) and date(s) of the publications of such advertisements; dates of attendance at any pre-bid, pre-award, or other meetings, if any, scheduled by the University, with certified minority- and women-owned business enterprises, and the reasons why any such firm was not selected to participate on the project.

(b) Whether Contractor has attempted to make project plans and specifications available to firms who are not members of associations with plan rooms and reduce fees for firms who are disadvantaged.

(c) Whether Contractor has utilized the services of organizations which provide technical assistance in connection with M/WBE participation.

(d) Whether Contractor has structured its Subcontracts so that opportunities exist to complete smaller portions of work.

(e) Whether Contractor has encouraged the formation of joint ventures, partnerships, or other similar arrangements among Subcontractors.

(f) Whether Contractor has requested the services of the Department of Economic Development (DED) to assist Subcontractors' efforts to satisfy bonding requirement.

(g) Whether Contractor has made progress payments promptly to its Subcontractors.

(h) Whether the terms of this section have been incorporated into each Subcontract which is entered into by the Contractor. It shall be the responsibility of Contractor to

ensure compliance by every Subcontractor with these provisions.

6. MWBE Utilization Plan.

(a) The Contractor represents and warrants that Contractor has submitted an MWBE Utilization Plan prior to the execution of the contract.

(b) MWBE Utilization Plan (Form 7557-107).

Contractors are required to submit a Utilization Plan on Form 7557-107 with their bid or proposal. Complete the following steps to prepare the Utilization Plan:

- i. list NYS Certified minority- and women-owned business enterprises which the Contractor intends to use to perform the State contract;
- ii. insert a description of the contract scope of work which the Contractor intends to structure to increase the participation by NYS Certified minority- and women-owned enterprises on the State contract;
- iii. insert the estimated or, if known, actual dollar amounts to be paid to and performance dates of each component of a State contract which the Contractor intends to be performed by a NYS Certified minority- or women-owned business; and

(c) Any modifications or changes to the agreed participation by NYS Certified MWBEs after the Contract Award and during the term of the contract must be reported on a revised MWBE Utilization Plan and submitted to the SUNY University-wide MWBE Program Office.

(d) The University will review the MWBE Utilization Plan and will issue the Contractor a written notice of acceptance or deficiency within twenty (20) day of its receipt. A notice of deficiency shall include the:

- i. list NYS Certified minority- and women-owned business enterprises which the

Contractor intends to use to perform the State contract; name of any MWBE which is not acceptable for the purpose of complying with the MWBE participation goals;

- ii. reasons why it is not an acceptable element of the Contract scope of work which the MWBE Program Office has determined can be reasonably structured by the Contractor to increase the likelihood of participation in the Contract by MWBEs; and
- iv. other information which the MWBE Program Office determines to be relevant to the MWBE Utilization Plan.

(e) The Contractor shall respond to the notice of deficiency within seven (7) business days of receipt by submitting to the University a written remedy in response to the notice of deficiency.

- i. If the written remedy that is submitted is not timely or is found to be inadequate, the University-wide MWBE Program Office shall notify the Contractor and direct the Contractor to submit, within five (5) business days, a request for partial or total waiver of MWBE participation goals on forms provided by the University-wide MWBE Program Office.

- ii. Failure to file the waiver form in a timely manner may be grounds for disqualification of the bid or proposal.

(f) The University may disqualify a Contractor as being non-responsive under the following circumstances:

- i. If a Contractor fails to submit a MWBE Utilization Plan;
- ii. If a Contractor fails to submit a written remedy to a notice of deficiency in a MWBE Utilization Plan;
- iii. If a Contractor fails to submit a request for waiver; or

iv. If the MWBE Program Office determines that the Contractor has failed to document Good Faith Efforts.

(g) Contractor agrees to use such MWBE Utilization Plan for the performance of MWBEs on the Contract pursuant to the prescribed MWBE goals set forth in Section III-A of this Appendix.

(h) Contractor further agrees that a failure to submit and/or use such MWBE Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, SUNY shall be entitled to any remedy provided herein, including but not limited to, a finding of Contractor non-responsiveness.

7. Waivers.

(a) For Waiver Requests Contractor should use (Form 7557-114) – Waiver Request.

(b) If the Contractor, after making good faith efforts, is unable to comply with MWBE goals, the Contractor may submit a Request for Waiver form documenting good faith efforts by the Contractor to meet such goals. If the documentation included with the waiver request is complete the University shall evaluate the request and issue a written notice of acceptance or denial within twenty (20) days of receipt.

(c) If University, upon review of the MWBE Utilization Plan and updated Quarterly MWBE Contractor Compliance Reports determines that Contractor is failing or refusing to comply with the Contract goals and no waiver has been issued in regards to such non-compliance, the University may issue a notice of deficiency to the Contractor. The contractor must respond to the notice of deficiency within seven (7) business days of receipt. Such response may include a request for partial or total waiver of MWBE Contract Goals.

8. Quarterly MWBE Contractor Compliance Report.

Contractor is required to submit a Quarterly MWBE Contractor Compliance Report (Form 7557-114) to the University by the 5th day following each end of quarter over the term of the Contract documenting the progress made towards achievement of the MWBE goals of the Contract.

9. GOALS. (a) GOALS FOR MINORITY AND WOMEN WORK FORCE PARTICIPATION.

(i) The University shall include relevant work force availability data, which is provided by the DMWBD, in all documents which solicit bids for State Contracts and shall make efforts to assist Contractors in utilizing such data to determine expected levels of participation for minority group members and women on State Contracts.

(ii) Contractor shall exert good faith efforts to achieve such goals for minority and women's participation. To successfully achieve such goals, the employment of minority group members and women by Contractor must be substantially uniform during the entire term of this State Contract. In addition, Contractor should not participate in the transfer of employees from one employer or project to another for the sole purpose of achieving goals for minority and women's participation.

(b) GOALS FOR MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES PARTICIPATION. For all State Contracts in excess of \$25,000.00 whereby the University is committed to expend or does expend funds in return for labor, services including but not limited to legal, financial and other professional services, supplies, equipment, materials or a combination of the foregoing or all State Contracts in excess of \$100,000.00 whereby the University is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or

renovation of real property and improvements thereon, Contractor shall exert good faith efforts to achieve a participation goal of Twenty Five, point Fifty One percent **(25.51%)** for Certified Minority-Owned Business Enterprises and Eight, point Eighty Six percent **(8.86%)** for Certified Women-Owned Business Enterprises.

10. ENFORCEMENT. The University will be responsible for enforcement of each Contractor's compliance with these provisions. Contractor, and each Subcontractor, shall permit the University access to its books, records and accounts for the purpose of investigating and determining whether Contractor or Subcontractor is in compliance with the requirements of Article 15-A of the Executive Law. If the University determines that a Contractor or Subcontractor may not be in compliance with these provisions, the University may make every reasonable effort to resolve the issue and assist the Contractor or Subcontractor in its efforts to comply with these provisions. If the University is unable to resolve the issue of noncompliance, the University may file a complaint with the DMWBD.

Failure to comply with all of the requirements herein may result in a finding of non-responsiveness, non-responsibility and/or a breach of contract, leading to the withholding of funds or such other actions, remedies or enforcement proceedings as allowed by the Contract.

11. DAMAGES FOR NON COMPLIANCE.

Where the University determines that Contractor is not in compliance with the requirements of the Contract and Contractor refuses to comply with such requirements, or if Contractor is found to have willfully and intentionally failed to comply with the MWBE participation goals, Contractor shall be obligated to pay liquidated damages to the University.

Such liquidated damages shall be calculated as an amount equaling the difference between:

- a. All sums identified for payment to MWBEs had the Contractor achieved the contractual MWBE goals; and
- b. All sums actually paid to MWBEs for work performed or materials supplied under the Contract.

In the event a determination has been made which requires the payment of liquidated damages and such identified sums have not been withheld by the University, Contractor shall pay such liquidated damages to the University within sixty (60) days after such damages are assessed, unless prior to the expiration of such sixtieth day, the Contractor has filed a

complaint with the Director of the Division of Minority and Woman Business Development pursuant to Subdivision 8 of Section 313 of the Executive Law in which event the liquidated damages shall be payable if Director renders a decision in favor of the University.



Technical Specifications

For construction contracts greater than \$20,000

New Natural Gas Pipeline Installation Project

SU-021919

Dated February 19, 2019

Proposal Due Date

March 26th, 2019

State University of New York Purchase College

735 Anderson Hill Road

Purchase, New York 10577-1402

F. Edward Herran, Director of Procurement & Accounts Payable

DIVISION 01 – GENERAL REQUIREMENTS
SECTION 01 56 26 – TEMPORARY FENCING

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases.
- C. Manual gates and related hardware.

1.02 REFERENCES

- A. ASTM A116 Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.
- B. ASTM A121 Zinc-Coated (Galvanized) Steel Barbed Wire.
- C. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM A392 Zinc-Coated Steel Chain-Link Fence Fabric.
- E. ASTM C94 Ready-mixed Concrete.
- F. ASTM F567 Installation of Chain-Link Fence.
- G. ASTM F573 Residential Zinc-Coated Steel Chain Link Fence Fabric.
- H. ASTM F669 Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence.
- I. ASTM F1083 Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
- J. ASTM F1234 - Protective Coatings on Steel Framework for Fences.
- K. Chain Link Fence Manufacturers Institute (CLFMI) - Product Manual.

1.03 SYSTEM DESCRIPTION

- A. Fence Height: Height as specified on the Drawings or match existing.
- B. Line Post Spacing: At intervals not exceeding 10 feet.
- C. Fence Post and Rail Strength: Conform to ASTM F669 Heavy Industrial Fence quality.

1.04 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: None.
- C. Shop Drawings: None.

1.05 SUBMITTALS FOR CLOSEOUT

- A. Section 01700 - Contract Closeout: Procedures for submittals.
- B. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines [and easements].

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with manufacturer's instructions.

1.07 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three (3) years documented experience.

PART 2 - PRODUCTS

2.01 MATERIALS AND COMPONENTS

- A. Materials and Components: Conform to CLFMI Product Manual.
- B. Fabric Size: CLFMI service.
- C. Intermediate Posts: Type I round.
- D. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round.

2.02 MATERIALS

- A. Framing (Steel): ASTM F1083 Schedule 40 galvanized steel pipe, welded construction, minimum yield strength of 25 ksi; coating conforming to ASTM F1234 Type A on pipe exterior and interior.
- B. Fabric Wire (Steel): ASTM A116 galvanized wire.
- C. Concrete: Type specified in Section 03301.

2.03 COMPONENTS

- A. Line Posts: 2.38-inch diameter.
- B. Corner and Terminal Posts: 3.5 inch diameter.
- C. Gate Posts: 2 k inch diameter.
- D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- E. Gate Frame: 1.66 inch diameter for fittings and truss rod fabrication.
- F. Fabric: 2-inch diamond mesh interwoven wire, 9 gage thick, top salvage bottom selvage.
- G. Tension Wire: 6 gage thick Galvanized steel, single strand.
- H. Tie Wire: Min. 11GA Galvanized steel wire at posts and rails.

2.04 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.
- C. Gate Hardware: Fork latch with gravity drop; a minimum of two 180 degree gate hinges per leaf and hardware for padlock.

2.05 FINISHES

- A. Components and Fabric: Galvanized to ASTM A123.
- B. Hardware: Galvanized to ASTM A153.
- C. Accessories: Same finish as framing.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567 or applicable manufacturer's instructions.
- B. Place fabric on inside of posts and rails.
- C. Set posts plumb, in concrete footings with top of footing flush with finish grade. Slope top of concrete for water runoff.
- D. Line Post, Corner, Gate and Terminal Post Footing Depths Below Finish Grade: Sufficient to maintain fencing for the duration of the Work.
- E. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- F. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- G. Install brace rails on corner gate leaves.
- H. Do not stretch fabric until concrete foundation can adequately receive the load of the fence.
- I. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- J. Position bottom of fabric at finished grade.
- K. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- L. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- M. Install bottom tension wire or strap stretched taut between terminal posts.
- N. Do not attach the hinged side of gate from building wall; provide gate posts.
- O. Install gate with fabric and barbed wire overhang to match fence. Install three hinges per leaf with associated other hardware.

3.02 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Position: 1 inch.
- C. Components shall not infringe adjacent property lines.

END OF SECTION

DIVISION 03 - CONCRETE
03 30 00 –CAST IN PLACE CONCRETE

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PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This specification defines the requirements for constructing cast in place concrete as specified herein and on the Contract Documents.
- B. The work of this Section of the Specifications shall include concrete design mix, extra materials, labor, materials, tools, equipment, appliance or services necessary to complete the work as shown on the Drawings, as specified herein, or as required by the job conditions.
- C. The Contractor shall furnish all supervision, labor and materials required to accomplish the work associated with completing the concrete work as specified herein and indicated on the Contract Drawings.

1.02 REFERENCES

- A. All work under this section shall conform to the requirements of the “New York State Building Code”, and the regulations of governmental authorities having jurisdiction.
- B. American Concrete Institute (ACI):
 - 1. ACI 117: Standard Specifications for Tolerances for Concrete Construction and Materials
 - 2. ACI 211.1 & 2: Standard Practice for Selecting Proportions for Concrete
 - 3. ACI 214: Recommended Practice for Evaluation of Strength Test Results of Concrete
 - 4. ACI 304: Guide for Measuring, Mixing, Transporting, and Placing Concrete
 - 5. ACI 305: Hot Weather Concrete
 - 6. ACI 308: Standard Practice for Curing Concrete
 - 7. ACI 309: Guide for Consolidation of Concrete
 - 8. ACI 315: Details and Detailing of Concrete Reinforcement
 - 9. ACI 318: Building Code Requirements for Reinforced Concrete
- C. American Society for Testing and Materials (ASTM):
 - 1. A185: Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 2. C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - 3. C94: Standard Specification for Ready-Mixed Concrete
 - 4. C150: Standard Specification for Portland Cement
 - 5. C494: Standard Specification for Chemical Admixtures for Concrete

1.03 SUBMITTALS

- A. The Contractor shall furnish product data for all proposed material and equipment that will be furnished to complete the work. Submittal type, quantities and distribution shall be in accordance with the General Requirements section of the Contract Documents and this Section.
- B. Product Data: For each type of manufactured material and product indicated.
- C. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mix water to be withheld for later addition at Project site.

D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates.
2. Form materials and form-release agents.
3. Steel reinforcement and reinforcement accessories.
4. Admixtures.
5. Waterstops.
6. Floor and slab treatments.
7. Bonding agents.
8. Adhesives.
9. Joint-filler strips.
10. Repair materials.

E. Minutes of pre-installation conference.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer, with minimum 5 years experience, who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Construction Site Quality: Contractor shall maintain, on site, sufficient office, field engineering, and field supervision staff to assure that all materials and layout correspond with the requirements of the Contract Documents and approved drawings.
- C. Concrete Supplier: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered to the site, ready for use, in the manufacturer's original and unopened containers or packaging. Packaging to contain material description and manufacturer information.
- B. All delivered materials, products or equipment shall be stored under cover in a dry, weather-tight, and adequately ventilated location. All materials shall be elevated off of the ground.
- C. Aggregates to be used in field mixed concrete or grout shall be stockpiled in separate bins or piles in a manner suitable to minimize segregation and contamination of aggregates. Field mixing is not encouraged and will not be allowed without written approval by the Owner's Representative.
- D. Admixture storage tank and dispensing equipment shall be provided and serviced by the admixture manufacturer, at no cost to the owner.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II.
- B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalis, and loss on ignition not to exceed 5 percent.
- C. Coarse Aggregates: ASTM C 33 limits deleterious substances in coarse aggregate depending on climate severity and in-service location of concrete.
 - 1. Size #67 may be used for footings and walls over 12 inches thick.
 - 2. Coarse aggregate for applied topping, encasement of steel columns, and metal pan stair fill shall be Size 7.
 - 3. Maximum size of coarse aggregates not more than 1/5 of the narrowest dimension between sides of forms, 1/3 the depth of slabs, nor 3/4 of the minimum clear spacing between reinforcing bars.
- D. Lightweight Aggregate: ASTM C330, Table 1. Maximum size of aggregate not larger than 1/5 of the narrowest dimension between form, nor 3/4 of the minimum clear distance between reinforcing bars. Contractor to furnish certified report to verify that aggregate is sound and durable, and has a durability factor of not less than 80 based on 300 cycles of freezing and thawing when tested in accordance with ASTM C666.
- E. Fine Aggregate: ASTM C33 Fine aggregate for applied concrete floor topping shall pass a #4 sieve, 10 percent maximum shall pass a #100 sieve.
- F. Water: Potable and complying with ASTM C 94.

2.02 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.03 CURING MATERIALS

- A. Water: Potable.
- B. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:
 - a. Klear-Kote Cure-Sealer-Hardener, 30 percent solids; Burke Group, LLC (The).

- b. Polyseal WB; ChemMasters.
- c. UV Safe Seal; Lambert Corporation.
- d. Lumiseal WB Plus; L&M Construction Chemicals, Inc.
- e. Vocomp-30; W. R. Meadows, Inc.
- f. Metcure 30; Metacrete Industries.
- g. Vexcon Starseal 1315; Vexcon Chemicals, Inc.

2.04 CONCRETE MIXES

- A. Concrete Mix Requirements: Proportions for each mix shall provide for homogeneous, cohesive, workable and dense concrete, suitable in all respects for its intended purpose. Concrete mixes shall be selected to provide an average strength not less than that required by ACI 318, Chapter 5. Selected mixes shall conform to the specified requirements, Contractor may propose with his bid a cost-savings mix design making use of fly ash, but with a maximum replacement of cement with fly ash equal to 10 percent.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. After approval of design mixes no substitution in material or change in proportions of approval mixes may be made without additional tests and approval by the Owner's Representative and Engineer.
- D. Contractor shall notify the Owner's Representative of the time and location where each trial mix will be performed to permit the Testing Agency to observe the preparation, batching and testing, should the owner elect to do so.
- E. Air Entrainment: Entrained air is not required for concrete for footings. All other concrete shall be air entrained to 5-1/2 percent, except pea gravel and sidewalk concrete with shall be air-entrained to 6-1/2 percent.
- F. Cement Factor: Maintain minimum cement factors below regardless of compressive strength developed minimums, for air entrained concrete:
 - 1. 4000 psi – Minimum Cement 550 (lbs/yd) – Max. Water/Cement (.50)
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45 for concrete exposed to deicers or subject to freezing and thawing while moist.
- G. Cement Factor: Maintain minimum cement factors below regardless of compressive strength developed minimums, for non-air entrained concrete:
 - 1. 4000 psi – Minimum Cement 550 (lbs/yd) – Max. Water/Cement (.55)
- H. Slab-on-Grade: Proportion normal-weight concrete mix as follows:
 - 1. Compressive Strength (28 Days): 4000 psi.
 - 2. Maximum Slump: 4 inches.
- I. Admixtures: Slump may be increased by the use of the approved high range water-reducing admixture. Tolerances are as established by ASTM C94.
 - 1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.05 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Fabric (sizes less than W4.0): ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Welded Steel Wire Fabric (sizes W4.0 and larger): ASTM A497.

2.06 REINFORCEMENT ACCESSORIES

- A. Furnish chair supports for all steel reinforcement in floor slabs or equipment pads. Lifting the reinforcement after half the slab/pad has been poured is not acceptable.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
- C. Tie Wire: 16 gauge or heavier, black annealed wire, conforming to ASTM A82. Tie wire in concrete at exposed surfaces shall be non-corrosive; stainless steel, monel, or plastic coated.
- D. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 755M.

PART 3 - EXECUTION

3.01 REINFORCEMENT INSTALLATION

- A. General: Details of concrete reinforcement to be in accordance with ACI 318, and ACI 315, unless otherwise shown.
- B. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- C. Minimum clear distances between parallel bars, except in columns and multiple layers of bars in beams shall be equal to nominal diameter of bars. Minimum clear spacing in 1 inch or 1-1/3 times the maximum size of the coarse aggregate.
- D. Place reinforcement conforming to CRSI DA4, unless otherwise shown. Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- E. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.
- F. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars. Tie all intersections and splices with 16 gauge annealed wire.
- G. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

- H. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
- I. Secure reinforcing bars against displacement during the placing of concrete by spacers, chairs, or other similar supports. Portions of the supports, spacers, and chairs in contact with formwork shall be made of plastic in areas that will be exposed when completed. Type, number, and spacing of supports are to conform to ACI 315.
- J. Where concrete slabs are placed on the ground, use concrete blocks or other non-corrodible material of proper height, for support of reinforcement. Use brick or stone supports will not be permitted.
- K. Welded Wire Fabric:
 - 1. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire. Lap welded wire fabric at least 1-1/2 mesh panels plus end extension of wires not less than 12 inches in structural slabs. Lap welded wire fabric at least ½ mesh panels plus extension of wires not less than 6 inches for slabs on grade.
 - 2. Shall be placed in sheets or strips at the depth shown on the plans. Equal clearance shall be provided on each side of the slab, and successive sheets shall be lapped, as detailed. Reinforcement shall be continuous without interruption at emergency construction joints. All laps between sheets shall be held firmly together by wires or clips spaced not more than 4 feet apart. Continuous reinforcement shall be installed in accordance with the details developed. The height of preset chairs or supports shall be that shown on the plans within a tolerance of 1/8 inch; the arrangement and spacing shall be such that the reinforcement will be supported and held in the correct position within the allowable tolerance during the placing and consolidating of the concrete; sufficient bearing at the base of the device shall be provided to prevent over-turning or penetration into the sub-base; the design of the devices shall be as not to interfere with the placing and consolidating of the concrete.

3.02 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate joints for grade beams and slabs in the middle third of spans.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Space vertical joints in walls as indicated, maximum of 30'-0" o.c. Locate joints mid-way between piers in concealed locations where possible.
 - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated not greater than 900 sq. ft. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where waterproof cement-mortar or joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.

3.03 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints. Do not deposit concrete vertically more than 60". For deeper forms deposit concrete with a tremie.
 - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.04 CONCRETE FINISHES

A. Slab Finishes:

1. Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
2. Place slabs monolithically. Once slab placement commences, complete finishing operations within the same day. Slope finished slab to floor drains where they occur, whether shown or not.
3. Use straightedges specifically made for screeding, such as hollow magnesium straightedges or power strike-offs. Do not use pieces of dimensioned lumber. Strike off and screed slab to a true surface at required elevations. Use optical or laser instruments to check concrete finished surface grade after strike-off.
4. Scratch Finish: Finish for all base slabs receiving a bonded applied cementitious application. Thoroughly coarse wire broom within two hours after placing to roughen slab surface to insure permanent bond between slab and applied materials.
5. Float Finish: Slabs to receive unbonded toppings, steel trowel finish, fill, mortar setting beds, or a buildup roof, and ramps, stair treads, platforms, and equipment pads shall be floated to a smooth, dense uniform, sandy textured finish. During floating, while surface is still soft, check surface for flatness using a 10 foot straightedge. Correct high spots by cutting down and correct low spots by filling in with material of the same composition as floor finish. Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats.
6. Steel Trowel Finish: Concrete surfaces to receive resilient floor covering or carpet, monolithic floor slabs to be exposed to view in finished work, future floor roof slabs, applied toppings and other interior surfaces for which no other finish is indicated. Steel trowel immediately following floating. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure to compact cement paste and form a dense, smooth surface. Finished surface shall be smooth, free of trowel marks, and uniform in texture and appearance.

7. Broom Finish: Finish exterior slabs, platforms, steps, walks, ramps, and stair treads with a bristle brush moistened with clear water after surfaces have been floated. Brush in a direction transverse to main traffic.
8. Slab Finish Flatness (FF) and Levelness (FL) shall comply with the following minimums:
 - a. Areas covered with carpeting, or not otherwise included below:
 - (1) Slab on Grade – Overall Value FF 25/ FL 20; Minimum Local FF 17/FL15
 - (2) Level suspended slabs - Overall Value FF 25/ FL 20; Minimum Local FF 17/FL15
 - (3) Slabs exposed - Overall Value FF 36/ FL 20; Minimum Local FF 24/FL15
 - (4) Slabs to be covered - Overall Value FF 36/ FL 20; Minimum Local FF 24/FL15
 - b. Level tolerance such that 80 percent of all points fall within a $\frac{3}{4}$ inch envelop (+3/8 inch, - 3/8 inch) from the design elevation.

3.05 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.06 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
 1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.
 2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period. Cure for not less than seven days. Compound shall be certified to be compatible by floor coating manufacturer.

3.07 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- D. Repair materials and installation not specified above may be used, subject to Engineer's approval.

END OF SECTION

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**DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING
SECTION 23 11 23 – FACILITY FUEL GAS PIPING**

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PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Provide all work necessary to layout and install fuel gas piping systems required by this project. The piping systems shall include pipe, valves, fittings, flanges, gaskets, bolting, welding material, regulators, vents, hangers, supports, anchors and other components required for the proper and operational installation.
- B. The work of this Section of the Specifications shall include all labor, materials, tools, equipment, appliance or services necessary to complete the work as shown on the Drawings, as specified herein, or as required by the job conditions.
- C. All work shall conform to Con Edison's "Requirements for Gas Service Installation" book (Yellow Book). Relevant Con Edison specifications are attached to this specification section.

1.02 REFERENCES

- A. All work under this section shall conform to the requirements of the "New York State Building Code", Con Edison's requirements and the regulations of governmental authorities having jurisdiction.
- B. All work performed and material supplied under this Section shall be in accordance with the latest addenda thereto of the applicable codes, standards, specifications, regulations, procedures, and tests as cited.
- C. Where components or materials are specified to conform to requirements of the standards of organizations such as American Society of Mechanical Engineers (ASME) or Underwriters Laboratories (UL), that use of label or listing as method of indication compliance, proof of such conformance shall be submitted and approved by the Engineer. The label or listing of the specified organization will be acceptable evidence.

1.03 SUBMITTALS

- A. The Contractor shall furnish product data for all proposed material and equipment that will be furnished to complete the work. Submittal type, quantities and distribution shall be in accordance with the General Requirements section of the Contract Documents and this Section.
- B. Additional submittals, as necessary, for each manufactured item shall include but are not limited to the following: manufacturer's descriptive literature, shop drawings, catalog "cuts", and mill reports.
- C. Specific Submittals Include, but not limited to:
 - 1. Pipe and Fittings (Polyethylene)
 - 2. Pipe and Fittings (Steel)
 - 3. Valves
 - 4. Operator Qualifications as per Con Edison's requirements.
 - 5. Plastic Marking Tape
 - 6. Electric Markers

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Refer to Con Edison Specification G-8121 for the “Qualification of installers joining Polyethylene (PE) plastic pipe/tubing and fittings for gas mains and services” for required qualifications.
- B. Construction Site Quality: Contractor shall maintain, on site, sufficient office, field engineering, and field supervision staff to assure that all materials and layout correspond with the requirements of the Contract Documents and approved drawings.
- C. All valves shall be new. Surplus, salvaged or rebuilt valves are not acceptable.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Con Edison Specification G-8122 “Inspection, handling, storage, and transportation of polyethylene (PE) plastic pipe, tubing, and fittings for gas mains and services) for additional information.

PART 2 - PRODUCTS

2.01 UNDERGROUND PIPING MATERIALS

- A. All underground piping furnished as part of this Contract shall be Polyethylene (PE) Pipe. Refer to Con Edison Specification G-8104 “Polyethylene Pipe, Tubing and Fittings for Gas Mains and Services” for additional information.
- B. All PE pipe/tubing, fittings and risers shall comply to the latest revision of ASTM D2513 “Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings” (except for marking requirements D2513-87).
- C. All material used in the underground piping system shall be as previously approved by Con Edison. Refer to Section 13.0 in Con Edison specification G-8104 for approved manufacturers.

2.02 ABOVE GROUND PIPING MATERIALS

- 1. All above ground piping furnished as part of this Contract shall be as per Con Edison Specification G-8107 “Steel Pipe for Gas Mains and Services”:
 - a. All piping 2” and below shall be ASTM A106 Grade B, schedule 80
 - b. All piping above 2” shall be ASTM A53 Grade B, schedule 40
 - c. All pipe that is 2-inches in diameter and larger shall be welded.
 - 2. All steel piping shall receive external coating as per Con Edison Specification G-8062 “Extruded Polyolefin Coating on Steel Gas Pipe”.
 - 3. All material used in the above ground piping system shall be as previously approved by Con Edison. Refer to Section 13.0 in Con Edison specification G-8107 for approved manufacturers.
- B. Pressure Regulator and Accessories
- 1. Pressure regulator and meter assembly shall be as per Con Edison’s drawing number 361693 “Installation of parallel 2” regulators with turbine meter indoors and outdoors 10,000 CFH to 60,000 CFH”. Refer to detail 3/SU-103.
 - 2. Con Edison shall supply the gas meter, gas regulator and filters as indicated on note 1 of the above referenced detail.

2.03 VALVES

- A. All valves furnished as part of this project shall comply to Con Edison Specification G-100,298 “Valves for gas transmission and distribution piping systems.”
- B. All valve markings shall conform to MSS Specification SP-25 “Standard Marking System for Valves, Fittings, Flanges, and Unions.”
- C. All valves furnished as part of this project shall be lubricated plug valves. Refer to section 6.2 of Con Edison Specification G-100,298 for additional information. Refer to Section 18.0 for a list of approved manufacturers.

2.04 BACKFILL MATERIAL

- A. All backfill and bedding material furnished as part of this project shall comply to Con Edison Specification EO-8085 “General Specification for Backfill and Bedding Material for Excavations”

PART 3 - EXECUTION

3.01 GENERAL

- A. Refer to the attached Con Edison Specifications and Drawings for installation and testing requirements.
 - 1. Specification G-8100 “General Specification for the Installation of Gas Distribution Services”
 - 2. Specification G-8123 “Heat Fusion Joining of Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services”
 - 3. Specification G-8204 “Pressure Testing Requirements for Gas Mains and Services”
 - 4. Specification IP-20 “Installation of Mechanical Fittings for Plastic Pipe and Tubing”
 - 5. Specification IP-27 “Installation of Electrofusion Fittings on PE Plastic Pipe/Tubing and Molded Fittings using a Universal Electrofusion Processor”
 - 6. Drawing EO-16641-A “Installation of Plastic (Direct Burial or Insertion) Gas Service Piping”; specifically, the ‘Recommended Direct Burial Installation’.
- B. Trenching and Backfilling shall be as per the following Con Edison Specifications and Drawings:
 - 1. Specification EO-1181 “General Specification for Backfilling of Trench and Small Openings”
 - 2. Drawing 309495 “Trench Excavation for Gas Mains & Services up to 350 PSIG” (Detail 1/SU-103)

END OF SECTION

APPENDIX A:

CON EDISON'S SPECIFICATIONS AND DRAWINGS

(REFER TO YELLOW BOOK FOR COMPLETE SET OF SPECIFICATIONS)

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LAST REVIEW DATE:
6/17/14

REVIEW CYCLE:
5 Years ★

SPECIFICATION: G-8062-9

**TITLE: EXTRUDED POLYOLEFIN COATING ON
STEEL GAS PIPE**

VOLUME: 6

REVISION: (See ★)

- 1) Cover Page - Changed review cycle from 10 years to 5 years.
- 2) Section 4.0 - Updated Surface Preparation specification.



Gas Operations Standards

**TITLE: EXTRUDED POLYOLEFIN COATING ON
STEEL GAS PIPE**

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P. Carnevale	Liliana Gonzalez General Manager Technical Operations	9/16/09	Purchase and Test	5 PAGES



**TITLE: EXTRUDED POLYOLEFIN COATING ON
STEEL GAS PIPE**

1.0 SCOPE

This specification covers the requirements for the mill (factory-applied) coating of steel gas pipe with extruded polyolefin and will be applicable to all pipe sizes.

2.0 MATERIALS

2.1 The following coating systems, with their associated materials, are approved for pipe less than and equal to 4 inches in diameter:

A) X-Tru: Bredero Price Co. **or**
Liberty Coating Company

- 1) Adhesive: A blend of rubber, asphalt and high molecular weight resins.
- 2) Polyolefin: High density polyethylene, opaque yellow color.

B) Pritec: Bredero Price Co. **or**
Liberty Coating Company

- 1) Adhesive: Butyl Rubber
- 2) Polyolefin: High density polyethylene, black color.

2.2 For pipe sizes 6 inches in diameter and larger, Pritec is the only approved coating system as per 2.1B.

2.3 Pipe manufactured by submerged-arc welding as per Purchase and Test Specification G-8107 shall only be coated using Pritec as per 2.1B.

3.0 PRE-COATING INSPECTION

All pipe shall be visually inspected for defects such as dents, gouges, grooves, and arc burns as per Specification G-8107 prior to applying any coating. Any defects found shall be reported to Con Edison's Purchasing Department. Any pipe length(s) in question shall not be coated.



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**TITLE: EXTRUDED POLYOLEFIN COATING ON
STEEL GAS PIPE**

★ 4.0 **SURFACE PREPARATION**

The exterior of all pipe, prior to the application of the adhesive, shall be grit or sand blasted to a commercial gray metal finish in accordance with NACE/Steel Structures Painting Council - Surface Preparation Specification: NACE No. 3/SSPC-SP6.

5.0 **APPLICATION OF ADHESIVE**

5.1 After cleaning, the adhesive shall be applied to the exterior of the pipe so as to leave a uniform coating, with a minimum thickness of 10 mils, which completely covers the pipe surface to both ends.

5.2 The pipe shall be inspected for bare areas and other defects in the adhesive. If the inspection shows flooded areas, drips or that the adhesive has been applied over an improperly prepared surface, the length of pipe shall be re-cleaned and recoated.

6.0 **APPLICATION OF POLYOLEFIN**

6.1 The polyolefin shall be applied over the adhesive by extrusion.

6.2 The thickness of the polyolefin shall depend on the pipe size as follows:

<u>Nominal Pipe Diameter (Inches)</u>	<u>Polyolefin Thickness (Mils)</u>	
	<u>Nominal</u>	<u>Minimum</u>
3/4, 1, 1 1/2 2	25	23
	30	27

<u>Nominal Pipe Diameter (Inches)</u>	<u>Polyolefin Thickness (Mils)</u>	
	<u>Nominal</u>	<u>Minimum</u>
3, 4	35	32
6 to 10*	40	36
12 to 42*	60	54

*Pritec only



**TITLE: EXTRUDED POLYOLEFIN COATING ON
STEEL GAS PIPE**

6.0 APPLICATION OF POLYOLEFIN (Continued)

6.3 Unless otherwise specified the coating shall be cut back 6 inches from each end of the pipe length.

7.0 INSPECTIONS AND COATING REPAIRS

7.1 An electrical spark inspection, using an approved holiday detector, shall be made at the coating plant on all pipe coated, in accordance with this Specification and G-8201. The peak voltage of the detector shall be between 12,000 and 15,000 volts measured with the electrode in contact with the coated pipe.

7.2 The inspection in Section 7.1 shall be performed on all the coated pipe prior to the pipe being placed in storage or being shipped out, whichever is first. All defects found at this time shall be repaired by the Coater at his expense. The Coater shall furnish Con Edison's Purchasing Department written certification that the pipe has been inspected as per Section 3.0, that the coating has been applied and inspected in accordance with this specification, and that the pipe and coating are free of defects.

7.3 If the coated pipe is stored in the coating yard for a period exceeding one year, the inspection required by Section 7.1 shall be repeated just prior to shipment at the discretion of Con Edison's Purchasing Department. Repairs to defects found shall be made only after approval by Con Edison's Purchasing Department.

7.4 All coating repairs shall be done by one of the following methods:

- A) Completely remove all of the adhesive and polyolefin. Clean the pipe and apply new adhesive and polyolefin as per Sections 4.0, 5.0 and 6.0 above.
- B) Remove the damaged coating and install cold-applied primerless tape in accordance with the recommendations of the cold tape manufacturer and specification G-8209. Only the materials specified in Specification G-100,269 shall be used.



**TITLE: EXTRUDED POLYOLEFIN COATING ON
STEEL GAS PIPE**

8.0 HANDLING, STORAGE AND TRANSPORTATION

- 8.1 Handling, storage and transportation of the coated pipe shall be done in accordance with Specification G-8003.
- 8.2 Coating damage caused by improper handling, storage, or transportation of the coated pipe by the Coater or his agent shall be repaired at the Coater's expense, no matter how long the pipe has been in storage.
- 8.3 Each length of coated pipe shall be sealed at each end with a plastic vented end cap. These caps shall be installed such that they will not fall off during transportation, handling, and storage of the pipe.

9.0 PIPE MARKING

Each length of coated pipe shall be marked as per Specification G-8107.

10.0 REFERENCES

- | | |
|-----------|---|
| G-8003 | - Transportation, Handling and Storage of Steel Pipe for Gas Mains and Services |
| G-8107 | - Steel Pipe for Gas Mains and Services |
| G-8201 | - Electrical Spark Inspection of Coating on Steel Pipe |
| G-8209 | - Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures |
| G-100,269 | - Cold-Applied Primerless Tape |



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SPECIFICATION: **G-8100-13b**

TITLE: **GENERAL SPECIFICATION FOR THE
INSTALLATION OF GAS DISTRIBUTION
SERVICES**

VOLUME: **2 (Section 12.0), 10 and Yellow Book**

★ **COURSE ID:** [GAS0119](#)

★ **CORE GROUPS:** **Gas Construction**

★ **TARGET AUDIENCE:** **Gas Construction, Emergency Response
Force (ERF), Gas Development Lab,
Construction, Per Diem, and Gas
Contractors**

REV 13b (6/25/17):

Section 13: Removed GAS0023, "Contaminated soil at Gas Excavation off Con Edison Property".

Appendix G-2, Note 1: Clarified to include Wrought Iron.

REV 13a (4/14/17):

Section 5.28: Clarified grounding procedures.

Section 7.1 and Appendix I: Clarified installation of Excess Flow Valve.

Section 10.1: Clarified MAOP as "greater than or equal to 125 psig".

Appendix G-1: Updated the "Plastic Service Connections to Plastic Mains" chart.

Appendix G-3, Note 1: Clarified to include Wrought Iron.

REVISIONS (See ★):

1) Added Effective Date.

2) Cover Page - Changed "Registration Number " to "Course ID". Added Core Group designation. Changed "Target Training" to "Target Audience".

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|-----|-----------------------------|---|
| 3) | Signature Page | - Added "Operations Review". |
| 4) | Section 4.0 (old) | Removed section 4.0(old). Moved section 4.1(old) to section 8.11. Moved section 4.2(old) to section 9.20. Moved section 4.3(old) to sections 8.12 & 9.21. Renumbered subsequent sections. |
| 5) | Section 4.0 | Updated EH&S requirements. |
| 6) | Section 5.7 | Clarified requirements for bedding and backfill material. |
| 7) | Section 5.9(D) | Revised for clarity. |
| 8) | Section 5.9 and Appendix I | Revised clearances between newly installed/replacement gas services and other utilities/facilities. |
| 9) | Section 5.15 | Changed name of form to document pressure test from "50-13" to "As-Constructed/Emergency Sketch". |
| 10) | Section 5.18 | - Reworded for clarity. |
| 11) | Section 5.19 and 5.22 | Revised for clarity. |
| 12) | Section 5.39 | Revise preparation of As-Cons/Emergency sketch section to replace sections 5.39(old), 5.40(old) and 5.41(old). |
| 13) | Section 5.42(old) | Removed section 5.42(old) covering documentation of installed main valves and drips. Renumbered subsequent sections. |
| 14) | Section 6.4 | Added information to be submitted on the sketch when offsets are required to connect a service to the main. |
| 15) | Section 7.1 | - Revise the requirement for installation of Excess Flow Valves. |
| 16) | Section 9.3 | Added PE Plastic Pipe description chart. |
| 17) | Section 9.14 | - Changed size of approved plastic valves. |
| 18) | Section 9.15 and Appendix I | - Revised to allow MetFit fittings to be installed directly onto plastic molded fittings. |
| 19) | Section 9.18 | Added new section regarding heat of fusion of PE plastic pipe, tubing and fittings. |
| 20) | Section 9.19 | Added new section regarding inspection of PE plastic pipe, tubing and fittings prior to installation. |
| 21) | Section 12.2 | Revised pressure test requirement for service connection to the main. |
| 22) | Section 13.0 | Updated "References" section. |

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| 23) | Section 14 | - | Renamed Appendix C |
| 24) | Appendix C | - | Renamed and updated PE Valve chart |
| 25) | Appendix G-1 | | Updated Service to Main Connections |
| 26) | Appendix G-2 | | Revised to allow welding a no blow tapping tee to wrought Iron. |
| 27) | Appendix I | | Updated Key Task Matrix for Gas Service installation. |



Gas Operations Standards

TITLE: GENERAL SPECIFICATION FOR THE INSTALLATION OF GAS DISTRIBUTION SERVICES

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EH&S REVIEW BY: D. Gately		★ OPERATIONS REVIEW BY: R. McGrath (Gas Construction)		
AUTHOR:	APPROVED BY:	DATE APPROVED:	VOLUME: 2 (Section 12.0), 10, and Yellow Book	PAGE 1
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TITLE: GENERAL SPECIFICATION FOR THE INSTALLATION OF GAS DISTRIBUTION SERVICES

1.0 SCOPE

This specification details the construction requirements for the installation of new and replacement gas services designed to operate at pressures less than 125 psig.

2.0 LEGAL REQUIREMENTS

Federal: 49 CFR Part 192, Sections 123, 125, 143, 151, 159, 273, 279, 301-327, 351-383, 451-475, 479, 627, 751

State: 16 NYCRR Part 255, Sections 123, 125, 143, 151, 159, 273, 279, 301-327, 351-383, 451-475, 479, 627, 751

New York City: NYC Fuel Gas Code

3.0 DEFINITIONS

3.1 **Asbestos Containing Material (ACM)** – Asbestos or any material containing more than one percent asbestos.

3.2 **Autoseal** – a material that was used to seal cast iron main joints. This material may contain PCBs, benzene, and cresol.

3.3 **Distribution Piping** – all piping, tubing, and fittings that transport the gas to the customer's equipment/appliances *from*:

- for inside meter(s) - the meter outlet
- for outside meter(s) – outside the building wall.

3.4 **Epi-Seal** – a material that was used in the past to line gas services. This material may be ACM.

3.5 **Hazardous Material** – a material containing oil, sludge, benzene, PCBs, etc.

3.6 **Hole** – an opening in the main that is drilled only (not threaded).

3.7 **Maximum Allowable Operating Pressure (MAOP)** - the maximum pressure at which a main/service may be operated.

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3.0 **DEFINITIONS** (Continued)

- 3.8 **Meter Piping** - If the meter(s) is/are in the building, then the meter piping is the piping from the first fitting inside the building to the outlet side of the meter(s). Meter piping does not apply to locations with outside meter(s).
- 3.9 **Multi-residential** – a building that contains 4 or more dwelling units.
- 3.10 **Operator Qualified** - An individual who has been evaluated and can perform assigned covered tasks and can recognize and react to abnormal operating conditions.
- 3.11 **Point of Entry (POE)** – the point of entry for the gas service into a building.
- 3.12 **Pressure**
- | | |
|---------------------------------|---|
| Low | Pressure up to and including 12" WC. |
| Intermediate
Ossining System | Pressure greater than 1 psig and up to and including 5 psig. |
| Medium | Pressure greater than 2 psig and up to and including 15 psig. |
| High | Pressure greater than 15 psig and up to but less than 125 psig. |
- 3.13 **Residential** – a building that contains 1-3 dwelling units.
- 3.14 **Service Head Valve (SHV)** – service head valve is the valve located at the head of service
- 3.15 **Service Line/Piping** – all piping, tubing and fittings that transport the gas from the main to:
- for inside meter(s) – the outlet of the meter
 - for outside meter(s) – outside the building wall
- 3.16 **Service Regulator** – a mechanical device that reduces gas pressure from main pressure to customer utilization pressure. This may be located on the service or meter piping.

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3.0 DEFINITIONS (Continued)

3.17 **Taphole** – an opening in the main that is drilled and threaded.

★ 4.0 ENVIRONMENT, HEALTH, AND SAFETY (EHS) REQUIREMENTS

- 4.1 All non-hazardous pipe, tubing, fittings, and/or shavings that cannot be reused, shall be brought back to the workout location for proper disposal/recycling.
- 4.2 Materials for capping open ended services shall be on location. Services shall be capped when work is not in progress.
- 4.3 An appropriate environmental site setup shall be installed:

- A) Prior to cutting a properly supported existing service, **AND**
- B) Prior to disconnecting the service head piping.

The environmental site setup is dependent on the substances and quantity of material found in the main. At a minimum, the environmental site setup in the excavation and under the service head piping shall include non-skid matting, absorbent pads and catch basin.

The determination of the type of hazardous materials within the main can be made by:

- A) Visual inspection of main interior via plugs/tap holes on the main.
 - B) Review of the M&S plate.
 - C) Inspection of the existing condition in the excavation or building.
 - D) Internal inspection of the pipe with a camera.
- 4.4 The removal of service regulators is covered in [GEHSI E06.06](#), “Mercury-Containing Equipment” and **must only** be completed by trained company and/or Contractor (which includes Per Diem) personnel.

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★ 4.0 ENVIRONMENT, HEALTH, AND SAFETY (EHS) REQUIREMENTS (Continued)

- 4.5 Prior to a service insertion, abandonment or “relay” replacement (full or partial), the old service pipe shall be checked for hazardous substances.

If any hazardous substances (oil, sludge, etc.), other than drip water, are found in distribution mains, immediately contact EHS Operations.

- **Free flowing liquids (non-oily)** shall be treated as drip water and handled in accordance with [GEHSI E06.07](#), “Gas Drip Water.” Drip water is any accumulation of water from outside sources (i.e., water infiltration due to corrosion, cracks, condensation or water main breaks) found inside gas distribution pipes and is hazardous for benzene.
 - **Solid non-oily sludge and oily sludge** shall be handled in accordance with [GEHSI E06.11](#), “Liquids and Solids during Main Cut-Outs.”
 - **Autoseal** shall be handled in accordance with Gas Operations EH&S Instruction [GAS0025](#), “Handling Auto Seal in Gas Mains.” Autoseal (A.S.) or Never Leak (N.L.) were materials sprayed into cast iron mains to seal joints and may be hazardous for PCBs, benzene, and cresol.
- 4.6 If the existing service (that is to be replaced) is suspected to have been treated with Epi-Seal, perform the necessary steps in [GAS0027](#), “Handling Gas Services Containing Epi-Seal” to confirm if the Epi-Seal contains asbestos.
- 4.7 For existing steel mains and services coated with coal tar wrap, follow the established environmental procedure in the [Asbestos Management Manual \(AMM\), Chapter 6.04](#).
- ★ 4.8 **If** contaminated soil is discovered **off** Con Edison property, follow EH&S [GEHSI E5.11](#) “Excavated Soils on Property Not company owned” and contact your supervisor.
- 4.9 Prior to excavating/operating a curb valve, check the curb valve box for oily water and, if found, follow the established environmental procedure in [GEHSI E02.10](#), “Valve Test Boxes.”

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★ 4.0 **ENVIRONMENT, HEALTH, AND SAFETY (EHS) REQUIREMENTS** (Continued)

- 4.10 Check for “Clear Access” to the head of service piping and meter(s) location/room and other immediate areas (e.g. equipment/appliances) needed to be accessed as per [Asbestos Management Manual, Chapter 6.02](#).
- 4.11 Assume that paint on inside service piping is lead paint with PCBs and handle as per [GEHSI E06.04](#).
- 4.12 Check for grey duct seal at the head of service piping and handle as per [Asbestos Management Manual, Chapter 6.03](#).
- 4.13 Treat meter gaskets as asbestos containing material (ACM) as per [Asbestos Management Manual, Chapter 6.10](#).
- 4.14 Personnel shall not use personal electronic devices (PEDs) (e.g. cell phones, Blackberries, iPods) while performing tasks, or working with someone performing tasks described in this specification, or while in other situations in which they may be distracted and pose a safety risk to oneself or others.

EXCEPTIONS:

- It is acceptable to use Company-issued intrinsically safe radios or cell phones to communicate with the GERC, Gas Control or supervision to request assistance or to report findings.
- It is acceptable to use cell phones or cameras to document existing or new gas main or service installations only after confirming there are no gas readings using a calibrated combustible gas indicator.

5.0 **GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS**

OPERATOR QUALIFICATION

- 5.1 **Installers who tap an energized pipeline, weld steel, and join PE plastic pipe by butt fusion, branch saddle fusion, electrofusion, or with mechanical fittings must be Operator Qualified.**

All other “covered tasks” shall be completed by either Operator Qualified individuals or individuals under the direct observation of one who is Operator Qualified. “Direct observation” means that the Operator Qualified individual remains in direct visual and verbal contact at all times with the individual performing the task.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

OPERATOR QUALIFICATION (Continued)

- 5.2 Installers who join PE plastic pipe/ tubing and fittings by butt fusion, branch saddle fusion, electrofusion, or with mechanical fittings must be Operator Qualified **and** in compliance with the annual requalification requirements of Gas Specification [G-8121](#), "Qualification of Installers Joining Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services."

All butt fusion, branch saddle fusion, and electrofusion joints must be fabricated in accordance with the fusion procedures outlined in Gas Specifications [G-8123](#), "Heat Fusion Joining of Polyethylene Plastic Pipe/Tubing and Fittings for Gas Mains and Services" and [IP-27](#), "Installation of Electrofusion Fittings on Plastic Pipe/ Tubing and Molded Fittings Using a Universal Electrofusion Processor."

All mechanical joints must be fabricated in accordance with the installation procedures outlined in Gas Specification [IP-20](#), "Installation of Mechanical Fittings for Plastic Pipe and Tubing."

- 5.3 Welders shall be Operator Qualified in accordance with the requirements in Gas Specification [G-1065](#), "Qualification of Welders and Welding Procedures".

Welding shall be performed in accordance with Gas Specification [G-1064](#), "Shielded Metal Arc Welding Procedures for Welding Steel Pipe and Fittings."

COVER/PROTECTION

- 5.4 Where possible, the direct burial of new/replacement services shall be installed with a minimum cover of 24 inches. For cover less than 24 inches, adequate protection (e.g. protection plates) shall be provided only when subsurface obstruction prevents obtaining 24 inches (See Gas Drawing [EO-6799-C](#), "Protective Covers for Gas Main and Service Installations")

NOTE: If a minimum of 18 inches of cover cannot be maintained, consult with the Gas Distribution Engineering Department.

- 5.5 "WARNING BURIED GAS LINES BELOW" TAPE (Class/Stock #024-6660) must be installed at a **minimum** of 12" above the top of the direct buried new/replacement service. When new/replacement services are inserted, the tape is to be installed in all excavations, such as the main connection, the curb valve and other excavations.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

COVER/PROTECTION (Continued)

5.6 Electronic markers (EMs) shall be installed as per Gas Drawing [502664](#), "Installation of Electronic Markers on Gas Mains and Services" and noted on the emergency sketch or signed off layout. EMs shall be installed in addition to warning tape and tracer wire, when required for PE pipe.

- ★ 5.7 Each new/replacement service line must be properly supported on undisturbed or well-compacted soil. All installations of new/replacement direct buried (or on the exposed portion of inserted services) services shall be backfilled with a minimum of 12" above the top of the service line with sand, 3/8" clean fill or recycled screening backfill. All material used for backfill and pipe support must be free of materials that could damage the pipe or its coating. Install properly compacted suitable backfill on top of the 12" minimum backfill described above. See Gas Drawing [309495](#), "Trench Excavation for Gas Mains and Services up to 350 psig.

NOTE: If a service is installed in a "rock area", a 4"- 6" bedding of sand, 3/8" clean fill or recycled screening backfill shall be used.

5.8 Adequate protection devices shall be installed in areas where the service head valve, service regulator (if required), meter(s), and associated valves are subject to vehicular damage. See Gas Drawing [502163](#), "Bumper Installation."

CLEARANCES

- ★ 5.9 Where possible, the direct burial of new/replacement services shall be installed with the following minimum required clearances between gas facilities and electric facilities, steam facilities, water and sewer facilities, and other facilities (e.g., telephone, cable, petroleum):

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

CLEARANCES (Continued)

Subsurface Facility	Gas Service	Minimum Clearance with Protection
Electric Conduit or structure	4 inches	2 inches
Electric Underground Residential Distribution System (URD) (direct buried) Cable	12 inches	2 inches
Electric Oil-o-static (Electric Transmission) *	12 inches	6 inches
Steam	4 inches (metallic gas pipe)	2 inches (metallic gas pipe)
	35 feet (PE plastic gas pipe)	35 feet (PE plastic gas pipe)
Water & Sewer	6 inches	2 inches
Other Facility (e.g., telephone, cable, petroleum)	4 inches	2 inches

* Where gas mains/services run parallel to electric transmission lines for significant distances contact electric transmission for guidance.

- A) For instances where the proximity of the electric facility is less than the minimum required clearance from a gas facility, either facility shall be relocated or phenolic board (Class/Stock #596-4473, 1'x2' or #596-4432, 1'x4') shall be installed between the two facilities. (See Electric Drawing [EO-5570-C](#), "Clearances of Electric Subway from Gas Mains and Other Subsurface Structures")



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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

CLEARANCES (Continued)

- B) For instances where exposed electric conduits in close proximity to gas facilities are found to be deteriorated to the extent that cable is visible, the deteriorated conduits shall be removed. If it can be ascertained that the cable installation is visibly damaged or further guidance is required to repair the damaged conduits, contact the applicable Electric Operations' Control Center to coordinate the replacement of the damaged cable prior to any repair. (See Corporate Instruction [CI-920-1](#) "Gas Facilities – Clearances, Encroachments, Interference, and Corrosion")

NOTE: Report locations where phenolic board has been installed or where conduit repair has been made as per Corporate Instruction [CI-920-1](#)

- C) For instances where 6 inches cannot be maintained between a water or sewer facility and the gas service, either facility shall be relocated or water impingement rubber mat(s) (Class/Stock #059-5306, 2' x 2' x 1/2" mat) shall be installed between the two facilities for protection. The rubber matting shall be installed either horizontally over/under the gas service or vertically alongside the gas service (DO NOT wrap the rubber mat around the gas service). The rubber matting shall be installed a minimum of 2" from the gas service and shall **not** be installed "edge to edge". When more than one rubber mat is installed to protect the gas service, the mats shall *overlap* a minimum of 6".
- ★ D) For instances where 35 feet cannot be maintained between a steam facility and the PE plastic gas service, the PE plastic gas service shall be relocated or the gas service shall be replaced with metallic (e.g., steel or copper) gas pipe. For instances where the proximity of the steam facility is less than 4" from a metallic gas service, the metallic gas service shall be relocated or a steam blanket (Class/Stock #415-0108) shall be installed between the two facilities for protection. (See Sections 9.9 and 9.10)
- E) For instances where 4 inches cannot be maintained between a facility other than electric, steam, water, or sewer (e.g., telephone, cable, petroleum) and the gas service, either facility shall be relocated or phenolic board (Class/Stock # 596-4473 or # 596-4432) shall be installed between the two facilities for protection.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

PIPING

- 5.10 Plastic pipe shall be installed so as to minimize shear or tensile stresses. Care shall be taken to prevent kinking and buckling.
- 5.11 All piping and associated fittings shall be checked for obstructions (e.g. end caps, dirt, debris) prior to tie-in.
- 5.12 For gas services installed in a casing or conduit, the casing or conduit shall be designed to withstand the superimposed loads.
- 5.13 Any portion of plastic piping exposed due to the removal of a section of casing or which spans disturbed earth shall be of sufficient strength to withstand the external loading and shearing forces or it shall be protected with a suitable bridging piece.
- 5.14 Gas services that enter a building from beneath (i.e. through the floor, rather than through the foundation/vaulted wall) the building shall be encased in a gas tight conduit that is vented to the outside atmosphere. (See Gas Drawing [EO-16546-B](#), "Installation of Flexible Sleeve Elbow Unit Where Service Enters From Beneath Building Not Exceeding 99 PSIG")
- ★ 5.15 Gas services inserted/installed under an enclosed living space (e.g. an enclosed porch) shall be encased in a gas tight conduit, which is sealed at both ends and vented above ground to the outside atmosphere. If the existing service pipe is to be reused as the conduit, then it must be pressure tested at 3 psig for 5 minutes and documented on the [As-Constructed/Emergency Sketch](#) form. It shall also be sealed at both ends and vented to the outside atmosphere. All below ground vent piping shall be coated per applicable Company specifications.

(See Specification [G-8096](#), "Sealing the Annular Space Between a Gas Pipe and a Wall, Casing Pipe, or Sleeve" and Gas Drawing [EO-4890-B](#), "Service Pipe/Tubing And Service Sleeve Through Vault, Open Areaway, Open Area Under Stairs, Under Enclosed Area, And Into Vaulted Basement")

The recommended method to seal and vent the end of the conduit that is in the ground (under an enclosed living space) outside the building is to:

- A) Install the appropriate "Renu" coupling from the list below for 1", 1 ½" and 2" pipe sizes with taphole to seal and vent (with vent cap) the end of the conduit (which could be the old service pipe **provided** it passes a 3 psig pressure test for 5 minutes) to the new service pipe/tubing.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

PIPING (Continued)

1. 1" IPS x 1/2" CTS with 3/8" vent (Class/Stock # 341-5817)
2. 1 1/2" IPS x 1 1/4" CTS with 3/4" vent (Class/Stock # 341-5825)
3. 2" IPS x 1 1/4" CTS with 3/4" vent (Class/Stock # 341-5833)

OR

- B) Tap a hole in the conduit to vent (with vent cap) and install a 3M coldshrink to seal the end of the conduit (which could be the old service pipe provided it passes a 3 psig pressure test for 5 minutes) to the new service pipe/tubing.
- 5.16 Steel service pipe that is inside a sleeve for more than 10 feet shall be supported by insulating skids. (See Gas Specification [G-100,280](#), "Pipeline Casing Insulating Skids")
- 5.17 Gas services installed through a subsurface vault or open areaway shall be sleeved (with **only steel** pipe as the sleeve) and the ends sealed as per Gas Drawing [EO-4890-B](#).
- ★ 5.18 Gas service piping installed in an open area underneath an outside staircase shall be installed as per [EO-4890-B](#).
- Compression fittings are **not** permitted, except as indicated below:
- A) **If** the gas service meter is **also** located in an open area **under** an outside staircase, **then** one compression fitting is permitted to be installed.
- B) **If** there is a service regulator **and** meter located in an open area **under** an outside staircase, **then** the one permissible compression fitting shall only be installed on the (*low-pressure*) piping between the regulator outlet and meter inlet.
- ★ 5.19 All above ground outdoor service piping **shall** be metallic.
- 5.20 New service installations and replacements should be installed perpendicular to the main and should not run at angles.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

PIPING (Continued)

5.21 Threaded pipe and fittings for gas service piping shall **not** be installed underground **except** for the **first** service connection *fitting* to the main/strap saddle (when required). (See Gas Drawing [EO-16645](#), "Steel/Copper Service Connections to Metallic Mains")

- ★ 5.22 New and replacement (relayed) services that enter a building (either above ground or underground) through the building's concrete/masonry foundation/vaulted wall, shall enter via a continuous steel or PVC sleeve for a new service or relay or the old service pipe for an insertion. The annular space at each end (between the service pipe and the sleeve or old service pipe) shall be sealed with link-type seals. (See Gas Specification [G-8096](#) and Gas Drawing [EO-4890-B](#) for requirements and methods to seal the annular space between the service pipe and the sleeve).

NOTES: For up to 2" PE service, seal the annular space inside the building with a service head adapter.

For a 2" service through a 3" sleeve or a 3" service through a 4" sleeve, use a 2" or 3" gasket accordingly with waterproof caulking material to seal the annular space. (These gaskets are available from Dresser)

- 5.23 New and replacement services that enter a building aboveground through the building's non-concrete/masonry foundation wall, do **not** require a wall sleeve. Seal the annular space (between the service pipe and the non-concrete/masonry wall) with waterproof caulking material.
- 5.24 For a service replacement, a compression coupling with a 1/8" threaded plug shall be installed on low-pressure piping at the head of service for possible future use in testing the service pressure.

NOTE: For compression couplings greater than (>) 2" diameter, then a 1/8" hole shall be drilled, tapped and plugged into the barrel of the coupling.

5.25 Bolts or stud-bolts used shall extend completely through the nuts.

5.26 Transition fittings shall **only** be used when:

- A) transitioning a plastic service (when a service head adapter is not used) outside the building wall and through the wall sleeve. The steel end of the transition fitting shall be a threaded/beveled end at the point of entry.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

PIPING (Continued)

- B) making coupled pipe connections and the plastic pipe diameter is 10" (only PE to CI connections) or 16" and above, for which restraining couplings are currently not manufactured.

NOTE: There are restraining couplings for:

- 12" PE to ST
- 12" PE to CI
- 10" PE to ST

(See Gas Specification [G-8153](#), "Reinforcing Compression Fittings")

- C) connecting to a tapping tee (weld end) or bottom out fitting at the main.

NOTE: The threaded end of steel pipe or nipples shall not be placed in compression style couplings

- 5.27 A #10 bonding cable (Class/Stock #563-1361) shall be installed across all steel/copper service piping cut-out sections **prior** to making the cuts to maintain electrical continuity and eliminate arcing. The bonding cable shall be attached either across the service piping or from service piping to metallic main by thermit weld (on steel piping only), clamp or magnetic connectors.

NOTE: Prior to thermit welding, check the condition of the pipe and also check for the presence of gas.

- ★ 5.28 Use the Arcless Static Ground (ASG) kits (Class/Stock # 025-2569) or wet rags/burlap to wrap and ground all plastic pipe/tubing in the excavation prior to disconnecting/cutting the plastic service piping to eliminate static electricity arcing.



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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

VALVES

- 5.29 All valves shall be checked for proper operation (i.e. opened and closed) prior to installation.
- 5.30 All services shall have an accessible curb valve. Whenever possible, curb valves shall be installed in the sidewalk.

NOTE: In Westchester, the curb valves shall be installed in the sidewalk (or unpaved area adjacent to the street).

- 5.31 Whenever possible, meters and meter/regulator sets shall be installed outdoors.

When meters and meter/regulator sets are installed indoors, they should be installed as close as practical to the POE.

For indoor meter and meter/regulator sets, the service head valve (SHV) must be accessible and shall be installed as follows:

A) Low Pressure Service

- 1) The indoor SHV shall be installed as close as possible and within 24" (of "running pipe" length) (NYC Fuel Gas Code) from the point the gas service connection enters the building.

NOTE: This may allow the SHV to be used as a "bypass valve" (for "bypassing" the building) at the future date.

- 2) For buildings with a vaulted (and accessible) basement, the SHV shall be installed:
- in the vaulted area for a *PE plastic service*;
 - either in the vaulted area or the basement for a *copper service*.

B) Intermediate, Medium or High Pressure Service

The indoor SHV shall be **the first fitting** installed inside the building.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

VALVES (Continued)

- C) For a service insertion with a service head adapter, the indoor SHV shall be the first fitting installed onto the service head adapter. However, if a "permanent" obstruction exists, then the SHV shall be installed as close as possible to the service head adapter (provided supervision approves and documents it on 50-13R).
- 5.32 Where the SHV is located 6 feet or more above the floor level, an operating chain or a permanent access platform shall be installed by the customer.
- 5.33 The SHV shall be tamperproof (up to and including 4" diameter) and shall be:
- A) screw ends for all low pressure services that are 4" or less in diameter;
 - B) screw ends for all services operating at greater than low pressure that are 2" or less in diameter.
 - C) flanged (weld neck) ends for all low pressure services that are 6" and larger in diameter;
 - D) flanged (weld neck) ends for all services operating at greater than low pressure that are 3" and larger in diameter.

NOTE: The customer must install a flange insulating kit on the downstream side of all flanged end SHVs.

- 5.34 The curb valve and curb valve box shall be supported with a pre-cast base or bricks. The entire assembly should be placed on well compacted soil. (See Gas Drawings [EO-16629-A](#), "Installation of Steel Gas Service Piping," [EO-16641-A](#), "Installation of Plastic (Direct Burial or Insertion) Gas Service Piping," and [EO-16532-A](#), "Installation of Copper Tubing Gas Service Piping")
- 5.35 A building bypass valve should be installed for new/replacement services to a building (large apartment, commercial, etc.) that may require future "bypassing".
- 5.36 Abandoning an Existing Curb Valve
- A) To abandon an existing curb valve box in a concrete sidewalk, remove the top of the box or curb valve box cover, backfill up to 3" from the surface and then fill the remaining 3" with concrete. If feasible, break out and remove the top of the box.

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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

VALVES (Continued)

- B) To abandon an existing curb valve box in a soil area, remove the top of the box and fill with suitable material.

REGULATORS

- 5.37 Each service regulator for a new/replacement service (**except** for service replacements by insertion) must be installed **outside** of the building, unless it is impractical or unsafe.

When the service regulator must be installed within the building:

- A) the service regulator shall be installed as close as practical to the SHV (see the below chart) and the location of the curb valve shall be indicated on a tag attached to the regulator vent cap. (See Gas Specification [G-8028](#), "Requirements for Indicating the Location Of The Curb Valve Box On A Gas Service With An Indoor Regulator")

Service Pipe Diameter	Maximum Distance from SHV to Regulator "running pipe" Length
$\leq 2"$	4 feet
$> 2"$ and $\leq 4"$	8 feet
$> 4"$ and $\leq 8"$	15 feet
$> 8"$	20 feet

NOTE: For footage distance in excess of the above chart, see the gas meter equipment section of the Company's "[A Customer Guide to Gas Service Installation](#)" (Yellow Book) for additional requirements that must be met to allow the excess linear footage of "running pipe" between the SHV and the regulator.

- B) For regulator vent installation requirements, refer to Gas Drawing [EO-17118](#), "Regulator Vent Installation."



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5.0 GENERAL REQUIREMENTS FOR SERVICE INSTALLATIONS (Continued)

REGULATORS (Continued)

- 5.38 For buildings in flood zones with indoor or outdoor service regulators, vent lines should be elevated so the terminus is 3 feet above the base flood elevation (BFE). If this is not feasible, a Vent Line Protector (VLP) shall be installed on the vent line to prevent water intrusion. (See Gas Specifications [G-8217](#), "Flood-Prone Areas for the Installation of Gas Service Regulator Vent Line Protectors (VLP's)" and [G-699](#), "Installation and Inspection of Gas Service Regulator Vent Line Protectors (VLPs)")

DOCUMENTATION AND RECORD OF WORK

- ★ 5.39 Prepare and submit an [as-constructed/emergency sketch](#) (e.g. one-line sketch or red-lined layout) and associated paperwork necessary for mapping for all installations, replacements, or abandonments of gas mains and services as per [CI-940-1](#) "Processing Gas Mapping Information."
- 5.40 For additional information on the requirements, responsibilities, and timetables for updating gas maps and records refer to Corporate Instruction [CI-940-1](#), "Processing Gas Mapping Information".

MISCELLANEOUS

- 5.41 Electrically powered equipment shall **never** be used on a gas service.

EXCEPTION: Welding/fusion equipment and equipment approved by Corrosion Control and the Gas Development Lab.

- 5.42 Welding or cutting shall not be performed on pipe or pipe components that contain a combustible mixture of gas and air in the area of work. Post warning signs where appropriate.
- 5.43 Purging equipment and purge pipes shall be electrically bonded to the main/service or ground as required. See Specification [G-8129](#) "Purging Gas Mains, Services and Regulator Stations."
- 5.44 Refer to Gas Specification [IP-16](#), "Operation, Maintenance, Handling and Storage of the Modular - Style, Compressed Natural Gas (CNG) Bypass Cart" for bypassing a building.



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6.0 SERVICE CONNECTIONS TO MAINS

6.1 For service connections to mains, see Appendix G-1 through G-3.

NOTE: The method of service connection to the main should be documented on the paperwork for the job.

6.2 Whenever practical, all service connections to a main should be located at the top of the main. If not practical, then the service connection shall be located at the side of the main.

6.3 For all pressures, reuse existing "welded" tee if found in good condition.

★ 6.4 When offsets are required to connect a service to the main (i.e. "looped service"), the offset should be kept as close as possible to the main to reduce the possibility of a future damage to the service-to-main connection. Note on sketch as "looped service" with measurements.

6.5 All tapping/drilling shall **only** be performed with approved tapping/drilling equipment. Under no blow conditions, only tapping/drilling equipment designed to be used for no blow shall be used.

NOTE: The use of a hole saw and air drill to "drill a hole" (on live or dead main) **is prohibited**.

6.6 For cast iron, steel, or wrought iron pipe, the pipe must be reinforced when the diameter of the tap hole exceeds 25% of the nominal diameter of the pipe. See Table 1 for maximum tap hole size without reinforcement.

EXCEPTIONS:

- A) A 1" tap hole can be drilled and threaded in a 3" steel or wrought iron main without reinforcement.
- B) A 1¼" tap hole can be drilled and threaded in a 4" steel or wrought iron main without reinforcement.
- C) A 1¼" tap hole in a 4" cast iron main must have a strap saddle (double strap) installed for the threaded connection.
- D) A 1½" tap hole in a 6" cast iron main must have a strap saddle (double strap) installed for the threaded connection.

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6.0 **SERVICE CONNECTIONS TO MAINS** (Continued)

6.7 Table 1, **Metallic Main Tap Hole Sizes**

Main Size	Maximum Tap Hole Size Without Reinforcement
3"	1"
4"	1 ¼" *
6"	1 ½" *
8"	2"
10"	2 ½"
12"	3"
16"	4"
18"	4"
20"	5"
24"	5"
30"	5"
36"	5"

* See EXCEPTIONS for cast iron in Section 6.6

6.8 Where the maximum "tap hole" size indicated in Section 6.7 will be exceeded, the main shall be reinforced as follows, and an anode bag shall be installed on the strap saddle or sleeve as per Gas Specification [G-8205](#), "Corrosion Control of Buried Steel Gas Distribution Mains and Services."

- A) Installed with either a strap saddle or clamp for a 1½" drilled only hole in a 4" cast iron, steel or wrought iron main.
- B) Installed with either a strap saddle or clamp for a 2" drilled only hole in a 4" or 6" cast iron, steel, or wrought iron main.
- C) Reinforced with a Style 50, Style 80 or "approved special order fitting" (i.e., green sleeve) for cast iron mains.
- D) Reinforced with a welded fitting (i.e., tapping tee) or "approved special order fitting" (i.e., green sleeve) for steel or wrought iron mains.



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6.0 SERVICE CONNECTIONS TO MAINS (Continued)

- 6.9 When installing a plug into a taphole, the plug shall be placed on top of a cleaned area on the main (**prior** to removing tapping equipment or **prior** to disconnecting a service) and shall be slid (in contact) across the main and screwed into the taphole.
- 6.10 All service connections to 6" and smaller cast iron mains shall be connected to the cast iron main using an insulated strap saddle (double strap) or similar approved fitting. (See Gas Drawing [EO-16645](#))

NOTE: It is not necessary to tap and thread the hole when using a strap saddle or other threaded reinforcement fitting.

- 6.11 Intermediate and medium pressure services connected to 8" - 12" cast iron mains shall be connected using an insulated strap saddle or similar approved fitting (See Gas Drawing [EO-16645](#))
- 6.12 Welding of no blow tapping tees is **always** an acceptable service connection to steel. Intermediate, medium and high pressure services connected to a steel main should be connected by welding a no-blow tee to the steel main. Only when welding is impractical, can an insulated strap saddle with a threaded no-blow tee be used to connect the service to a steel main. Catching gas on the fly is **only** permitted as specified in Gas Specification [IP-30](#), "Procedure for Removing or Replacing Live Intermediate, Medium and High Pressure Gas Pipe and/or Fittings Without No-Blow Equipment."
- 6.13 For all 2" and smaller diameter low pressure PE plastic services, the **preferred** connection is to install the plastic brass based tee **directly** into the main or insulated strap saddle (as required in Section 6.8). See Appendices H-1 and H-2 for installation requirements of plastic brass-based tees.

NOTE: When field conditions do not allow for the installation of the plastic brass based tee, the angle valve tee, posilock tee or riser/threaded tee may be installed.

- 6.14 PE plastic service connections to PE plastic pipe with SDR greater than (>) 15.5 **shall** be connected using an electrofusion tee with the following reduced electrofusion times. (See Gas Specification [IP-27](#))
- A) SDR 23.5 PE plastic pipe
Reduce electrofusion fusion cycle time by 10% of the time displayed when the coupling is scanned.

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6.0 SERVICE CONNECTIONS TO MAINS (Continued)

- B) SDR 26 PE plastic pipe
Reduce electrofusion cycle time by 15% of the time displayed when the coupling is scanned.
- C) SDR 32.5 PE plastic pipe
Reduce electrofusion cycle time by 25% of the time displayed when the coupling is scanned.

6.14 An air drill or other high speed pneumatic device shall **not** be used to "drill" the "**cookie-cutter**" down the PE plastic tee, through the plastic main and back up the plastic tee.

7.0 EXCESS FLOW VALVES

- ★ 7.1 Excess Flow Valves (EFVs) shall be installed on all new or replaced services to single family residences supplied by *high-pressure* regardless of load and new or replaced (including partial replacements) *high-pressure* non-single family residence services which use a meter up to and including a **class 1000 meter or equivalent** (e.g. two (2) class 500 meters, four (4) class 250 meters, one (1) class 500 and two (2) class 250 meters).

NOTE: An EFV is required for a partial service replacement only if the replacement segment is near the service-to-main connection (where an EFV is usually located). An EFV is **not** required for a partial service replacement if the replacement segment is far away from the main-to-service connection because EFVs in those locations may not provide excavation-damage protection.

7.2 The following rules apply to all EFV installations:

- A) EFVs shall **not** be installed on services operating at low, intermediate or medium pressure.
- B) EFVs shall **not** be installed where contaminants in the gas stream could interfere with the EFV operation or cause loss of service.
- C) EFVs shall **not** be installed where it could interfere with necessary operation or maintenance activities, such as blowing liquids from the line.
- D) Only EFVs approved by the Gas Development Lab shall be installed.
- E) **For an outdoor meter installation**, install the tag (which comes with the EFV) on the "riser" valve.

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7.0 EXCESS FLOW VALVES (Continued)


- F) **For an indoor meter installation**, install the tag (which comes with the EFV) on the service head valve.

NOTE: If there is no access to the premises at the time of the installation of the EFV, secure the EFV tag to the peck vent. When a crew comes to perform the turn-on and has access to the premises, they shall relocate the EFV tag (or install a new EFV tag) from the peck vent to the service head valve.

- G) The EFV shall be installed **as close as practical** to the service tee connection at the gas main. See exception below.
- H) For “branch” services, the EFVs shall be installed on each individual service, as close to the “branch connection” as possible.

EXCEPTION: If there are only two (2) “branch” services and each service has a class 500 meter equivalent (i.e. two (2) class 250 meter), or less (i.e one (1) class 250 meter), the EFV shall be installed as close as practical to the “branch” service tee connection at the main (i.e. only one EFV is required on the branch service as close as practical to the main).

- I) When gassing in or automatically resetting the service, the curb valve, service head and meter valves are to be opened slowly so as not to trip the EFV. Automatic resetting of an EFV can take from 15 seconds to 10 minutes.
- J) Each EFV installation shall be indicated (using this symbol) on the emergency sketch (if applicable), “as constructed” or layout and shall be mapped on the respective mains and services (M&S) plate.


E . F .
1000

- K) Layouts shall indicate where EFVs are required.

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8.0 STEEL SERVICE INSTALLATIONS

- 8.1 Steel service piping shall be joined only by personnel, who are “Operator Qualified” in joining the steel pipe by welding or approved mechanical fittings.

NOTE: Non-restraining couplings shall be reinforced, when required, as detailed in Gas Specification [G-8153](#).

- 8.2 The following pipe sizes are the smallest to be used for new direct bury steel service installations (Contact Gas Distribution Engineering if less than (<) 2” low pressure or intermediate pressure service is required):

<u>System Pressure</u>	<u>Minimum Pipe Size</u>
Low or Intermediate	2”
Medium	1”
High	1”

- 8.3 All buried or sleeved steel service pipe, fittings, and buried vent piping shall be coated and separately protected. Cathodic protection shall be in accordance with applicable Company specifications. Corrosion Control shall prepare specifications for painting /coating.
- 8.4 Any portion of a new above ground gas service installation that is exposed to the atmosphere must be cleaned and coated. Coating materials must be suitable for the prevention of atmospheric corrosion.
- 8.5 Cathodic protection on buried steel gas mains shall be designed to protect the newly installed steel pipeline in its entirety. All new steel installations shall be coated and have adequate cathodic protection in its entirety within one calendar year of the installation of the steel pipeline. Where the pipeline has been installed in segments, the one-year calendar year requirement shall begin when the final segment is energized.
- 8.6 The cathodic protection of the steel service shall be checked prior to and after backfilling.
- 8.7 For steel services in unstable soil, offsets using compression end elbows shall be installed to provide flexibility. A brace shall also be installed inside the building wall to prevent pull-out. See Gas Specification [G-11831](#), “Procedure for Checking Areas Where Main and/or Service Movement is Anticipated” for the required service inspections in areas of unstable soil.

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8.0 STEEL SERVICE INSTALLATIONS (Continued)

- 8.8 All dents, gouges, grooves or arc burns which affect the curvature of the steel pipe at the weld or compression connection **must** be removed.
- 8.9 All dents, gouges, grooves or arc burns which have a depth greater than 12-1/2% of the wall thickness (See Appendix D) of the steel pipe or as determined by Gas Engineering **must** be removed by cutting out the damaged section as a cylinder. The minimum cylinder length to be removed is one pipe diameter or 12 inches, whichever is greater.
- 8.10 If coated pipe is installed by boring, driving or other similar method, precautions must be taken to minimize damage to the coating during installation.

★ 8.11 Steel Pipe, Valves, and Fittings

- A) See Gas Specification [G-8107](#), "Steel Pipe for Gas Mains and Services" for approved steel pipe.
- B) See Gas Specification [G-8003](#) for the inspection, handling, storage, and transportation requirements of steel pipe.
- C) All steel pipe for buried or submerged installations shall be factory coated as per Gas Specification [G-8062](#), "Extruded Polyolefin Coating on Steel Pipe" or field coated as per Gas Specification [G-8209](#), "Field Coating of Steel Gas Pipe and Fittings Installed Underground and in Subsurface Structures".
- D) See Gas Specification [G-100,298](#), "Valves for Gas Transmission and Distribution Systems for approved metallic valves.
- E) All fittings (e.g. forged tees, elbows, flanges, control fittings, mechanical couplings, etc) shall meet the requirements of the applicable Purchase and Test (Volume 6) specifications.

★ 8.12 Restrictions

The following materials shall not be installed for buried or submerged installations:

- A) ductile iron pipe and fittings,
- B) galvanized pipe and fittings,
- C) pipe and fittings made from amphoteric metal (e.g. aluminum),
- D) pipe, valves, or fittings not approved by Gas Distribution Engineering.

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9.0 PE PLASTIC SERVICE INSTALLATIONS

- 9.1 See Gas Specification [G-8104](#) for approved PE plastic pipe, tubing, and fittings.
- 9.2 The following pipe sizes are the smallest to be used for new direct bury PE plastic service installations. Contact Gas Distribution Engineering if less than (<) 2" LP or IP service is required.

<u>System Pressure</u>	<u>Minimum Pipe Size</u>
Low or Intermediate	2" IPS
Medium	1 ¼" IPS
High	1" IPS

NOTE: 1" CTS and 1 ¼" CTS shall not be installed on any high pressure system. (See Gas Specification [G-8200](#), "Service Sizing")

- ★ 9.3 PE Plastic pipe with an SDR of 11 or less (i.e. 9.3) is approved for installations up to and including 100 psig and is the **only** plastic pipe to be installed on distribution systems **above** low pressure.

PE Plastic pipe with an SDR of 15.5 has a design pressure rating (70.6 psig) well below the MAOP for most of the CECONY high pressure distribution systems, and therefore cannot be installed in the high-pressure distribution systems.

★ **NOTES: M8000** pipe was all black and replaced in 1997 with Performance Pipe 8100.

Performance Pipe 6800 is black with two thick yellow stripes at three different points on the pipe's surface.

Performance Pipe 8100 has a "yellow shell" around black pipe. This is the equivalent of Performance Pipe 8300 and JM Eagle (US Poly) UAC3700.

Performance Pipe 8300 is black with one thick yellow stripe at four different points on the pipe's surface and the print line states PE100. This is the equivalent of Performance Pipe 8100 and JM Eagle (US Poly) UAC 3700.

★ **JM Eagle (US Poly) UAC3700** is black with one yellow stripe at three different points on the pipe's surface. This is the equivalent of Performance Pipe 8100 and 8300.

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9.0 PE PLASTIC SERVICE INSTALLATIONS (Continued)

★ NOTES (Continued):

★ **ENDOT EN PE 4710 (GAS)** is black with one thin yellow strip at three different points on the pipe's surface. This is equivalent to Performance Pipe 8300 and JM Eagle UAC3700.

Dura-Line Polypipe GDB50 is black with either one thin yellow stripe at three different points on the pipe's surface (similar to JM Eagle and ENDOT) or one yellow stripe at six different points on the pipe's surface.

- 9.4 Couplings up to and including 12" shall **only** be a restraining-type (e.g. Dresser Style 711 or CSI Maxi-Grip), so as to prevent pullout due to tensile forces.

EXCEPTION: There are currently **no** 10" PE-CI restraining-type couplings manufactured. (See Section 5.26B)

- 9.5 The SDR size of the stiffener **must** correspond with the SDR size of the plastic pipe. See Gas Specification [IP-20](#) for the installation of approved mechanical fittings and stiffeners required for PE plastic pipe and tubing.
- 9.6 Bends in the service can be made by the use of molded elbows or by manually bending the pipe in accordance with the following table:

Plastic Pipe Size	SDR 9.3 Minimum Bending Radius	SDR 11 Minimum Bending Radius	SDR 15.5 Minimum Bending Radius
1 1/4" IPS	3 feet	4 feet	--
2" IPS	4 feet	5 feet	--
3" IPS	6 feet	8 feet	--
4" IPS	8 feet	10 feet	--
6" IPS	--	14 feet	--
8" IPS	--	18 feet	--
10" IPS	--	23 feet	25 feet
12" IPS	--	27 feet	29 feet
16" IPS	--	34 feet	--

The radius of the circular bend in the pipe must be **equal to or greater** than the footage listed above.



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9.0 PE PLASTIC SERVICE INSTALLATIONS (Continued)

- 9.7 Tape a minimum #14 AWG red or yellow insulated copper tracer wire (e.g. Class/Stock # 563-0040, #12 AWG yellow) to all direct buried plastic service installations at 20 to 30 foot intervals. Bring the tracer wire to the top of the curb box or riser. See Sections 11.2 and 12.6 for tracer wire requirements for trenchless technology and service insertions. Tracer wire may not be wrapped around the plastic pipe and contact with the plastic pipe must be minimized (i.e. just to the contacts for "taping intervals").

9.8 GROUNDING

If conditions exist that a flammable gas - air mixture may be encountered and static charges may be present, such as during gassing-in, purging, a damage, etc., the plastic pipe shall be grounded. This may be done by using the ASG grounding kit (Class/Stock #025-2569) or by covering the pipe ends near the opening and also the remaining length of plastic pipe in the work area with wet rags saturated with soap solution to minimize the build-up of static charges. Keep the rags in contact with the soil to provide grounding.

When utilizing hand and/or pneumatically/ hydraulically powered tools on plastic pipe/tubing, and a flammable gas-air mixture may exist, always ground these tools to dissipate static electricity charges. Attach a #10 wire (Class/Stock #563-1361) to the tool and a nearby water main, fire hydrant or digging bar in earth (*not soil on a road surface*). In addition, the entire length of plastic pipe/tubing in the work area must be wrapped with ASG kits and kept wet and grounded at each end of the excavation.

When utilizing mechanical or hydraulically powered squeeze-off tools on plastic pipe/tubing, ground these tools utilizing the manufacturer's recommended grounding kit.

For additional information on static electricity and plastic pipe/tubing, refer to Gas Specification [G-8178](#), "Shut-off of Polyethylene Plastic Pipe/Tubing Used for Gas Mains and Services."

- 9.9 Plastic pipe/tubing shall **not** be installed in the following areas:

- A) Above ground, except on bridges as provided in Gas Specification [G-8005](#).
- B) Where the temperature of the pipe/tubing is below -20°F or exceeds 100°F.

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9.0 PLASTIC SERVICE INSTALLATIONS (Continued)

- C) In a subsurface vault or any below grade enclosure (**not** containing therein any steam facilities) unless it is completely encased in a gas tight metal pipe having adequate corrosion protection.
- D) Where the soil is saturated with solvents, fuels (e.g. gasoline), or oils.
- E) More than 3" beyond the inner face of the building wall (NYC Fuel Gas Code) (this includes a building's vaulted area) and the 3" (or less) of plastic pipe/tubing must be fully encased within a steel sleeve or existing service pipe. The plastic service pipe or tubing shall terminate at a transition fitting or service head adapter/basement tee.

The use of an insulok fitting (3/4", 1", 1 1/4", 1 1/2" and 2") as a "**sleeve fitting**", **not** as a "gas carrier fitting", is **acceptable** for all pressures. When the insulok is used as a "sleeve fitting", the green insulating gasket should be removed since it is not required.

NOTE: In the New York City gas operating areas, when working on (e.g. bypassing, main replacement, service transfer or replacement [full or partial]) a service that was previously inserted with plastic tubing inside the old service pipe through the building's vaulted area, **then** the plastic tubing must be replaced and terminate within 3" of the inner face of the building's vaulted wall.

Cut the old service (used now as a sleeve for the plastic tubing) pipe as close as possible to the building's vaulted basement wall and install an insulok and service head adapter and re-pipe with steel pipe through the vaulted basement area.

- F) Within 35 feet of **any** steam facility (Company/private) or in any subsurface structure, inside of which, a steam facility is located (NYC Fuel Gas Code). (See Section 5.9)

9.10 Prior to installing PE plastic gas or steam facilities south of 97th Street in Manhattan, the following steps shall be taken:

- A) Gas Engineering shall review the proposed installation with Steam Engineering to determine the location of existing or planned steam facilities.

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9.0 PLASTIC SERVICE INSTALLATIONS (Continued)

Conversely, Steam Engineering shall provide Gas Engineering with preliminary layouts of proposed steam installations to determine the location of existing plastic gas facilities in the area.

- B) All gas layouts and sketches designating the installation of plastic gas services south of 97th Street and all steam layouts calling for extension or relocation of the steam system shall be stamped or have wording indicating that the job has been reviewed for the minimum 35' clearance between plastic gas facilities and steam facilities. The reviewing engineering technician in Gas and Steam Engineering shall date and sign the documents or type name and employee number.

The stamp or layout wording shall state, as a minimum, the following:

Steam Facilities within 35' of the plastic gas pipe

Yes ☐ No ☐ (Check One)

(Gas) Signed _____ Employee # _____ Dated _____
(Steam) Signed _____ Employee # _____ Dated _____

- 9.11 Slack for unstable soil conditions and/or expansion and contraction shall be provided by snaking the pipe within the trench or by installing an expansion loop (check with Gas Distribution Engineering).

NOTE: See Gas Specification [G-11831](#) for required service inspections in areas of unstable soil.

- 9.12 The backfilling of new and replacement plastic service pipe should be performed **as soon as possible** to limit expansion and contraction of the plastic pipe and also to avoid possible damage to the plastic pipe.
- 9.13 All kinks, buckles, and dents, gouges, grooves etc. which have a depth greater than 10% of the wall thickness (See Appendix B) of the plastic pipe/tubing or as determined by Gas Distribution Engineering **must** be removed by cutting out the damaged section as a cylinder. The minimum cylinder length to be removed is one pipe diameter or 12 inches, whichever is greater.

NOTE: Performance Pipe 8100 pipe/tubing has a “yellow shell” that is 1-2 mils (0.001-0.002) thick.

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9.0 PLASTIC SERVICE INSTALLATIONS (Continued)

- ★ 9.14 Plastic valves are approved up to and including 16" diameter. Where the same diameter valve comes in reduced port and full port openings (See Appendix C), a full port valve shall be used (unless otherwise noted on a layout or requested by Gas Distribution Engineering).
- ★ 9.15 PE plastic molded fittings (caps, elbows, reducers, tees and valves) without pup lengths can **only** be joined to plastic pipe/tubing or other molded fittings by butt fusion, electrofusion, or MetFit fittings. (See Gas Specification [G-8104](#) for approved fittings with pup lengths of PE plastic pipe or tubing). (See [G-100,285](#) for approved MetFit fittings). With the exception of MetFit fittings, plastic molded fittings can **not** be joined to plastic pipe/tubing or other molded fittings by mechanical fittings.

Install and inspect MetFit mechanical fittings as per manufacturer's procedures. Molded fittings shall **not** be altered in order to utilize MetFit fittings.

- 9.16 A plastic service can be installed directly to a gasoline station building provided that the ground soil is **not** saturated as stated in Section 9.9.
- 9.17 When steel fittings are used with a plastic service installation, they shall be coated and separately protected from any steel or cast/wrought iron main. Steel fittings shall also be insulated from any copper tubing. Cathodic protection shall be in accordance with applicable Company specifications.
- ★ 9.18 Heat fusion of PE plastic pipe, tubing, and fittings of different SDR wall thickness shall only be performed between **one change in SDR**.

SDR	7	↔	9/ 9.3	↔	11	↔	13.5	↔	15.5
-----	---	---	--------	---	----	---	------	---	------

Joining of PE plastic pipe, tubing, and fittings with SDR wall thickness **greater than one change in SDR** shall be electrofused. Approved restraining-type mechanical couplings may only be used for joining PE plastic pipe and tubing when an electrofusion coupling is unavailable. (See Appendix A, "Approved Joining Methods for PE Plastic Pipe" and Gas Specifications [IP-20](#) and [G-8209](#))

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9.0 **PLASTIC SERVICE INSTALLATIONS** (Continued)

- ★ 9.19 Inspect PE plastic pipe, tubing, and fittings prior to installation to verify:

- 1) No cuts, gouges, deep scratches, or other defects.
- 2) PE plastic material is high density polyethylene (HDPE), PE3408/4710, and manufactured per ASTM D2513.
- 3) PE plastic material is NOT older than 10 years old.

(See Gas Specification [G-8122](#), "Transportation, Handling, and Storage of Polyethylene Plastic Pipe/Tubing, and Fittings for Gas Mains and Services")

★ 9.20 **PE Plastic Pipe, Valves, and Fittings**

- A) See Gas Specification [G-8104](#), "Polyethylene Pipe, Tubing, and Fittings for Gas Mains and Services" for approved PE plastic pipe, tubing, and fittings.
- B) See Gas Specification [G-8122](#), "Inspection, Handling, Storage, and Transportation of Polyethylene (PE) Plastic Pipe, Tubing, and Fittings for Gas Mains and Services" for the inspection, handling, storage, and transportation requirements of PE plastic pipe, tubing, and fittings.
- C) See Gas Specification [G-100.298](#) for approved PE plastic valves.

★ 9.21 Restrictions

The following materials shall not be installed for buried or submerged installations:

- A) used PE plastic pipe, and
- B) pipe, valves, or fittings not approved by Gas Distribution Engineering.

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10.0 TRENCHLESS TECHNOLOGY

★ 10.1 In Vicinity of Mains With an MAOP Greater Than or Equal to 125 PSIG

The use of trenchless technology (i.e. directional boring, hole hog, bullet, etc.) **within 5 feet** (radial distance) running parallel or crossing gas mains/services operating at greater than or equal to 125 psig; 69 KV, 138 KV & 345 KV oil-o-static pipelines and fiber optic communication lines is **prohibited**.

NOTE: This does **not** include insertion, PIM or Con-Split. For PIM and Consplit, a minimum of 3 feet radial distance is required.

The use of trenchless technology is permitted for radial distances greater than 5 feet and less than 15 feet **provided that** Gas Distribution Engineering is contacted to determine the number and location of test pits that are required.

The use of trenchless technology is permitted for radial distances of 15 feet or greater.

10.2 Plastic Pipe

When using trenchless technology (e.g. PIM, directional boring, hole hog, bullet) to install plastic pipe, no sleeve is required.

NOTE: For pipe bursting of steel, a sleeve shall be used.

Trace-Safe Kevlar-coated, yellow, #19 AWG tracer wire (manufactured by Neptco) (non-stock) shall be taped to the plastic pipe at appropriate intervals. Bring the tracer wire to the top of the curb valve box or riser. Tracer wire may not be wrapped around the plastic pipe and contact with the plastic pipe must be minimized (i.e. just to the contacts for "taping intervals").

10.3 If coated pipe is installed by boring, driving or other similar method, precautions must be taken to minimize damage to the coating during installation.

10.4 Appropriate excavations shall be made to determine the location of buried facilities (e.g. water, sewer and sewer laterals, telephone, electric, etc.)

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11.0 PLASTIC/COPPER TUBING SERVICE INSERTION INSTALLATION

- 11.1 Plastic tubing shall be joined only by personnel, who are “Operator Qualified” in joining the plastic tubing by butt fusion, branch saddle fusion, electrofusion, and/or approved mechanical fittings. (See Section 5.2)

Copper tubing shall be joined only by personnel, who are Operator Qualified in joining copper tubing by approved mechanical fittings.

- 11.2 Brass couplings shall **only** be used to connect a copper-to-copper connection. They shall **not** be used for a plastic-to-plastic connection or a plastic to copper connection.
- 11.3 All copper tubing and plastic tubing in CTS sizes (except for 1/2” CTS) that is found direct buried or is direct buried as part of an insertion shall have a protective sleeve installed (around the tubing) to protect the tubing from damage. (See Section 5.13)
- 11.4 Protective bushings must be installed on the ends of the existing service pipe (after the pipe is cut, removed and reamed) and **prior** to insertion to protect the plastic or copper from damage.
- 11.5 The leading open end of the plastic or copper must be sealed prior to insertion.
- 11.6 A minimum #14 AWG red or yellow insulated copper tracer wire (e.g. Class/Stock # 563-0040, #12 AWG yellow) shall be taped to the plastic tubing at appropriate intervals. Bring the trace wire to the top of the curb valve box or riser. Tracer wire may not be wrapped around the plastic pipe and contact with the plastic pipe must be minimized (i.e. just to the contacts for “taping intervals”).

EXCEPTION: When tight tolerances between the casing and plastic tubing prohibit the installation of tracer wire, then gaps in the casing should be jumped with tracer wire and be brought to the top of the curb valve box or riser.

- 11.7 The plastic or copper shall be inspected **before and after** insertion to detect any dents, gouges, grooves, etc.
- 11.8 All dents gouges, grooves, etc. which have a depth greater than 10% of wall thickness for copper or PE plastic, or as determined by Gas Engineering **must** be removed by cutting out the damaged section as a cylinder. The minimum cylinder length to be removed is one pipe diameter or 12 inches, whichever is greater. (See Appendix B for Plastic Pipe Defect Chart and Appendix E for Copper Tubing Defect Chart)

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11.0 PLASTIC/COPPER TUBING SERVICE INSERTION INSTALLATION (Continued)

11.9 Each and every end of the existing service pipe, shall be sealed (between the old service pipe and new tubing) to prevent migration of gas or water.

NOTE: The recommended method to seal is by using the 3M cold shrink or “Slipseals.” (See Gas Specification [G-8096](#))

11.10 When steel fittings are used with a plastic or copper insertion, they shall be coated and separately protected from any steel or cast/wrought iron main. Steel fittings shall also be insulated from any copper tubing. Cathodic protection shall be in accordance with applicable Company specifications.

11.11 The pressure ratings for PE plastic tubing are as follows:

SIZE	LOW PRESSURE (LP)	INTERMEDIATE PRESSURE (IP)	MEDIUM PRESSURE (MP)	HIGH PRESSURE (HP)
1/2" PE CTS	Yes	Yes	Yes	Yes
1" PE IPS	Yes	Yes	Yes	Yes
1" PE CTS	Yes	*	*	No
1 1/4" PE IPS	Yes	Yes	Yes	Yes
1 1/4" PE CTS	Yes	*	*	No

* CTS tubing should **not** be installed in the event of a future MAOP upgrade.

11.12 The backfilling of the new/replacement section of tied-in PE plastic/copper tubing should be performed **as soon as possible**, so as to limit the expansion and contraction of the PE plastic tubing and also to avoid possible damage to the PE plastic/copper tubing.

11.13 The following items are also applicable to PE plastic insertions.

- A) for static electricity and plastic pipe/tubing, see Section 10.8. Also see Specification [G-8178](#).
- B) for SDR size and stiffener, see Section 9.5.
- C) for plastic tubing inside a building's vaulted area, see Section 9.9.



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11.0 PLASTIC/COPPER TUBING SERVICE INSERTION INSTALLATION (Continued)

- D) for areas where plastic tubing cannot be installed, see Section 9.9.
- E) for administrative controls for plastic pipe/tubing in steam areas in Manhattan, see Section 9.10.
- F) for plastic insertion in unstable soil, see Section 9.11.
- G) for cathodic protection of steel fittings used on plastic tubing, see Section 9.17.
- H) for a plastic service insertion to a gasoline station building, see Section 9.9. It may be necessary to excavate test pits over the inserted service to ensure the soil is not saturated with fuels or oils.

12.0 PRESSURE TEST, PURGING AND GAS-IN

12.1 Pressure test the gas service as per Specification [G-8204](#), "Pressure Testing Requirements for Gas Mains and Services".

- ★ 12.2 PE plastic (i.e., electrofusion tapping tees, SPA saddles) and metallic tapping fittings used for service connections shall be pressure tested to 90 psig for LP, IP, and MP or 150 psig for HP prior to drilling and/or tapping. Alternately, if not feasible to do so, the service connections to the main can be given a leak test (i.e., soap tested) at operating pressure and documented as part of the pressure test when placed into service.

12.3 Following the successful completion of the service pressure test, purge the service pipe/tubing as per [G-8129](#) and gas-in the service pipe/tubing and leak test the tie-in points at service line pressure.

The gas-in of a service replacement (where the building is "on bypass") should be performed **from** the building **out to** the main.

NOTE: When installing 1-1/4" angle valve tee, utilize the 1/8" test plug to gas in.

When it is necessary to gas-in **from** the main **to** the building, the gas must be vented to outside the building via a continuous temporary pipe/tubing connection. **Never** vent the gas into a building during gas-in.

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12.0 PRESSURE TEST, PURGING AND GAS-IN (Continued)

12.4 If the customer's piping is not approved for turn-on at the time of service installation/reconnection, **or** for service replacements, where the purging and gas-in cannot be accomplished at the time of the service replacement, then the SHV, curb valve or meter valve(s) must be closed and verified that it/they is/are not passing and secured with an approved locking device(s) and all open ends plugged/capped.

NOTE: Whenever possible, perform a double shutdown (i.e., curb valve, service head valve/riser valve, meter valve). **Verify each isolation valve(s) is off, holding, and locked.**

★ 13.0 REFERENCES

Bypassing Building

Operation, Maintenance, Handling and Storage of the Modular - Style, [IP-16](#)
Compressed Natural Gas (CNG) Bypass Cart

Casing Installations

Sealing the Annular Space Between a Gas Pipe and a Wall, Casing [G-8096](#)
Pipe, or Sleeve

Typical Casing End Seal For Steel Main in Cast Iron Casing [EO-14800-C](#)

Clearances

Gas Facilities – Clearances, Encroachments, Interference, and [CI-920-1](#)
Corrosion

Clearances of Electric Subway from Gas Mains and Other Subsurface [EO-5570-C](#)
Structures

Contractor/Per Diem

Qualification of Contractors' Maintenance Engineers and Field [G-8195](#)
Supervisors Engaged in Gas Maintenance / Installation of Mains
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Corrosion Control

Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures [G-8209](#)

Electrical Spark Inspection of Coating on Steel Pipe [G-8201](#)

Corrosion Control of Buried Steel Gas Distribution Mains and Services [G-8205](#)

Corrosion Testing on Buried Steel Gas Mains and Services [G-11830](#)

Fittings

Segmenting Long Radius Forged Elbows [EO-14620-C](#)

Gas Main Installation

General Specification for the Installation of Gas Distribution Mains [G-8005](#)

Gas Operations EH&S Instructions

Handling Auto Seal in Gas Mains [GAS0025](#)

Handling Gas Services Containing Epi-Seal [GAS0027](#)

GEHSIs And AMMs

Asbestos Duct Seal Removal Or Minor Disturbances [AMM 6.03](#)

Asbestos Gasket Removal-Gas [AMM 6.10](#)

Clear Access To Customer Premises [AMM 6.02](#)

Coal Tar Wrap Removal – Gas Electric and Fuel Oil. [AMM 6.04](#)

Excavated Soils on Property Not company owned [GEHSI E05.11](#)

Drip Pots and Drip Pot Liquids [GEHSI E06.08](#)

Gas Drip Water [GEHSI E06.07](#)

Hazardous Non-PCB Contaminated Soil [GEHSI E06.12](#)



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★ 13.0 **REFERENCES** (Continued)

GEHSIs And AMMs (Continued)

Liquids and Solids from Natural Gas Mains During Mains Cutouts [GEHSI E06.11](#)

Mercury-Containing Equipment [GEHSI E06.06](#)

Paint Chips [GEHSI E06.04](#)

Valve Test Boxes [GEHSI E02.10](#)

Joining of Plastic Pipe

Qualification of Installers Joining Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services. [G-8121](#)

Heat Fusion Joining of Polyethylene (PE) Plastic Pipe/Tubing and Fittings For Gas Mains and Services [G-8123](#)

Installation of Mechanical Fittings for Polyethylene (PE) Plastic Pipe and Tubing [IP-20](#)

Installation of Electrofusion Fittings on Polyethylene (PE) Plastic Pipe/Tubing and Molded Fittings Using a Universal Electrofusion Processor [IP-27](#)

PE Plastic Pipe

Polyethylene Pipe, Tubing, and Fittings for Gas Mains and Services [G-8104](#)

Inspection, Handling, Storage, and Transportation of Polyethylene (PE) Plastic Pipe, Tubing, and Fittings for Gas Mains and Services [G-8122](#)

PE Plastic Pipe Installation

Shut-Off Of Polyethylene Plastic Pipe/Tubing Used For Gas Mains and Services [G-8178](#)

Steel Pipe

Extruded Polyolefin Coating on Steel Pipe [G-8062](#)

Steel Pipe for Gas Mains and Services [G-8107](#)

Plugs

Wood Plugs for Use with Cast Iron and Steel Pipes [EO-3942-C](#)

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PPE

Requirements For Airline Respirator (ALR), Flame Retardant Coveralls (FRC), Harness and Line (H&L) and Harness and Gantry [IP-42](#)

Pressure Testing

Pressure Testing Requirements for Gas Mains and Services [G-8204](#)

Purging

Purging Gas Mains, Services and Regulator Stations [G-8129](#)

Reinforcement

Reinforcing Non-Restraining Compression Fittings [G-8153](#)

Maintenance and Replacement of Gas Services

Responsibility for Maintenance and Replacement of Gas Services [G-8149](#)

Service Connections

Steel/Copper Service Connections to Metallic Mains [EO-16645](#)

Service Installation

Installation of Copper Tubing Gas Service Piping [EO-16532-A](#)

Installation of Flexible Sleeve Elbow Unit Where Service Enters From Beneath Building Not Exceeding 99 PSIG [EO-16546-B](#)

Installation of Meter Piping For Class 250 TC to 1000 TC Diaphragm Gas Meters – Outdoors [EO-16585-A](#)

Installation of Steel Gas Service Piping [EO-16629-A](#)

Installation of Plastic (Direct Burial or Insertion) Gas Service Piping [EO-16641-A](#)

Service Sizing [G-8200](#)

Procedure for Checking Areas Where Main and/or Service Movement is Anticipated [G-11831](#)

Pipeline Casing Insulating Skids [G-100,280](#)

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Service Installation (Continued)

Procedure for Removing or Replacing Live Intermediate, Medium and High Pressure Gas Pipe and/or Fittings Without No-Blow Equipment [IP-30](#)

Using the “Renu” Method to Bypass a Building [IP-39](#)

Bumper Installation [502163](#)

Street Opening

Street Opening Color Coding, Permit Signs at Worksite and Pavement Restoration Markers [G-8194](#)

Trenching and Backfill

Typical installation 1, 2 or 4 Duct Electric Subway with 2” to 12” Gas Main in Common Trench [EO-5571-B](#)

General Specification for Backfilling of Trench and Small Openings [EO-1181](#)

General Backfill and Bedding Material for Excavation [EO-8085](#)

Trench Excavation for Gas Mains & Services Up to 350 PSI [309495](#)

Installation of Electronic Markers on Gas Mains and Services [502664](#)

Trenching and Backfill (Continued)

Protective Covers for Gas Main and Service Installations [EO-6799-C](#)

Sheeting for Trenches and Excavations [EO-16954-B](#)

Plywood Sheeting for Trenches and Excavations [EO-16965](#)

Valves

Requirements for Indicating the Location Of The Curb Valve Box On A Gas Service With An Indoor Regulator [G-8028](#)

Installation of Valves on Gas Distribution Mains [G-8141](#)

Installation of 6", 8" and 12" Polyethylene Gas Valves [309808](#)

Installation of 4"-36" Welded End Ball Valve and Valve Box [EO-13911](#)

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Vaults/Enclosed Areas

Service Pipe/Tubing And Service Sleeve Through Vault, Open
Areaway, Open Area Under Stairs, Under Enclosed Area, And Into
Vaulted Basement

[EO-4890-B](#)

Common Ground Alliance (CGA) letter dated 9/30/03 to DOT, RSPA on CGA Best
Practice on Minimum 12" Radial Separation

Vents

Regulator Vent Installation

[EO-17118](#)

Installation and Inspection of Gas Service Regulator Vent Line
Protectors (VLPs)

[G-699](#)

Flood-Prone Areas for the Installation of Gas Service Regulator Vent
Line Protectors (VLP's)

[G-8217](#)

Welding

Shielded Metal Arc Welding Procedure for Welding Steel Pipe and
Fittings

[G-1064](#)

Qualification of Welders and Welding Procedures

[G-1065](#)

Radiographic Inspection of Pipeline Welds

[G-1070](#)

★ 14.0 **APPENDICES**

A (Deleted)

B Plastic Pipe Defect Chart

★ C PE Valves

D Steel Pipe Defect Chart

E Copper Tubing Defect Chart

F (Deleted)



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 - ★ G-1 Plastic Service Connections to Plastic Mains
 - ★ G-2 Plastic Service Connection to Cast Iron, Steel and Wrought Iron Mains
 - ★ G-3 Steel Service Connections to Cast Iron, Steel and Wrought Iron Mains
 - H-1 & H-2 Installation Requirements for the Plastic Brass-Based Tee
 - ★ I Key Task Matrix for Gas Service Installation/Replacement (Gas Specification [G-8100](#))

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APPENDIX A

Appendix A Has Been Deleted

APPENDIX B

PLASTIC PIPE/TUBING CHART MAXIMUM PERMISSIBLE DEFECT

Nominal Size	SDR	Outside Diameter	Minimum Wall Thickness	Maximum Permissible Defect
1/2" CTS	7.0	0.625"	0.090"	0.009"
1" CTS	12.5	1.125"	0.090"	0.009"
1 1/4" CTS	15.3	1.375"	0.090"	0.009"
1" IPS	9.33	1.315"	0.140"	0.014"
1" IPS	11	1.315"	0.119"	0.011"
1 1/4" IPS	9.33	1.660"	0.178"	0.017"
1 1/4" IPS	11	1.660"	0.151"	0.015"
2" IPS	9.33	2.375"	0.255"	0.025"
2" IPS	11	2.375"	0.215"	0.021"
3" IPS	9.33	3.500"	0.375"	0.037"
3" IPS	11	3.500"	0.318"	0.031"
4" IPS	9.33	4.500"	0.482"	0.048"
4" IPS	11	4.500"	0.409"	0.040"
6" IPS	11	6.625"	0.602"	0.060"
8" IPS	11	8.625"	0.785"	0.078"
10" IPS	11	10.750"	0.977"	0.097"
10" IPS	15.5	10.750"	0.694"	0.069"
12" IPS	11	12.750"	1.159"	0.115"
12" IPS	15.5	12.750"	0.823"	0.082"
16" IPS	11	16.000"	1.455"	0.145"
16" IPS	15.5	16.000"	1.032"	0.103"

★ APPENDIX C

PE VALVES

<u>SIZE</u>	<u>BORE</u>	<u>BORESIZE</u>	<u>CV</u>	<u>EQUIV LENGTH</u>	<u>OVERALL LENGTH No Pups</u>	<u>WEIGHT</u>
1/2"CTS	Full	1.01"	7	0.94'	12.00"	1.0lbs
1"CTS	Full	1.01"	33	2.0'	12.00"	1.0 lbs
1"IPS	Full	1.01"	42	2.6'	12.00"	1.0 lbs
1 1/4" CTS	Full	1.38"	100	1.5'	12.00"	2.0 lbs
1 1/4" IPS	Full	1.38"	100	1.6'	12.00"	2.0 lbs
2"	Full	1.85"	175	3.8'	14.7"	3.8 lbs
3"	Full	2.5"	390	5.3'	15"	8.0 lbs
4"	Full	3.62"	700	5.8'	20"	19.5 lbs
6"	Full	5.22"	1,800	6.1'	20"	38 lbs
8"	Full	6.66"	3,650	5.5'	69.5"	66.4 lbs
12"	Full	9.9"	7,000	10.6'	83.8"	305 lbs
16"	Full	11.5"	Info Pending	Info Pending	88.3"	365 lbs

APPENDIX D

STEEL PIPE CHART MAXIMUM PERMISSIBLE DEFECT

Nominal Size	Outside Diameter	Minimum Wall Thickness	Maximum Permissible Defect
1"	1.315"	0.133"	0.017"
1 1/2"	1.900"	0.145"	0.018"
2"	2.375"	0.154"	0.019"
3"	3.500"	0.216"	0.027"
4"	4.500"	0.237"	0.030"
6"	6.625"	0.280"	0.035"
8"	8.625"	0.322"	0.040"
10"	10.750"	0.365"	0.046"
12"	12.750"	0.375"	0.047"
16"	16.000"	0.375"	0.047"
20"	20.000"	0.375"	0.047"
24"	24.000"	0.375"	0.047"
24"	24.000"	0.500"	0.063"
26"	26.000"	0.500"	0.063"
30"	30.000"	0.375"	0.047"
30"	30.000"	0.500"	0.063"
36"	36.000"	0.500"	0.063"
36"	36.000"	0.562"	0.070"
36"	36.000"	0.625"	0.078"

APPENDIX E

COPPER TUBING CHART MAXIMUM PERMISSIBLE DEFECT

Nominal Size	Outside Diameter	Minimum Wall Thickness	Maximum Permissible Defect
1/2"	0.625"	0.049"	.005"
1"	1.125"	0.065	.007"
1 1/4"	1.375"	0.065	.007"
2"	2.125"	0.083	.008"

APPENDIX F

Appendix F has been deleted

★ APPENDIX G-1

PLASTIC SERVICE CONNECTIONS TO PLASTIC MAINS (ALL PRESSURES)

		<u>Service Size</u>											
		1/2" CTS	1" CTS	1" IPS	1-1/4" CTS	1-1/4" IPS	2" IPS	3" IPS	4" IPS	6" IPS	8" IPS	10" IPS	12" IPS
Main Size													
	1-1/4" IPS	1		1		9							
	2" IPS	1	1	1	1	1	1						
	3" IPS	1	1	1	1	1	1	9					
	4" IPS	1	1	1	1	1	1	2	9				
	6" IPS	1	1	1	1	1	1	3	4	9			
	8" IPS	1	1	1	1	1	1	5	6	6	9		
	10" IPS	7	7	7	7	7	7	8	8	8	8		
	12" IPS	1	1	1	1	1	1	8	8	8	8		9

Service to Main Connection

- 1) Electrofuse Tapping Tee
- 2) Development Lab to electrofuse 4" X 4" branch saddle & "hot tap" (and install plastic reducer as needed.)
- 3) Development Lab to electrofuse 6" X 3" branch saddle & "hot tap"
- 4) Development Lab to fuse 6" X 4" branch saddle & "hot tap"
- 5) Development Lab to electrofuse "specially purchased" Friatec 8" X 4" branch saddle & "hot tap" (and install plastic reducer as needed.)
- 6) Development Lab to fuse 8" X 4" or 8" X 6" branch saddle & "hot tap"
- 7) Install IPEX 10" – 16" X 2" electrofuse tapping tee and install plastic reducer as needed
- 8) Development Lab to fuse 12" X 4" or 12" X 6" or 12" X 8" branch saddle and "hot tap" (and install plastic reducer as needed.)
- 9) Perform plastic main cut-out with full plastic main tee

Note: If field conditions prohibit service/main connection specified above or for service/main combinations not listed, contact Gas Distribution Engineering for guidance and written confirmation.

★ APPENDIX G-2

PLASTIC SERVICE CONNECTIONS TO STEEL, WROUGHT IRON, AND CAST IRON MAINS

	Service Size				
	≤ 1-1/4"	2"	3"	4"	≥ 6"
2" LP	1 or 2	1 or 2			
2" IP, MP & HP	1 or 2	1 or 2			
4" LP	1, 2, 4, 5, 12 or 13	1, 2, 4, 5 or 13	1 or 6	1 or 6	
4" IP, MP & HP	1, 2 or 5	1, 2 or 5	1 or 6	1 or 6	
6" LP	1, 2, 4, 5, 12 or 13	1, 2, 4, 5 or 13	1 or 6	1 or 6	1 or 6
6" IP, MP & HP	1, 2 or 5	1, 2 or 5	1 or 6	1 or 6	1 or 6
8" LP	1, 2, 4, 5, 12 or 13	1, 2, 4, 5, 12 or 13	1 or 6	1 or 6	1 or 6
8" IP, MP & HP	1, 2 or 5	1, 2 or 5	1 or 6	1 or 6	1 or 6
10" LP	1, 2, 4, 12 or 13	1, 2, 4, 12 or 13	1 or 6	1 or 6	1 or 6
10" IP, MP & HP	1 or 2	1 or 2	1 or 6	1 or 6	1 or 6
12" LP	1, 2, 4, 12 or 13	1, 2, 4, 12 or 13	1 or 7	1 or 6	1 or 6
12" IP, MP & HP	1 or 2	1 or 2	1 or 6	1 or 6	1 or 6
16" LP	1, 2, 4, 12 or 13	1, 2, 4, 12 or 13	1 or 7	1 or 8	1 or 6
16" IP, MP & HP	1 or 2	1 or 2	1 or 6	1 or 6	1 or 6
20" LP	1 or 12	1 or 12	1 or 7	1 or 8	1 or 6
20" IP, MP & HP	1	1	1 or 6	1 or 6	1 or 6
24", 30" & 36" LP	1 or 12	1 or 12	1 or 7	1 or 8	1 or 6
24", 30" & 36" IP, MP & HP	1	1	1	1	1 or 6

	Service Size			
	≤ 2"	3"	4"	≥ 6"
4" LP	2, 4, 5 or 13	6 or 9	6	
4" IP & MP	2 or 5	6 or 10	6 or 10	
6" LP	2, 4, 5 or 13	6, 9 or 10	6 or 10	6 or 10
6" IP & MP	2 or 5	6 or 10	6 or 10	6 or 10
8" LP	2, 3, 4, 5, 12 or 13	6, 9 or 10	6, 10 or 11	6 or 10
8" IP & MP	2 or 5	6 or 10	6 or 10	6 or 10
10" LP	2, 3, 4, 12 or 13	6	6	6
10" IP & MP	2	6 or 10	6 or 10	6 or 10
12" LP	2, 3, 4, 12 or 13	7 or 10	6 or 10	6 or 10
12" IP & MP	2	6 or 10	6 or 10	6 or 10
16" LP	2, 3, 4, 12 or 13	6, 7 or 10	6, 8 or 10	6 or 10
16" IP & MP	2	6 or 10	6 or 10	6 or 10
18", 20", 24" & 30" LP	3 or 12	6, 7 or 10	6, 8 or 10	6 or 10
36" LP	3 or 12	6 or 7	6 or 8	6

Service to Main Connection

- 1) Weld a no blow tapping tee (Steel or Wrought Iron Mains Only)
- 2) Install insulated strap saddle and threaded no blow tapping tee. *Double strap for CI main and 10" and 12" ST mains. *Single strap for ST mains (other than 10" and 12").
- 3) Tap main and install plastic brass based tee (Preferred)
- 4) Drill main only and install insulated strap saddle and plastic brass based tee (Preferred)
- 5) Install clamp with takeoff (FPT) and threaded no blow tapping tee
- 6) Install "approved special order fitting" with appropriate welded fitting(s)
- 7) Tap main and install 3" service with riser tee

Steel fittings must be properly insulated, coated and cathodically protected.

- 8) Tap main and install 4" service with riser tee
- 9) Install Style 80 with 3" threaded takeoff (FPT) and install 3" nipple (TOE) and riser tee
- 10) Install Style 50 and weld a no blow tapping tee
- 11) Install Style 80 with 4" threaded takeoff (FPT) and install 4" nipple (TOE) and riser tee
- 12) Tap main and install riser tee with nipple (PE) and insulok
- 13) Drill main only and install insulated strap saddle with nipple (TOE) and riser tee

FPT - Female Pipe Thread
TOE - Threaded One End
PE - Plain End (no threads)

Note: If field conditions prohibit service/main connection specified above or for service/main combinations not listed, contact Gas Distribution Engineering for guidance and written confirmation.

★ APPENDIX G-3

STEEL SERVICE CONNECTIONS TO STEEL, WROUGHT IRON, AND CAST IRON MAINS

	Service Size					
	≤ 1"	1-1/2"	2"	3"	4"	≥ 6"
2" LP	1 or 2	1 or 2	1 or 2			
2" IP, MP & HP	1 or 2	1 or 2	1 or 2			
4" LP	1, 2, 6 or 7	1, 2, 3 or 7	1, 2, 3 or 7	1 or 8	1 or 8	
4" IP, MP & HP	1, 2 or 7	1, 2 or 7	1, 2 or 7	1 or 8	1 or 8	
6" LP	1, 2, 4, 5 or 7	1, 2, 4, 5 or 7	1, 2, 3 or 7	1 or 8	1 or 8	1 or 8
6" IP, MP & HP	1, 2 or 7	1, 2 or 7	1, 2 or 7	1 or 8	1 or 8	1 or 8
8" LP	1, 2, 5 or 7	1, 2, 5 or 7	1, 2, 5 or 7	1 or 8	1 or 8	1 or 8
8" IP, MP & HP	1, 2 or 7	1, 2 or 7	1, 2 or 7	1 or 8	1 or 8	1 or 8
10" LP	1, 2 or 5	1, 2 or 5	1, 2 or 5	1 or 8	1 or 8	1 or 8
10" IP, MP & HP	1 or 2	1 or 2	1 or 2	1 or 8	1 or 8	1 or 8
12" LP	1, 2 or 5	1, 2 or 5	1, 2 or 5	1 or 9	1 or 8	1 or 8
12" IP, MP & HP	1 or 2	1 or 2	1 or 2	1 or 8	1 or 8	1 or 8
16" LP	1, 2 or 5	1, 2 or 5	1, 2 or 5	1 or 9	1 or 10	1 or 8
16" IP, MP & HP	1 or 2	1 or 2	1 or 2	1 or 8	1 or 8	1 or 8
20" LP	1 or 5	1 or 5	1 or 5	1 or 9	1 or 10	1 or 8
20" IP, MP & HP	1	1	1	1 or 8	1 or 8	1 or 8
24", 30" & 36" LP	1 or 5	1 or 5	1 or 5	1 or 9	1 or 10	1 or 8
24", 30" & 36" IP, MP & HP	1	1	1	1	1	1

	Service Size				
	≤ 1-1/2"	≤ 2"	3"	4"	≥ 6"
4" LP	2, 4 or 7	2, 4 or 7	8, 11 or 12	8 or 12	
4" IP & MP	2 or 7	2 or 7	8 or 12	8 or 12	
6" LP	4, 7 or 14	3, 7 or 14	8, 11 or 12	8 or 12	8 or 12
6" IP & MP	2 or 7	2 or 7	8 or 12	8 or 12	8 or 12
8" LP	4, 7 or 14	3, 7 or 14	8, 11 or 12	8, 12 or 13	8 or 12
8" IP & MP	2 or 7	2 or 7	8 or 12	8 or 12	8 or 12
10" LP	2 or 5	2 or 5	8	8 or 12	8 or 12
10" IP & MP	2	2	8	8	8
12" LP	2 or 5	2 or 5	9 or 12	8 or 12	8 or 12
12" IP & MP	2	2	8 or 12	8 or 12	8 or 12
16" LP	2 or 5	2 or 5	9 or 12	10 or 12	8 or 12
16" IP & MP	2	2	8 or 12	8 or 12	8 or 12
18", 20", 24", 30" & 36" LP	5 or 12	5 or 12	9 or 12	10 or 12	8 or 12

Service to Main Connection

- 1) Weld a no blow tapping tee (Steel or Wrought Iron Mains Only)
- 2) Install insulated strap saddle and threaded no blow tapping tee. "Double strap for CI main and 10" and 12" ST mains. "Single strap for ST mains (other than 10" and 12").
- 3) Drill main only and install insulated strap saddle with nipple (TOE) and riser tee
- 4) Drill main only and install insulated strap saddle and service tee
- 5) Tap main and install riser tee with nipple (PE) and insulok
- 6) Tap main and install insulated strap saddle and service tee
- 7) Install clamp with takeoff (FPT) and threaded no blow tapping tee
- 8) Install "approved special order fitting" with appropriate welded fitting(s)
- 9) Tap main and install 3" service with riser tee
- 10) Tap main and install 4" service with riser tee
- 11) Install Style 80 with 3" threaded takeoff (FPT) and install 3" nipple (TOE) and riser tee
- 12) Install Style 50 and weld a no blow tapping tee
- 13) Install Style 80 with 4" threaded takeoff (FPT) and install 4" nipple (TOE) and riser tee
- 14) Drill main only and install insulated strap saddle and threaded no blow tapping tee

INSTALLATION REQUIREMENTS FOR THE PLASTIC BRASS-BASED TEE

THE PLASTIC BRASS-BASED TEE IS FOR LOW PRESSURE USE ONLY

MAIN MATERIAL / SIZE	SERVICE SIZE		
	1"	1 1/4"	2"
CAST IRON			
4"	CASE 2	CASE 2	CASE 2
6"	CASE 2	CASE 2	CASE 2
8" & LARGER	CASE 3	CASE 3	CASE 3
PROTECTED STEEL/ WROUGHT IRON			
4"	CASE 2	CASE 2	CASE 2
6"	CASE 2	CASE 2	CASE 2
8"	CASE 2	CASE 2	CASE 2
10"	CASE 2	CASE 2	CASE 2
12"	CASE 2	CASE 2	CASE 2
16"	CASE 2	CASE 2	CASE 2
LARGER THAN 16"	SEE NOTE 2	SEE NOTE 2	SEE NOTE 2
UNPROTECTED STEEL			
4"	CASE 1	CASE 1	CASE 1
6"	CASE 1	CASE 1	CASE 1
8"	CASE 1	CASE 1	CASE 1
10"	CASE 1	CASE 1	CASE 1
12"	CASE 1	CASE 1	CASE 1
16"	CASE 1	CASE 1	CASE 1
LARGER THAN 16"	SEE NOTE 2	SEE NOTE 2	SEE NOTE 2

**FOR EACH NUMBER IN THIS CHART REFER TO THE
CORRESPONDING CASE DRAWING IN APPENDIX H-2**

NOTES

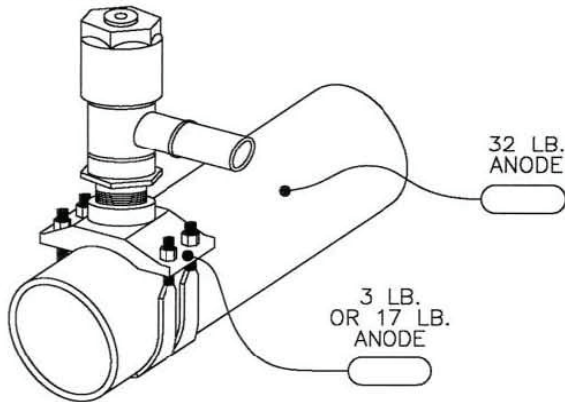
1. IT IS ALWAYS ACCEPTABLE TO USE A STRAP SADDLE WITH A LARGER OUTLET AND CORRESPONDING PLASTIC BRASS-BASED TEE.
2. FOR STEEL MAINS GREATER THAN 16" IN DIAMETER, THERE ARE NO STRAP SADDLES AVAILABLE. IN THESE INSTANCES A PLASTIC BRASS-BASED TEE CANNOT BE USED.
3. A PLASTIC BRASS-BASED TEE SHALL NOT BE THREADED DIRECTLY INTO A STEEL OR WROUGHT IRON MAIN.

MATERIAL	CLASS/STOCK #
PLASTIC BRASS-BASED TEE	
1 1/4" BRASS INLET x 1 1/4" CTS OUTLET	341-4463
1 1/4" BRASS INLET x 1" CTS OUTLET	341-4471
1 1/2" BRASS INLET x 1 1/4" CTS OUTLET	341-4588
1 1/2" BRASS INLET x 1" CTS OUTLET	341-4513
2" BRASS INLET x 1" CTS OUTLET	341-4521
2" BRASS INLET x 1 1/4" CTS OUTLET	341-4505
2" BRASS INLET x 2" IPS OUTLET	341-4794
STRAP SADDLES	
4" CI x 1 1/2" TAP	341-5098
4" CI x 1 1/4" TAP	341-5205
4" CI x 2" TAP	341-5221
4" ST x 1 1/4" TAP	341-5114
4" ST x 1 1/2" TAP	341-5569
4" ST x 2" TAP	341-5122
6" CI x 1 1/2" TAP	341-5072
6" CI x 1 1/4" TAP	341-5239
6" CI x 2" TAP	341-5254
6" ST x 1 1/4" TAP	341-5080
6" ST x 2" TAP	341-5130
8" CI or ST x 2" TAP	341-5189
10" CI or ST x 2" TAP	341-5155
12" CI or ST x 2" TAP	341-5148
16" CI OR ST x 2" TAP	CONTACT THE DEVELOPMENT LAB TO ORDER

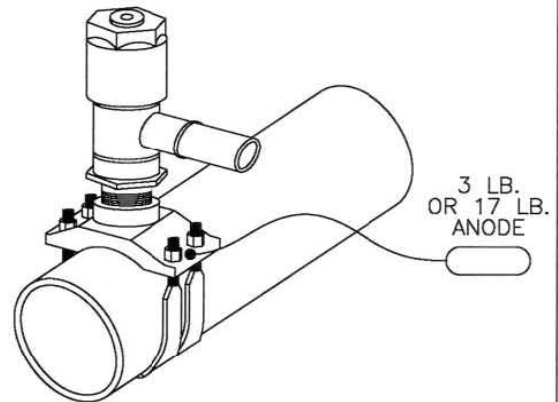
PREPARED BY: P.SMITH
REVIEWED BY: B.DAS
APPROVED BY: M.BALDOVIN
DATE: 5/29/07

INSTALLATION REQUIREMENTS FOR THE PLASTIC BRASS-BASED TEE

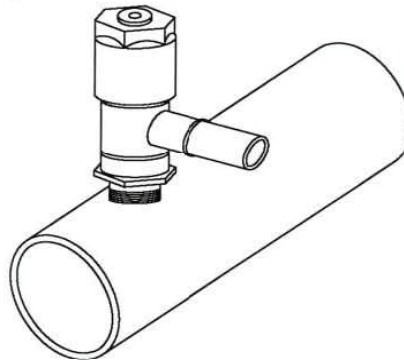
THE PLASTIC BRASS-BASED TEE IS FOR LOW PRESSURE USE ONLY

CASE ①

FOR UNPROTECTED STEEL MAINS, DRILL THE MAIN ONLY AND CONNECT THE BRASS-BASED TEE USING AN INSULATED STRAP SADDLE. ATTACH A 3 LB. MAGNESIUM ANODE TO 6" AND SMALLER STRAP SADDLES AND A 17 LB. MAGNESIUM ANODE TO 8" AND LARGER STRAP SADDLES. INSTALL A 32 LB. "HOT SPOT" MAGNESIUM ANODE TO THE PIPE.

CASE ②

FOR PROTECTED STEEL, CAST IRON (6" AND SMALLER) OR WROUGHT IRON MAINS, DRILL THE MAIN ONLY AND CONNECT THE BRASS-BASED TEE USING AN INSULATED STRAP SADDLE. ATTACH A 3 LB. MAGNESIUM ANODE TO 6" AND SMALLER STRAP SADDLES AND A 17 LB. MAGNESIUM ANODE TO 8" AND LARGER STRAP SADDLES.

CASE ③

FOR CAST IRON MAINS (8" AND LARGER), DRILL AND TAP THE MAIN AND CONNECT THE BRASS-BASED TEE DIRECTLY TO THE MAIN WITHOUT A STRAP SADDLE. NO ANODE IS NECESSARY.

PREPARED BY: P.SMITH
REVIEWED BY: B.DAS
APPROVED BY: M.BALDOVIN
DATE: 5/21/07

★ APPENDIX I

KEY TASK MATRIX FOR GAS SERVICE INSTALLATION/REPLACEMENT (GAS SPECIFICATION G-8100)

Task	G-8100 Section Reference	Description	Impact
Tracing Wire Installation	9.7 10.2 11.6	For all new (direct buried/trenchless technology/insertions) plastic services, tape a minimum #14 red or yellow tracing wire to the plastic service installations at 20 to 30 feet intervals and bring end up into top of the curb box or riser. On insertions, when tight tolerances between the casing and plastic tubing prohibit the installation of tracer wire, then gaps in the casing should be jumped with tracer wire and be brought to the top of the curb valve box or riser. Electronic markers are to be installed in addition to tracer wire per Gas Drawing 502664.	Failure to properly install tracer wire causes difficulty locating facilities for code 753 mark outs Contractor damage due to mismark
★ Maintaining Clearances	5.9 CI-920-1	Install new/replacement service with a minimum clearance of 4" from any subsurface facility or structure. A 12" clearance is needed if electric cable is direct buried (not in conduit). A minimum clearance of 2" is acceptable, provided that the service is properly protected. Where gas mains/services run parallel to electric transmission lines for significant distances contact electric transmission for guidance.. A minimum 6" clearance is needed around water mains and services. A rubber mat must be installed if this clearance is not maintained.	Damage to gas service due to electric burnout in contact with gas service. Also water impingement damaging gas service.
★ As-Constructed/Emergency Sketch Submission	5.39 CI-940-1	An " As-Constructed/Emergency Sketch " for all installation of new and replacement gas services (where horizontal lane has changed) shall be prepared and emailed on the same day as the tie-in to Gas Engineering Maps & Records. If horizontal lane has not changed then the emergency sketch shall be prepared and emailed on the next business day to Gas Engineering Maps & Records.	Damage to gas service due to unmapped facilities.

★ APPENDIX I

KEY TASK MATRIX FOR GAS SERVICE INSTALLATION/REPLACEMENT (GAS SPECIFICATION G-8100)

(Continued)

★ Cover and Protection	5.4 5.5 EO-6799-C	Where possible, the direct burial of new/replacement services shall be installed with a minimum cover of 24". For cover less than 24" inches steel protection plates shall be installed. "WARNING BURIED GAS LINES BELOW" tape must be installed at a minimum of 12" above the top of the direct buried new/replacement service.	Damage to gas services due to lack of adequate cover and/or warning tape.
★ Excess Flow Valves	7.1 7.2	Excess Flow Valves (EFVs) shall be installed on all new or replaced services to single family residences supplied by <i>high-pressure</i> regardless of load and new or replaced (including partial replacements, See Section 7.1, Note.) <i>high-pressure</i> non-single family residence services which use a meter up to and including a class 1000 meter or equivalent (e.g. two (2) class 500 meters, four (4) class 250 meters, one (1) class 500 and two (2) class 250 meters).	Uncontrolled release of gas on a contractor damage.
★ Piping Requirements	1.2 9.9 9.15	Only 1/2" PE CTS may be used on elevated pressure. All other pipe sizes must be IPS. With the exception of MetFit fittings, plastic molding fittings can not be joined to plastic pipe/tubing or other molded fittings by mechanical fittings without pup lengths of PE plastic pipe or tubing. Install and inspect MetFit mechanical fittings as per manufacturer's procedures. Molded fittings shall not be altered in order to utilize MetFit fittings. Service tees and branch saddle connections shall only be connected using electro fusion or an approved mechanical tee. Sidewall fusion is not permitted. Plastic pipe/tubing shall not extend more than 3" beyond the foundation wall and 3" or less of plastic pipe/tubing shall be fully encased within a steel sleeve.	Gas leak due to incorrect pipe selections/installations.
Electrical Tool Use-Live Gas	5.41	Electrically powered equipment shall never be used on a gas service.	Gas fire due to electric ignition.
Grounding for Static Electricity	9.8	On plastic services, if conditions exist that a flammable gas-air mixture may be encountered and static charges may be present, such as during gassing-in, purging, a damage, etc, then the plastic pipe shall be grounded. This may be done by using the ASG grounding kit or wet rags saturated with soap solution to minimize the build up of static charges. Mechanical or hydraulically powered tools used on plastic pipe need to be grounded if a flammable gas-air mixture exists.	Gas fire due to static electric ignition.

★ APPENDIX I

KEY TASK MATRIX FOR GAS SERVICE INSTALLATION/REPLACEMENT (GAS SPECIFICATION G-8100)

(Continued)

Environmental Issues	4.3 4.5	Determine the type and quantity of hazardous materials within the service by inspecting tap holes, reviewing M&S plate, and existing conditions in the excavation. Prior to cutting an existing service, it must be properly supported and an environmental site setup must be installed (plastic sheeting to catch any material escaping from the cut pipe). If any hazardous material is found (oil, sludge, etc.) other than drip water is found, contact EHS Operations for guidance on proper removal.	Failing to follow procedure will result in injury or damage to employees, public, and environment.
Pressure Testing	12.1	Pressure test services at 150 PSIG for high pressure and 90 PSIG for medium, intermediate, and low pressure. 15 min duration for service size 2" or less and 30 min for service size greater than 2". Also see Gas Specification G-8204	Gas leak due to pipe defects and/or improper installation.
Valve Location	5.30	Curb valves shall be installed in the sidewalk or unpaved area adjacent to the street in Westchester.	Unable to shut down gas service quickly in an emergency.
★ Operator Qualifications	5.1 5.2 5.3	Installers of new/replacement services must be "Operator Qualified". Only personnel qualified to join plastic pipe/tubing and weld or tap can perform these tasks.	Gas leak due to lack of proper training.
★ Pipe Defects	8.8 8.9 9.13 11.7 11.8 Appendix B Appendix D Appendix E G-8122 G-8003	All dents, gouges, grooves, etc which have a depth greater than 10% of the wall thickness (See Appendix B or G-8122 for plastic pipe/tubing, Appendix E for copper and Appendix D or G-8003 for steel) must be removed by cutting out 12" or more of the damaged section.	The defects could cause an eventual gas leak. When using perfection fittings, all scratches should be eliminated.



LAST REVIEW DATE: 3/22/16 ★ EFFECTIVE DATE 3/22/16	REVIEW CYCLE: 5 Years
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SPECIFICATION: **G-8104-14a**

TITLE: **POLYETHYLENE PIPE, TUBING AND FITTINGS FOR GAS MAINS AND SERVICES**

VOLUME: **6 & Yellow Book**

★ **COURSE ID:** **NONE**

★ **CORE GROUPS:** **NONE**

★ **TARGET AUDIENCE:** **NONE**

REV 14a (4/24/18):
Added Effective Date.

Cover Page: Added Course ID, Core Group, and Target Audience designations.

Section 15.0: Added new section, "Records". Renumbered subsequent sections

REVISIONS: (See★)

- 1) This specification has been revised to incorporate comments made by GTI's technical experts and Con Edison's subject matter experts.
- 2) Section 2.0 - Added Legal Requirements.
- 3) Section 3.0 - Added statement for "accepted revision indicated in 16 NYCRR Section 10.3." Removed "And Compliance" in General Requirements title and ASTM F714. Added ASTM F 1924, ASTM F1973, ASTM F 1948, ASME B 1.20.
- 4) Section 3.3 - Added manufacturer's letter of compliance requirement.
- 5) Section 4.1 - Added Endot, MT Deason, Plasson USA, Nupigeco, Dura-line. Changed Dow DGDA 2590 resin to 2490. Changed Chevron Phillips/Marlex resin from H525 to H516. Updated other existing abbreviations.



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- 6) Section 4.2 - Revised section covering rework / regrind reflecting change to Part 192.
- 7) Section 4.3 - Removed "Department Manager." Added "Section Manager."
- 8) Section 4.5 - Added "Approved PE Pipe and Tubing" header.
- 9) Section 4.7 - Added "Approved PE Fittings, Transition Fittings, and Anodeless Risers" header.
- 10) Section 4.8 - Added "Fabricated Fittings and Pup Pieces" header. Added mitering remark and joiner requirement
- 11) Section 5.1 - Added Anodeless Riser requirement per ASTM F1973.
- 12) Section 5.7 - Added Anodeless Riser requirement per ASTM F1973.
- 13) Section 7.1 - Added Transition Fitting requirement per ASTM F1973.
- 14) Section 7.6 - Added Transition Fitting requirement per ASTM B1.20.1.
- 15) Section 7.7 - Added Transition Fitting approval details and Category 1 requirement
- 16) Section 9.1 - Added "or supplier".
- 17) Section 9.2 - Added "visually unacceptable fusions per ASTM F 2620" requirement.
- 18) Sections 9.6 & 9.7 - Removed "Department Manager." Added "Section Manager."

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- 19) Section 10.1 - Added "Date of manufacture" marking requirements.
- 20) Section 10.2 - Added Anodeless Risers Category 1 Marking requirement.
- 21) Section 10.3 - Added Anodeless Risers labeling of transition zone requirement.
- 22) Section 12.1 - Added "or non-stock numbers."
- 23) Section 12.3 - Added new section. Contents previously located as individual notes in Sections 12.17 and 12.19.
- 24) Section 13.0 - Removed "Sizes of." Added "Tubing" in title.
- 25) Section 13.1 - Added Endot, MT Deason, Dura-line, Nupigeco, and Gas Distribution (acronym GD used for JM Eagle). Renamed IPF to PUSA, CP to GFCP, and P to EP. McJunkin Red Man is now named MRC Global.
- 26) Section 13.2 - Removed "UAC 3700" for JM Eagle and added "PE 4710 GD." Added Endot and Dura-line. Added "Yellowstripe" for PP. Deleted 2" and 3" 500 foot coils. Added 2" 350 foot coils. Deleted 10", 12" and 16" SDR 15.5 pipe. Added 16" SDR 11 pipe.
- 27) Section 13.3 - Removed "PE 3408/4710 (SDR 11)/Steel" in title.
- 28) Section 13.5 - Deleted section covering molded tapping tees. Added section for bolted tapping tee.
- 29) Section 13.6 - Replaced 3/4" IPS X 1/2" CTS with 1" IPS X 1/2" CTS. Added 1 1/2" IPS X 1 1/4" CTS Anodeless Riser Bend with 0.151" PE wall thickness.
- 30) Section 13.7 - Removed PP fabricated 3-way tees.

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- 31) Section 13.8 - Deleted note regarding MRC Global fabrication.
- 32) Section 13.9 - Added "Saddle" to title. Removed "Fabricated" in title. Added MRC Global part numbers. Removed CP and PP part numbers. Added 16" x 16" x 6" and 16" x 16" x 8" tees comment.
- 33) Section 13.11 - Removed PP Part numbers.
- 34) Section 13.12 - Deleted 16" fabricated 90 degree elbows from the table. Also, deleted PP 10" and 12" fabricated elbows.
- 35) Section 13.13 - Deleted 16" fabricated 45 degree elbows from the table. Also, deleted PP 10" and 12" fabricated elbows.
- 36) Section 13.14 - Deleted section covering fabricated 22 1/2 degree elbows (previously Section 12.14). Renumbered subsequent sections. Added 12" IPS 22 1/2 degree elbows (non-mitered).
- 37) Section 13.15 - Deleted note regarding MRC Global fabrication. Added MRC Global part numbers. Removed "Fabricated" in title and added "Butt Fusion."
- 38) Section 13.16 - Added MRC Global part numbers. Removed 3" IPS from table. 8" IPS is now Non-Stock in table. Removed "Fabricated" in title and added "Saddle." Deleted note regarding MRC Global fabrication. Added Gas Development Lab note.
- 39) Section 13.17 - Deleted 6" x 4", 8" x 4", 8" x 6" (PP Part only), 10" x 4", 10" x 6" (PP Part only), 12" x 4", 12" x 6" (PP Part only) and 12" x 8" (PP Part only) branch saddles. Added 16" x 6" and 16" x 8" branch saddles. Added Gas Development Lab comment.

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- 40) Section 13.18
 - Updated approved manufacturers for the 1-1/4" CTS Coupling. Added 2" IPS X 1" CTS and 2" IPS X 1-1/4" IPS reducer couplings.
- 41) Section 13.19
 - Added additional sizes of EF tapping tees to the table. Updated approved manufacturers for EF tapping tees. Removed note regarding packaging and relocated it to Section 12.3. Added note for IPEX (Friatec) tapping tee undersaddle.
- 42) Section 13.20
 - Retitled section to reflect manufacturer's terminology.
- 43) Section 13.21
 - Reworded description of repair patches. Removed note regarding packaging and relocated it to Section 12.3.
- 44) Section 13.22
 - Added new section covering EF SPA Saddles.
- 45) Section 13.23
 - Added new section covering EF Adjustable Elbows.
- 46) Section 13.24
 - Added new section covering EF Buttfused Repair Sleeves.
- 47) Section 13.25
 - Added new section covering EF Branch Saddles.
- 48) Section 13.26
 - Added new section covering EF 45° Elbows.
- 49) Section 13.27
 - Added new section covering EF 90° Elbows.
- 50) Section 13.28
 - Added new section covering EF Bottom Out Saddles.
- 51) Section 14.0
 - Added G-100,298, G-8121, and G-8123.



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1.0 SCOPE

This specification establishes the requirements for the purchase of polyethylene pipe, tubing, molded fittings, fabricated fittings, transition fittings, electrofusion fittings, and anodeless risers.

2.0 LEGAL REQUIREMENTS

2.1 Code of Federal Regulations Title 49 Transportation Part 192

2.2 NYCRR Part 255 "Codes, Rules and Regulations of the State of New York, Title 16 Public Service"

3.0 GENERAL REQUIREMENTS

- ★ 3.1 All pipe/tubing, fittings and risers shall comply with the latest revision of ASTM D2513 "Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings" (except for marking requirements D2513-87). For references to external standards cited in this specification, use the accepted revision indicated in 16 NYCRR Section 10.3. If the external standard is not listed within section 10.3, use the latest revision of the standard.
- A) API 5L, "Specification for Line Pipe," (Includes Errata and Addendum)
 - B) ASTM A53, "Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless"
 - C) ASTM F1055 "Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing"
 - D) ASTM D3261 "Standard Specification for Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene Plastic Pipe and Tubing"
 - ★ E) ASTM F1924, Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing.

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3.0 GENERAL REQUIREMENTS (Continued)

- ★ F) ASTM F1973 Specification for Factory Assembled Anodeless Risers and Transition Fittings
- ★ G) ASTM F1948 Specification for Metallic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing.
- H) Plastic Pipe Institute Technical Note TN-30 "Requirements for the Use of Rework Materials in Manufacturing of Polyethylene Gas Pipe"
- ★ I) ASME B1.20.1, "Pipe Threads, General Purpose"

3.2 Prior to approval of material for use in the Con Edison distribution system, all manufacturers of polyethylene pipe/tubing, molded fittings, fabricated fittings, transition fittings, and risers shall:

- ★ A) Provide all test data required to show compliance with the appropriate code, specification or ASTM requirements to the Section Manager of Gas Operations Development Lab.
- ★ B) Have their product(s) comply with the requirements of the applicable ASTM specification, and all Federal and New York State regulations.

★ **3.3 Manufacturers must provide a letter of compliance for USDOT 49 CFR Part 192.283 relating to the following fusion procedures:**

- A) For non-lateral connections, butt fusion testing for pipe and fittings using the PPI generic butt fusion joining procedure in Appendix A of PPI Technical Report TR-33. Include additional qualification testing information of manufacturer's D2513 high density polyethylene (PE 3408/4710) pipe joined in accordance with TR-33 and evaluated in accordance with 192.283. See list of approved pipe/tubing manufacturers in Section 13.2.

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3.0 **GENERAL REQUIREMENTS** (Continued)

- B) For lateral connections, saddle fusion testing for pipe and fittings using the PPI generic saddle fusion joining procedure in Appendix A of PPI Technical Report TR-41. Include additional qualification testing information of manufacturer's D2513 high density polyethylene (PE 3408/4710) pipe joined in accordance with TR-41 and evaluated in accordance with 192.283. See list of approved pipe/tubing manufacturers in Section 13.2.
- C) Manufacturers must qualify their electrofusion joining procedure to ASTM F1055 in accordance with 192.283.

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4.0 APPROVED PLASTIC RESIN MATERIAL

- ★ 4.1 The following table lists the approved resins and manufacturers for the various components:

<u>Resin Mfr./ Resin #</u>	★ DOW Chem/ DGDA 2490	Ineos/ Eltex TUB- 121	Basell/ Hostalen GM5010T 2	Totalfina/ Finathene XT-10N	Totalfina/ Finathene XS-10B	★ Chevron Phillips/ Marlex H516
<u>Component</u>						
★ Pipe	EN, JM, PP, DU			PP		PP
★ Tubing, Coiled	EN, JM, PP, DU			PP		PP
Transition Fittings	JM, PP			PP		
Molded Fittings	PP, EP	GFCP, EP		PP	GFCP	
Anodeless Risers, CTS	PP			PP		
Anodeless Risers, IPS	JM, PP			PP		
Electrofusion Fittings		GFCP, IF, PUSA, II, MT	IF		GFCP, NG	IF
Fabricated Fittings	PUSA, MRC	MRC		PUSA, MRC	MRC	
Sleeve Pipe	PP, DU					PP

Abbreviations: The following abbreviations are used in the table above:

- | | |
|------------------------|---|
| ★ EN – Endot | JM – JM Eagle |
| IF – Ipex (Friatec) | ★ MT – MT Deason |
| II – Ipex (Innoge) | ★ PUSA – Plasson USA |
| EP – Elster Perfection | PP – Performance Pipe |
| JM – JM Eagle | ★ GFCP – Georg Fischer Central Plastics |
| MRC – MRC Global | ★ NG – Nupigeco |
| ★ DU – Dura-line | |

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4.0 APPROVED PLASTIC RESIN MATERIAL (Continued)

★ **4.2 Rework Material**

Rework and/or regrind material is not allowed in plastic pipe, tubing, and molded fittings purchased under this specification per Code of Federal Regulations.

4.3 New Suppliers

Any manufacturers of PE 3408/4710 plastic pipe/tubing, electrofusion and molded fittings, transition fittings, or risers not listed in Section 5.1 may request consideration for approval from the Section Manager of the Gas Development Lab. Submitted material shall be capable of meeting the legal and general requirements of Section 2.0 and 3.0 of this specification, as appropriate.

4.4 Changes to ASTM Standards that allow reclassification of plastic material approved under this specification does not constitute a change in formula and does not require additional testing. Suppliers of plastic materials should submit to the Section Manager of the Gas Development Lab their intention to change to the corresponding classification prior to making any change.

4.5 Approved PE Pipe and Tubing

- A) Polyethylene gas tubing in copper tubing sizes (CTS) shall be supplied with a standard 0.090" minimum wall thickness. See the table in Section 13.2 for approved CTS tubing material.
- B) Iron pipe sizes (IPS) shall be supplied with standard dimension ratios as indicated in Section 13.2.

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4.0 APPROVED PLASTIC RESIN MATERIAL (Continued)

4.6 Extruded pipe, tubing, electrofusion and molded fittings shall be manufactured to dimensional tolerances as specified in ASTM D2513 or F1055 as appropriate. Molded fittings shall be smooth and have uniform dimensions internally.

4.7 Approved PE Fittings, Transition Fittings, and Anodeless Risers

All molded, electrofusion, and fabricated plastic fittings transition fittings, and anodeless risers, electrofusion and heat fusion assembled, are found in Section 13.3 through 13.25 of this specification

★ 4.8 Fabricated Fittings and Pup Pieces

★ A) The mitering of any butt fusion joint is strictly forbidden.

B) Only approved plastic pipe/tubing in accordance with Section 13.2 shall be used to butt fuse “pup” lengths on molded fittings, and to manufacture fabricated fittings such as 3-way reducing tees, assembled offsets, assembled crosses, etc.

★ C) Manufacturers and suppliers must identify the heat fusion joiner on the fitting label or directly on the pipe.

D) Approved manufacturers and materials for all are shown in Section 4.1.

5.0 ANODELESS RISER REQUIREMENTS

★ 5.1 Anodeless Risers (riser) shall conform to requirements of ASTM F1973. The riser shall consist of combined 24” rigid and 36” flexible casings with integral service head adapter (SHA) with swivel capabilities and approved moisture seal. The service head adapter unit must be joined with crimping/swaging of a collar to the riser unit.

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5.0 ANODELESS RISER REQUIREMENTS (Continued)

The swivel (SHA) shall consist of a bottoming swivel nut, permanent internal stiffener, compression seal and ferrule assembly and have an outlet male pipe thread. The SHA fitting shall be manufactured in accordance with ASTM F1948-05, Category 1. The SHA shall incorporate a snap – ring groove in the nut portion of the adapter that is used for the purpose of joining the nut to a flexible casing.

- 5.2 The riser shall completely enclose the above ground portion of the plastic service line in a metallic casing. The outlet of the riser shall be of API 5L or ASTM A53 Schedule 40 steel pipe or equivalent. The metallic casing shall have a minimum wall thickness of 0.065”.
- 5.3 The riser shall be designed and constructed so that in the event a leak or failure of the plastic pipe within the casing, the gas would not escape from the seal at the transition zone.
- 5.4 All welding shall be performed in accordance with API 1104.
- 5.5 The underground portion of the riser shall be effectively sealed to prevent the entrance of moisture. The seal shall be designated and constructed to withstand a 10 PSIG pressure test. The moisture seal shall be manufactured from molded vinyl and tested for Dura Hard A, between 60-70 and Weight per Gal.- Liquid Plastics 9.78-9.98 LB. and Brookfield Visc SP #4, 20 rpm @ 80 Deg F 1200 to 2400 cps.
- 5.6 End caps are required on both plastic and threaded steel ends.
- 5.7 Prior to use in the gas distribution system, all risers shall be approved for use per requirements of Section 3.2 of this specification. The manufacturer shall submit design drawings, material certifications, coating specifications, marking requirements, and performance test reports to verify compliance with ASTM F1973. All joints used in risers shall be Category 1.

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6.0 TAPPING TEE REQUIREMENTS

- 6.1 All cutters shall be made of or plated with a corrosion-resistant material or treated with an anti-rust material and shall be capable of tapping SDR 11 and 9.3 pipe and capturing and retaining the "coupon".
- 6.2 The cutters of all 2" outlet tapping tees for main sizes 6" and larger shall be designed in a manner to prevent collapse of the cutter and to prevent stress cracking during tapping operations. All cutters must have internal threads or "similar design" to facilitate tapping and removal/retention of the "coupon" by the cutter.

7.0 TRANSITION FITTING REQUIREMENTS

- ★ 7.1 Transition fittings purchased by the company shall meet requirements of ASTM F1973.
- 7.2 A crimp type anode connector designed to accept a No. 10 AWG stranded wire shall be tack welded to the steel pipe as close to the transition area as possible. The anode connector shall be installed in such a way so as to not protrude excessively from the surface of pipe. Each new manufacturer (prior to approval) must submit a sketch showing the proposed location of the anode connector.
- 7.3 The minimum length of the steel and plastic ends of the transition fitting shall be as indicated in Section 13.3.
- 7.4 Each transition fitting shall be pressure tested prior to shipment. The required minimum test pressure for all transition fittings is 150 PSIG for 10 seconds.
- 7.5 Steel pipe used shall conform to API 5L or ASTM A53. Steel pipe shall be Schedule 40 and conform to Spec G-8107.
- ★ 7.6 The threads of threaded transition fittings shall conform to requirements of ASME B 1.20.1, Pipe Threads and be protected from damage. End caps are required on the plastic end.

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7.0 TRANSITION FITTING REQUIREMENTS (Continued)

- ★ 7.7 Prior to use in the gas distribution system, all transition fittings shall be approved for use per requirements of Section 3.2 of this specification. The manufacturer shall submit design drawings, material certifications, coating specifications, marking requirements, and performance test reports to verify compliance with ASTM 1973. All joints used in transition fittings shall be Category 1.

8.0 COATING REQUIREMENTS

8.1 Transition Fittings

- A) The steel pipe section of all transition fittings shall be supplied with an approved mill coating. The surface preparation and coating application shall be in accordance with the coating manufacturer's recommended procedure with minimum dry film thicknesses as listed in 8.1C in this specification.
- B) The limits of the coating shall be as follows:
- sizes 3" and smaller - 6" from beveled end
 - sizes 4" and larger - 8" from beveled end
 - all sizes - 1" from threaded end
- C) The requirement for coating material is 16 mils minimum, 18 mils average. The following coating materials have been approved for transition fittings:
- DuPont Nap-Gard 7-2530 (Gray Fusion Bonded Epoxy)
 - DuPont Nap-Gard 7-2534 (Riser Gray III)

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8.0 COATING REQUIREMENTS (Continued)

8.2 Anodeless Risers

- A) The outer steel casing portion of the riser shall be supplied with an approved mill coating. The surface preparation and coating application shall be in accordance with the coating manufacturer's recommended procedure with a minimum dry film thickness as listed in 8.2B of this specification.
- B) The requirement for coating material is 16 mils minimum, 18 mils average. The following coating materials have been approved for anodeless risers:
- DuPont Nap-Gard 7-2530 (Gray Fusion Bonded Epoxy)
 - DuPont Nap-Gard 7-2534 (Riser Gray III)

9.0 QUALITY CONTROL

- 9.1 The manufacturer or supplier is responsible for complying with all of the provisions of this specification. Con Edison may make any investigation necessary to verify compliance by the manufacturer and may reject any material that does not comply with this specification.
- 9.2 Material which shows injurious defects, visually unacceptable fusions per ASTM F 2620 or which proves defective when properly applied in service will be reason to reject the manufacturer's product and remove the product from the approved list.
- 9.3 In the event of a discrepancy with the manufacturer's test data and the Company's Quality Control test data, a mutually agreed upon independent test lab may be used for verification testing.
- 9.4 If the test results confirm substandard or defective materials, the manufacturer will become responsible for all costs associated with the removal of the substandard or defective materials including independent testing lab fees.

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9.0 **QUALITY CONTROL** (Continued)

9.5 At the request of the Gas Development Lab, the pipe or tubing manufacturer shall submit a Certification Letter* with the following information:

- A) Customer Order Number
- B) Ship Date
- C) Date Manufactured
- D) Nominal Size
- E) Total Quantity Shipped
- F) Extruded Pipe Lot Numbers (Print Line Info)
- G) Footage Shipped For Each Extruded Pipe Lot Number
- H) Min/Max O.D. For Each Extruded Pipe Lot Number
- I) Min/Max Burst For Each Extruded Pipe Lot Number
- J) Min/Max Wall Thickness for Each Extruded Pipe Lot Number
- K) Min/Max Hoop stress for Each Extruded Pipe Lot Number

*This letter may be requested at time of shipment or when an adverse product condition is discovered.

- ★ 9.6 Approved manufacturers shall not make any change in the design, fabrication, material, marking or packaging prior to submitting written notification of change to the Section Manager of the Gas Development Lab for evaluation. Unannounced changes will result in the manufacturer's product being unapproved and removed from the Approved Vendor's list.
- ★ 9.7 Changes in resin formula are considered a change in design. Notification to the Section Manager of the Gas Development Lab will be made for required testing and approval.

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10.0 MARKINGS AND IDENTIFICATION

- ★ 10.1 All pipe, tubing, electrofusion and molded fittings, fabricated fittings, transition fittings, and anodeless risers must be permanently marked in accordance with the appropriate ASTM standard. General marking requirements include the following information:
 - A) Manufacturer's name
 - B) Date of manufacture
 - C) Size
 - D) SDR or wall thickness
 - E) Material
 - F) Lot number
 - G) ASTM designation
- ★ 10.2 Anodeless risers and transition fittings shall be marked to meet Category 1 tensile strength.
- ★ 10.3 All anodeless risers shall be labelled to clearly show the transition zone between the plastic and metallic carrier, to prevent installation of the riser so that the transition zone is below grade.
- 10.4 Markings and other product identifiers shall be durable and resistant to fading. The identifier shall be permanently affixed to the product.
- 10.5 Supplemental markings or bar-coding relevant to the tracking of the product is acceptable on all products.

11.0 TRANSPORTATION, HANDLING AND STORAGE

(Refer to Con Ed Specification G-8122, "Transportation, Handling and Storage of Polyethylene Plastic Pipe and Fittings for Gas Mains and Service".)

- 11.1 The supplier is responsible for the polyethylene pipe and fittings during transportation.

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11.0 TRANSPORTATION, HANDLING AND STORAGE (Continued)

- 11.2 The manufacturer shall provide end protection of such design, material, and mechanical strength to protect the ends of the pipe and tubing from damage and entry of foreign material under normal handling and transportation conditions.
- 11.3 Coils of plastic pipe and tubing must be delivered on pallets or reels, whichever is applicable.
- 11.4 Bundles of plastic pipe shall not be stacked higher than seven (7) bundles high.
- 11.5 All plastic pipe, tubing, transition fittings and anodeless risers shall be supplied with plastic end closures.
- 11.6 Large diameter plastic pipe is to be shipped from the manufacturer with adequate separation (e.g. "lags") between each row to facilitate safe unloading using a forklift.
- 11.7 Upon arrival of the plastic pipe and fittings from the supplier at Company or cross docker's warehouses, the material will be inspected. Any pipe or fittings found to be damaged during this inspection will be rejected and returned to the supplier at his expense.

12.0 PACKAGING AND LABELING

- 12.1 Boxes of fittings must be labeled to show the description and quantities of the fitting, including the Con Ed class and stock number or non-stock numbers.
- 12.2 All coated fittings shall be adequately packaged to prevent any damage to the mill coating and threads during shipping, handling, or storage.
- ★ 12.3 All electrofusion fittings shall be individually sealed/packaged by the manufacturer to protect the fittings from the elements.

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★ 13.0 **POLYETHYLENE PIPE, TUBING AND FITTINGS**

NOTE: For resin type, refer to table in Section 4.1.

★ 13.1 **Abbreviations**

The following abbreviations are used in the tables throughout this section:

CP – Georg Fischer Central Plastics
DU- Dura-Line Polypipe
EN - Endot
IF – Ipex (Friatec)
II – Ipex (Innoge)
PUSA –Plasson USA
EP – Elster Perfection
PP – Performance Pipe
MRC – MRC Global
MT- MT Deason
NG- Nupigeco
N/A – Not Available
GD- Gas Distribution (for JM Eagle Pipe)

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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS

★ 13.2 Pipe and Tubing

<u>Nominal Size</u>	<u>SDR</u>	<u>Outside Diameter</u>	<u>Minimum WT</u>	<u>Length</u>	<u>★ Approved Mfr/Material</u>	<u>CI/Stk Number</u>	
1/2" CTS	7.0	0.625"	0.090"	500' Coil	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	360-0947
1" CTS	12.5	1.125"	0.090"	500' Coil	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	360-0988
1 - ¼" CTS	15.3	1.375"	0.090"	500' Coil	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	360-0954
1" IPS	11.0	1.315"	0.119"	500' Coil	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0351
1-1/4" IPS	11.0	1.660"	0.151"	500' Coil	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0369
★2" IPS	11.0	2.375"	0.216"	20' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0591
				40' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0856
				350' Coil	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0377
★3" IPS	11.0	3.500"	0.318"	20' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0583
				40' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0385
4" IPS	11.0	4.500"	0.409"	20' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0575
				40' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0393
6" IPS	11.0	6.625"	0.602"	20' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0567
				40' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0401
8" IPS	11.0	8.625"	0.785"	20' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0559
				40' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0518



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13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

Nominal Size	SDR	Outside Diameter	Minimum WT	Length	★ Approved Mfr/Material		CI/Stk Number
★12" IPS	11.0	12.750"	1.159"	40' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0641
	11.0	12.750"	1.159"	20' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300 EN PE 4710	328-0849
★16" IPS	11.0	16.000	1.455	40' Lth	JM Eagle PE 4710 GD DURA-LINE GDB50	PP Yellowstripe 8300	320-0053

13.3 Transition Fittings

The following table lists fittings that allow for a transition from schedule 40 steel pipe to PE 4710 SDR 11 polyethylene pipe:

Nominal Size	Steel End Type	Steel Length	PE Length	Class and Stock
1"	Beveled	18"	12"	341-1113
1"	Threaded	24"	12"	341-4323
1 1/4"	Beveled	18"	12"	341-1105
1 1/4"	Threaded	24"	12"	341-4331
1 1/4"	Threaded	5 1/2"	12"	341-5981
2"	Beveled	18"	12"	341-1097
2"	Threaded	24"	12"	341-4349
3"	Beveled	18"	12"	341-1089
3"	Threaded	24"	12"	341-4356
4"	Beveled	18"	18"	341-1071
4"	Threaded	24"	18"	341-4414
6"	Beveled	18"	18"	341-1063
8"	Beveled	18"	18"	341-2822
12"	Beveled	18"	24"	341-3820
16"✓	Beveled	18"	24"	341-0278

★ ✓Smith Blair is approved to make **only** the 16" (SDR 11) transition fitting.

Approved Manufacturers: Central Plastics, R.W. Lyall and Smith Blair (**only** for 16" transition fitting).

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13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

13.4 Sleeve Pipe for Trenchless Technology

<u>Nominal Size</u>	<u>SDR</u>	<u>Outside Diameter</u>	<u>Minimum WT</u>	<u>Length</u>	<u>CI/Stk</u>
6" IPS	26	6.625"	0.255"	40'	328-0682
8" IPS	26	8.625"	0.332"	40'	328-0674
10" IPS	32.5	10.750"	0.331"	40'	328-0666

★ 13.5 Bolted Tapping Tees (NIST)

<u>Main Size</u>	<u>Outlet</u>		<u>Cutter</u>		<u>Base Type</u>	<u>Mfr. & Part No.</u>	<u>CI/Stk</u>
	<u>Size</u>	<u>Pup Lth</u>	<u>Dia.</u>	<u>Type</u>			
1 1/4"	1 1/4" *	None	.60"	Std	Std Round	P 55505	337-9831

***NOTE:** Elster Perfection NIST (Non Interruptible Service Transfer) Tee

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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

★ 13.6 Anodeless Riser Bends

<u>Nominal Size</u>	<u>PE Wall Thickness</u>	<u>Perfection Part No.</u>	<u>RW Lyall Part No.</u>	<u>CI/Stk</u>
1" IPS X 1/2" CTS	.090"	75199	Con Ed 050010B	341-3721
1" IPS X 1" CTS	.090"	75607	Con Ed 07003A	341-3739
1 1/2" IPS X 1 1/4" CTS	.090"	79055	Con Ed 090040A	341-3747
1 1/2" IPS X 1 1/4" CTS	.151"	79782	N/A	341-5650
1" IPS X 1" IPS	SDR 11	79437	N/A	341-5023
2" IPS X 2" IPS	SDR 11	78302	N/A	341-5304
3" IPS x 3" IPS	SDR 11	78512	N/A	341-5577
3" IPS Flanged x 3" IPS	SDR 11	79912	N/A	341-5593
4" IPS x 4" IPS	SDR 11	79964	N/A	341-5585
4" IPS Flanged x 4" IPS	SDR 11	79965	N/A	341-5601

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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

★ 13.7 Molded Threaded Brass Base Service Tees

Inlet Size	Outlet Size*	Pup Lth	Mfr. & Part No.	CI/Stk
1 1/4" MPT	1" CTS	--	CP 10005417	341-4471
1 1/4" MPT	1 1/4" CTS	--	CP 10011154	341-4463
1 1/2" MPT	1" CTS	6"	CP 10011852	341-4513
1 1/2" MPT	1 1/4" CTS	--	CP 10005419	341-4588
2" MPT	1" CTS	6"	CP 10011851	341-4521
2" MPT	1 1/4" CTS	--	CP 10005421	341-4505
2" MPT	2" IPS	--	CP 10003672	341-4794

13.8 Molded 3-Way Tees

Size	SDR	Mfr. & Part No.	CI/Stk
1" IPS	11	PP 1007910	341-1329
	11	CP 10003838	
1 1/4" IPS	11	PP 1007917	341-1311
	11	CP 10003815	
2" IPS	11	PP 1006426	341-1303
	11	CP 10002956	
3" IPS	11	PP 1007933	341-1295
	11	CP 10007746	
4" IPS	11	PP 1006434	341-1287
	11	CP 10012422	
6" IPS	11	PP 1006442	341-2137
	11	CP 10007787	
8" IPS	11	PP 1007945	341-2830
	11	CP 10007789	
10" IPS	11	CP 10004233	341-4083
12" IPS	11	CP 10004242	341-3853

13.9 Saddle Heat Fusion Reducing 3-Way Tees*

Size	SDR	MRC Part No	CI/Stk
6" x 6" x 4"	11	6309-9019	341-4661
8" x 8" x 6"	11	6309-9017	341-4679
12" x 12" x 6"	11	6309-9024	341-4687
12" x 12" x 8"	11	6309-9023	341-4695

*The Gas Development Lab can special order 16" x 16" x 6" and 16" x 16" x 8" Saddle Heat Fusion 3-Way Tees.

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★ 13.0 **POLYETHYLENE PIPE, TUBING AND FITTINGS** (Continued)

13.10 Molded Caps

Size	SDR	Part No.	CI/Stk
1" IPS	11	PP 1007908	341-2087
	11	CP 10003837	
1 1/4" IPS	11	PP 1007915	341-1279
	11	CP 10001876	
2" IPS	11	PP 1006420	341-1261
	11	CP 10007419	
3" IPS	11	PP 1007930	341-1253
	11	CP 10002937	
4" IPS	11	PP 1006428	341-1246
	11	CP 10002938	
6" IPS	11	PP 1006436	341-1238
	11	CP 10007786	
8" IPS	11	PP 1007942	341-3184
	11	CP 10007484	
10" IPS	15.5	PP 1064048**	341-4133
	11	CP 10009508	
12" IPS	11	PP 1064775**	341-3812
	11	CP 10009510	

**10" and 12" caps (from Performance Pipe) are an 8" molded cap with a swaged reducer.

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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

13.11 Molded Reducers

<u>Nominal Size</u>	<u>IPS SDR</u>	<u>CTS Wall Thickness</u>	<u>Part No.</u>	<u>Cl/Stk</u>
1" IPS x 1/2" CTS	11	0.090	PP 1071055 CP 10004189	341-1196
1" IPS x 1" CTS	11	0.090	PP 1010907 CP 10004194	341-2079
1" IPS x 1 1/4" CTS	11	0.090	PP 1010910 CP 6911190	341-2749
1 1/4" IPS x 1 1/4" CTS	11	0.090	PP 1007958 CP 10003946	341-1188
2" IPS x 1 1/4" CTS	11	0.090	CP 10004200	341-1170
1 1/4" IPS x 1" IPS	11	N/A	PP 1007964 CP 10004197	341-4620
2" IPS x 1 1/4" IPS	11	N/A	PP 1007977 CP 10007479	341-1220
3" IPS x 2" IPS	11	N/A	PP 1007985 CP 10007480	341-1212
4" IPS x 2" IPS	11	N/A	PP 1006466 CP 10007481	341-2855
4" IPS x 3" IPS	11	N/A	PP 1007992 CP 10007482	341-1204
6" IPS x 4" IPS	11	N/A	PP 1006469 CP 10007784	341-4067
8" IPS x 6" IPS	11	N/A	PP 1007995 CP 10007483	341-2814
10" IPS x 8" IPS	11	N/A	CP 10009509	341-4109
12" IPS x 8" IPS	11	N/A	CP 10013268	341-3861
12" IPS x 10" IPS	11	N/A	CP 10009511	341-4927

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★ 13.12 90° Elbows

<u>Size</u>	<u>SDR</u>	<u>Part No.</u>	<u>Type</u>	<u>CI/Stk</u>
1" IPS	11	PP 1007909 CP 10004111	Molded Molded	341-1378
1 1/4" IPS	11	PP 1007916 CP 10002945	Molded Molded	341-1360
2" IPS	11	PP 1006422 CP 10002946	Molded Molded	341-1352
3" IPS	11	PP 1007932 CP 10007745	Molded Molded	341-1345
4" IPS	11	PP 1006432 CP 10001630	Molded Molded	341-1337
6" IPS	11	PP 1006440 CP 10007785	Molded Molded	341-2095
8" IPS	11	PP 1007944 CP 10007788	Molded Molded	341-3044
★ 10" IPS	11	CP 10004116	Molded	341-4141
★ 12" IPS	11	CP 10003853	Molded	341-3796

★ 13.13 45° Elbows

<u>Size</u>	<u>SDR</u>	<u>Part No.</u>	<u>Type</u>	<u>CI/Stk</u>
3" IPS	11	PP 1007931 CP 10002941	Molded Molded	341-2103
4" IPS	11	PP 1006430 CP 10002942	Molded Molded	341-2111
6" IPS	11	PP 1006438 CP 10009505	Molded Molded	341-2160
8" IPS	11	PP 1007943 CP 10009506	Molded Molded	341-2806
★ 10" IPS	11	CP 10004070	Molded	341-4091
★ 12" IPS	11	CP 10004078	Molded	341-3804

★ 13.14 22.5° Elbows

<u>Size</u>	<u>SDR</u>	<u>Part No.</u>	<u>Type</u>	<u>CI/Stk</u>
★ 12" IPS	11	CP 360032157	Non-mitered	341-5791

13.15 Butt Fusion Offsets

<u>Size</u>	<u>SDR</u>	<u>MRC Part No.</u>	<u>CI/Stk</u>
4" IPS	11	6102-2226	341-4646
6" IPS	11	6102-2227	341-4638

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8" IPS	11	6102 2225	341 4653
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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

★ 13.16 Saddle Heat Fusion Crosses

Size	SDR	MRC Part No.	CI/Stk
1 1/4" IPS	11	2728-0505	341-4703
2" IPS	11	2728-0507	341-4711
4" IPS	11	2728-0509	341-4737
6" IPS	11	2728-0511	341-4745
8" IPS*	11	N/A	Non-Stock

* Gas Development Lab item

★ 13.17 Branch Saddles*

Main Size	Size	Outlet Pup Lth	SDR	Part No.	Type	CI/Stk
8"	6"	None	11	PP 1098236	Molded	341-4935
				CP 10004881	Molded	
10"	6"	None	11	CP 10005030	Molded	341-4943
12"	6"	None	11	CP 10005042	Molded	341-4968
12"	8"	None	11	CP 10005043	Molded	341-5056
16"	6"	None	11	Not Available	Molded	Non-stock
16"	8"	None	11	CP 10005060	Molded	Non-stock

Gas Development Lab use only

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★ 13.0 **POLYETHYLENE PIPE, TUBING AND FITTINGS** (Continued)

★ 13.18 **Electrofusion Couplings/ Reducers**

<u>Main Size</u>	<u>Manufacturer</u>	<u>Density</u>	<u>CI/Stk</u>
1 1/4" CTS	Central Plastics	High	341-5957
1" IPS	Central Plastics	High	341-4224
1 1/4" IPS	Central Plastics	High	341-4174
2" IPS	Central Plastics	High	341-4216
3" IPS	Central Plastics	High	341-4208
4" IPS	Central Plastics	High	341-4190
6" IPS	Central Plastics	High	341-4182
8" IPS	Central Plastics	High	341-4976
1/2" CTS	Ipex (Friatec)	High	341-5866
2" IPS	Ipex (Friatec)	High	341-5387
3" IPS	Ipex (Friatec)	High	341-5403
4" IPS	Ipex (Friatec)	High	341-5379
6" IPS	Ipex (Friatec)	High	341-5395
8" IPS	Ipex (Friatec)	High	341-5411
12" IPS	Ipex (Friatec)	High	341-5429
16" IPS	Ipex (Friatec)	High	341-5858
1" CTS	Ipex (Friatec)	High	341-5965
1 1/4" CTS	PUSA	High	341-5957
1 1/4" IPS x 1" IPS	Central Plastic	High	341-5973
1" IPS	Ipex (Friatec)	High	341-5908
1 1/4" IPS	Ipex (Friatec)	High	341-5916
1" IPS x 1/2" CTS	Ipex(Friatec), Central Plastic	High	341-5932
2" IPS X 1" CTS	Ipex (Friatec)	High	341-0441
2" IPS X 1 1/4" IPS	PUSA	High	341-1061

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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

★ 13.19 Electrofusion Tapping Tees

<u>Main Size</u>	<u>Outlet Size</u>	<u>Manufacturer</u>	<u>Density</u>	<u>CI/Stk</u>
1 ¼" IPS	X ½" CTS	Central Plastics	High	341-5619
1 ¼" IPS	X ½" CTS	MT Deason	High	341-5619
1 ¼" IPS	X ½" CTS	Plasson	High	338-7099
1 ¼" IPS	X ½" CTS	Ipex (Friatec)	High	338-7099
1 ¼" IPS	X 1" IPS	Central Plastics	High	341-5627
1 ¼" IPS	X 1" IPS	Plasson	High	341-5627
1 ¼" IPS	X 1" IPS	MT Deason	High	341-5627
1 ¼" IPS	X 1" IPS	Ipex (Friatec)	High	338-7081
2" IPS	X ½" CTS	Central Plastics	High	341-5635
2" IPS	X ½" CTS	Plasson	High	341-5635
2" IPS	X ½" CTS	Ipex (Friatec)	High	341-5635
2" IPS	X ½" CTS	MT Deason	High	341-5635
2" IPS	X 1" IPS	Central Plastics	High	341-5643
2" IPS	X 1" IPS	Plasson	High	341-5643
2" IPS	X 1" IPS	Ipex (Friatec)	High	341-5643
2" IPS	X 1" IPS	MT Deason	High	341-5643
2" IPS	X 2" IPS	Ipex (Friatec)	High	337-9757
3" IPS	X 1" IPS	Ipex (Friatec)	High	341-1036
3" IPS	X 1 ¼" CTS	Ipex (EFS)	High	341-1035
3" IPS	X 2" IPS	Ipex (Friatec)	High	341-6021
4" IPS	X ½" CTS	Ipex (Friatec)	High	341-1037
4" IPS	X 1" IPS	Ipex (Friatec)	High	341-1038
4" IPS	X 1 ¼" CTS	Ipex (EFS)	High	337-9716
4" IPS	X 2" IPS	Ipex (Friatec)	High	337-9781
6" IPS	X ½" CTS	Ipex (Friatec)	High	341-1051
8" IPS	X 1 ¼" CTS	Ipex (EFS)	High	337-9732
8" IPS	X 2" IPS	Ipex (Friatec)	High	337-9773
10" IPS-16"IPS	X 2" IPS	Ipex (Friatec)	High	341-1065
12" IPS	X 1" IPS	MT Deason	High	341-1138
12" IPS	X 2" IPS	MT Deason	High	341-0980

NOTE: IPEX (Friatec) tapping tees include an undersaddle.

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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

13.20 Electrofusion Under Part Style Clamps for Central Plastics Tapping Tees

<u>Main Size</u>	<u>Manufacturer</u>	<u>Part #</u>	<u>CI/Stk</u>
For 1 1/4" IPS Main	Central Plastics	5750014	059-5207
For 2" IPS Main	Central Plastics	5750862	059-5215

★ 13.21 Electrofusion Repair Patches

<u>Main Size & Description</u>	<u>Manufacturer</u>	<u>Density</u>	<u>CI/Stk</u>
3" thru 6" Patch W/Saddle Clamp	Ipex (Friatec)	High	These are non-stock items purchased by the Gas Development Lab.
8" and larger Patch	Ipex (Friatec)	High	

★ 13.22 Electrofusion SPA Saddles

<u>Main Size</u>	<u>Manufacturer/Part #</u>	<u>Rating</u>	<u>CI/Stk</u>
3" IPS SPA Saddle	Friatec/Part # 228236	HDPE 4710/PE100	341-1044
4" IPS SPA Saddle	Friatec/Part # 228237	HDPE 4710/PE100	341-1045
6" IPS SPA Saddle	Friatec/Part# 228238	125 PSI	341-1046
8" IPS SPA Saddle	Friatec/Part # 228335	125 PSI	341-1047
10"-12" IPS SPA Saddle	Friatec/Part # 228241	125 PSI	341-1049

★ 13.23 Electrofusion Adjustable Elbows

<u>Size</u>	<u>Manufacturer/Part #</u>	<u>Rating</u>	<u>CI/Stk</u>
4" IPS Adjustable elbow	Plasson/Part # 5947B003040	100 PSI	341-1062
6" IPS Adjustable elbow	Plasson/Part # 5947B003060	100 PSI	341-1064

★ 13.24 Electrofusion Buttfused Repair Sleeves (non-leaking use only)

<u>Size</u>	<u>Manufacturer/Part #</u>	<u>Rating</u>	<u>CI/Stk</u>
4" IPS Sleeve	Nupigeco/Part # 12EIBFRS04	125 PSI	341-0300
6" IPS Sleeve	Nupigeco /Part # 12EIBFRS06	125 PSI	341-0279

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TITLE: POLYETHYLENE PIPE, TUBING AND FITTINGS FOR GAS MAINS AND SERVICES

★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

★ 13.25 Electrofusion Branch Saddles*

<u>Main Size</u>	<u>Outlet Size</u>	<u>Manufacturer</u>	<u>Density</u>	<u>Part #</u>
3" IPS	X 2" IPS	Ipex (Friatec)	High	228184
4" IPS	X 2" IPS	Ipex (Friatec)	High	228185
4" IPS	X 3" IPS	Ipex (Friatec)	High	228186
6" IPS	X 2" IPS	Ipex (Friatec)	High	228184
6" IPS	X 3" IPS	Ipex (Friatec)	High	228180
8" IPS	X 2" IPS	Ipex (Friatec)	High	228146
8" IPS	X 4" IPS	Ipex (Friatec)	High	228276
8" IPS	X 6" IPS	MT Deason	High	TRI1185-D
10"-22" IPS	X 2" IPS	Ipex (Friatec)	High	228182
10"-22" IPS	X 3" IPS	Ipex (Friatec)	High	228187
12" IPS	X 4" IPS	MT Deason	High	TRI1200-D
12" IPS	X 6" IPS	MT Deason	High	TRI1205-D
12" IPS	X 8" IPS	MT Deason	High	TRI1210-D

*
Gas

Development Lab Use Only

★ 13.26 Electrofusion 45° Elbows

<u>Size</u>	<u>SDR</u>	<u>Part No.</u>	<u>Type</u>	<u>Ci/Stk</u>
2" IPS	11	TRI0420-D	Molded	341-1203
4" IPS	11	TRI0440-D	Molded	341-1205
6" IPS	11	TRI0445-D	Molded	341-1206
8" IPS	11	TRI0450-D	Molded	341-1211

★ 13.27 Electrofusion 90° Elbows

<u>Size</u>	<u>SDR</u>	<u>Part No.</u>	<u>Type</u>	<u>Ci/Stk</u>
2" IPS	11	TRI0475-D	Molded	341-1207
4" IPS	11	TRI0485-D	Molded	341-1208
6" IPS	11	TRI0490-D	Molded	341-1209
8" IPS	11	TRI0495-D	Molded	341-1210

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★ 13.0 POLYETHYLENE PIPE, TUBING AND FITTINGS (Continued)

★ 13.28 Electrofusion Bottom Out Saddles*

<u>Main Size</u>	<u>Outlet Size</u>	<u>Manufacturer</u>	<u>Density</u>	<u>Part #</u>
12" IPS	X 4" IPS	MT Deason	High	NS0245372
12" IPS	X 6" IPS	MT Deason	High	NS0245373
12" IPS	X 8" IPS	MT Deason	High	NS0245374

*
Gas

Development Lab Use Only

★ 14.0 ASSOCIATED SPECIFICATIONS

- G-100,298 - Valves for Gas Transmission and Distribution Piping Systems
- G-8107 - Steel Pipe for Gas Mains and Services
- G-8121 - Qualification of Installers Joining Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services
- G-8122 - Inspection, Handling Storage and Transportation of Polyethylene (PE) Plastic Pipe, Tubing and Fittings for Gas Mains and Services
- G-8123 - Heat Fusion Joining of Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services
- EO-16989 - Fabricated Plastic Pipe Fittings

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★ 15.0 **RECORD RETENTION**

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.

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	LAST REVIEW DATE: 08/28/18	REVIEW CYCLE:
	EFFECTIVE DATE: 9/10/18	5 Years

SPECIFICATION: G-8107-17

TITLE: STEEL PIPE FOR GAS MAINS AND SERVICES

VOLUME: 6 & Yellow Book

COURSE ID: NONE

CORE GROUP: NONE

TARGET AUDIENCE: NONE

REVISIONS: (See ★)

- 1) Section 8.4 - Added note about internal coating.
- 2) Section 13.1 - Updated approved pipe manufacturers.
- 3) Section 15.0 - Updated references.




Gas Operations Standards

TITLE: STEEL PIPE FOR GAS MAINS AND SERVICES

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	EH&S REVIEW BY: C. Little		OPERATIONS REVIEW BY: N/A		
	AUTHOR:	APPROVED BY:	DATE APPROVED:	VOLUMES: 6 and Yellow Book	PAGE 1 OF
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TITLE: STEEL PIPE FOR GAS MAINS AND SERVICES

1.0 SCOPE

This specification concerns the purchase of steel pipe for use on the Company gas system.

2.0 DEFINITIONS


- 2.1 Company - Consolidated Edison Company of New York, Inc.
- 2.2 Manufacturer - The party that manufactures steel pipe.
- 2.3 Coater - The party that applies coating on bare steel pipe prior to delivery to the Company.
- 2.4 Vendor - The party from whom the Company purchases the pipe.
- 2.5 API - American Petroleum Institute.
- 2.6 ASTM - American Society for Testing and Materials.

3.0 GENERAL REQUIREMENTS

- 3.1 All steel pipe shall conform to this specification and to
- ASTM Specification A53/A53M- "*Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*" in accordance with the latest edition of A53/A53M.
or
 - ASTM Specification A106/A106M - "*Standard Specification for Seamless Carbon Steel Pipe for High - Temperature Service*" in accordance with the latest edition of A106/A106M
or
 - In accordance with the latest edition of API Specification 5L/ISO 3183 "*Specification for Line Pipe*" which includes the latest Errata and Addendums.

The indicated revisions are incorporated by reference in 16 NYCRR Part 10. In cases where this specification differs from the ASTM or API Specifications, this specification shall prevail.

- 3.2 Aluminum pipe or pipe made from amphoteric materials is not approved.

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TITLE: STEEL PIPE FOR GAS MAINS AND SERVICES

4.0 MATERIALS AND MANUFACTURING PROCESS

4.1 The following grades of steel are approved for gas piping:

- A) ASTM A53 Grade B
- B) ASTM A106 Grade B
- C) API 5L Grades B, X42, X46, X52, X56, X60 and X70.

4.2 The following processes of manufacture conforming to ASTM A53, ASTM A106, and API 5L are approved for gas piping:


- A) Seamless - all sizes
- B) Electric Resistance Weld - all sizes
- C) Submerged Arc Weld - 20" O.D. and larger for Grade B and for API 5L X42, X46, X52, X56, X60 and X70.
- D) Double Submerged Arc Weld - 20" O.D. and larger for Grade B and for API 5L X42, X46, X52, X56, X60 and X70.

4.3 The interior of all pipes shall be smooth, free of scale, oil, grease and projections.

5.0 APPROVED STEEL PIPE SIZES AND GRADES

The following pipe sizes and grades are approved for Distribution (up to 99 psig) and Transmission (above 125 psig) for standard construction.

Nominal Pipe Size In.	Outside Diam. In.	Identification-Steel		CLASS & STOCK NUMBERS FOR WELDED END PIPES					
		Iron Pipe Size	Sched. No.	Wall Thick. In.	Distribution (<=99 psig) (see Note a)				Transmission (>125 psig) (see Note b)
					Bare SGL R/L	Bare DBL R/L	Coated SGL R/L	Coated DBL R/L	
1	1.315	Std.	40	0.133	320-1753	non-stock	323-0372	non-stock	Contact Gas Transmission Engineering - Major Projects to specify appropriate schedule and grade of transmission pipe (>125 psig)
1	1.315	XS	80	0.179	320-0250	non-stock	non-stock	non-stock	
1 1/4	1.660	Std.	40	0.140	320-1761	non-stock	323-0729	non-stock	
1 1/4	1.660	XS	80	0.191	320-1415	non-stock	non-stock	non-stock	
1 1/2	1.900	Std.	40	0.145	320-1779	non-stock	323-0349	non-stock	
1 1/2	1.900	XS	80	0.200	320-1423	non-stock	non-stock	non-stock	
2	2.375	Std.	40	0.154	320-0367	non-stock	non-stock	non-stock	
2	2.375	XS	80	0.218	320-1431	non-stock	non-stock	323-0711	
3	3.500	Std.	40	0.216	320-0359	non-stock	323-0299	non-stock	
3	3.500	XS	80	0.300	320-1456	non-stock	non-stock	non-stock	
4	4.500	Std.	40	0.237	320-0342	non-stock	323-0273	323-0596	
4	4.500	XS	80	0.337	320-1464	non-stock	non-stock	non-stock	
6	6.625	Std.	40	0.280	320-1613	320-0334	323-0612	323-0257	

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TITLE: STEEL PIPE FOR GAS MAINS AND SERVICES

5.0 APPROVED STEEL PIPE SIZES AND GRADES (Continued)


Nominal Pipe Size In.	Outside Diam. In.	Identification-Steel		CLASS & STOCK NUMBERS FOR WELDED END PIPES (Continued)					
		Iron Pipe Size	Sched. No.	Wall Thick. In.	Distribution (<=99 psig) (see Note a)				Transmission (>125 psig) (see Note b)
					Bare SGL R/L	Bare DBL R/L	Coated SGL R/L	Coated DBL R/L	
6	6.625	XS	80	0.432	320-1472	non-stock	non-stock	non-stock	Contact Gas Transmission Engineering - Major Projects to specify appropriate schedule and grade of transmission pipe (>125 psig)
8	8.625	Std.	40	0.322	320-2009	non-stock	323-0620	323-0240	
8	8.625	XS	80	0.500	320-1522	non-stock	non-stock	non-stock	
10	10.750	Std.	40	0.365	320-0318	non-stock	323-0638	323-0224	
10	10.750	XS	60	0.500	320-1803	non-stock	non-stock	non-stock	
12	12.750	Std.	-	0.375	320-2025	320-0300	323-0646	323-0216	
12	12.750	XS	-	0.500	320-1530	non-stock	non-stock	non-stock	
16	16.000	Std.	30	0.375	320-0292	non-stock	non-stock	323-0208	
16	16.000	XS	40	0.500	320-1829	non-stock	non-stock	non-stock	
20	20.000	Std.	20	0.375	320-2264	320-0284	non-stock	323-0182	
20	20.000	XS	30	0.500	non-stock	non-stock	non-stock	non-stock	
24	24.000	Std.	20	0.375	320-0276	non-stock	non-stock	323-0166	
24	24.000	XS	-	0.500	320-2298	320-0243	non-stock	non-stock	
26	26.000	Std.	-	0.375	non-stock	non-stock	non-stock	non-stock	
26	26.000	XS	20	0.500	non-stock	non-stock	non-stock	non-stock	
30	30.000	Std.	-	0.375	non-stock	320-1969	non-stock	323-0737	
30	30.000	XS	20	0.500	non-stock	320-2462	non-stock	323-0810	
36	36.000	Std.	-	0.375	non-stock	320-0227	non-stock	non-stock	
36	36.000	Std.	-	0.562	non-stock	non-stock	non-stock	non-stock	
36	36.000	Std.	30	0.625	non-stock	non-stock	non-stock	non-stock	
Note a) - Any approved schedule and grade of steel may be used for distribution pipe (<=99 psig). See Section 4.1									
Note b) - Contact Gas Transmission Engineering - Major Projects to specify appropriate schedule and grade of transmission pipe (> 125 psig). See §14.6 for toughness testing requirements for transmission pipe (>125 psig)									

6.0 APPROVED LENGTHS

6.1 Pipe lengths approved are:

- A) Single Random lengths (SR) 20 feet, and Double Random lengths (DR) 40 feet with the following tolerances:

	<u>SR</u>	<u>DR</u>
Shortest length in the entire shipment	18.0 feet	35.0 feet

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6.0 **APPROVED LENGTHS** (Continued)

- B) Longest lengths available.
 - C) Lengths as ordered on individual requisitions.
- 6.2 Jointers, two or more shorter lengths of pipe joined together by welding or other means to meet length requirements, are not acceptable.

7.0 **PIPE ENDS**


- 7.1 Pipe that is 2 inches in diameter and larger shall be beveled for welding to conform to the requirements of API 5L or ASTM A106.
- 7.2 End tolerances shall conform to API 5L or ASTM A106 to facilitate the installation of mechanical compression joints.
- 7.3 The inside and outside edges of the pipe ends shall be free of burrs, projections, dents or gouges.

8.0 **PIPE COATING**

- 8.1 External coating, when required shall be as per Purchase Specification G-8062, "Extruded Polyolefin Coating on Steel Gas Pipe".
- 8.2 Bare steel pipe supplied to the Company shall have a lacquer coating, uniform in thickness on the outside pipe surface. No coating is required on bare steel pipe supplied to a coater.
- 8.3 Galvanized steel pipe is not approved.
- ★ 8.4 Internal coating, when required shall be as per Purchase Specification G-8108, "Internal Epoxy Coating on Steel Gas Pipe". Distribution pipe is 8" and greater. Transmission pipe is 4" and greater.

9.0 **PIPE MARKINGS**

- 9.1 By Manufacturer - Marking of all bare pipe shall conform to the requirements of API 5L, ASTM A106 or ASTM A53.
- 9.2 By Coater or Vendor - Coated pipe purchased shall have the pipe diameter, wall thickness, grade, Con Ed, date pipe was coated, heat number and API or ASTM specification under which the pipe has been manufactured paint stenciled on the coating surface as per API 5L, ASTM A106 or ASTM A53 along the pipe length.

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9.0 **PIPE MARKINGS** (Continued)

9.3 All required markings shall be legible and permanent.

10.0 **TRANSPORTATION AND PROTECTION OF PIPE**

10.1 Pipe transportation, handling and storage shall be in accordance with Company Specification [G-8003](#), "Transporting, Handling, and Storing Steel Gas Pipe".

10.2 The vendor shall be responsible for damages to the pipe or coating due to transportation.

11.0 **INSPECTION AND REJECTION OF PIPE**

11.1 Bare pipe shall be visually inspected for dents, gouges, grooves, or arc burns prior to surface preparation by the Coater. Any defects found shall be reported to the Transportation and Stores Department of the Company and the damaged pipe length in question shall not be coated.

11.2 A dent that contains or affects the longitudinal weld is not acceptable.


11.3 Pipe containing a dent in which the dent contains a scratch, gouge, groove or arc burn is not acceptable. A dent may be defined as a depression, which produces a gross disturbance in the curvature of the pipe wall as opposed to a scratch or gouge that reduces the pipe wall thickness.

11.4 The pipe shall contain no dents greater than 1/4 inch. The length of the dent in any direction shall not exceed one-half the pipe diameter.

11.5 Pipe containing gouges or grooves having a depth greater than 12 percent of the specified wall thickness, measured from the surface of the pipe is not acceptable.

11.6 Pipe containing any arc burns is not acceptable.

11.7 The Company reserves the right to inspect, test and subsequently reject any pipe that does not conform in any way to the standards set forth in this specification, or the API or ASTM Specification under which the pipe is manufactured, or the associated coating specifications as set forth herein. The vendor shall be liable for all costs incurred by the Company as a result of pipe failing to comply with this specification.

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12.0 **RECORD RETENTION**

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.


13.0 **APPROVED MANUFACTURERS**

★ 13.1 The following pipe manufacturers are approved:

<u>DOMESTIC</u>		<u>FOREIGN</u>	
<u>Mill Name</u>	<u>City, State</u>	<u>Mill Name</u>	<u>City, Country</u>
American Steel Pipe	Birmingham, AL	Hyundai Pipe Co.	Ulsan, S. Korea
Berg Steel Pipe Corp.	Panama City, FL	Salzgitter-Mannesmann	Hamm, Germany
Dura-Bond Pipe	Steelton, PA	Mittal/Isco Steel	Vereeniging, S. Africa
JSW Steel	Baytown, TX	Seah Steel Corp.	Pohang City, S.Korea
TMK-Ipsco Tubulars	Camanche, IA	Sumitomo Metal	Japan
TMK-Koppel Steel	Ambridge, PA	Tenaris Dalmine	Dalmine, Italy
USS-Lone Star Steel	Lone Star, TX	Tenaris Siderca	Buenos Aires, Argentina
Tenaris-Maverick Tube	Conroe, TX	Tubacero	Monterrey, Mexico
TMK-Newport Steel	Wilder, KY	Zelezniarne-Podbr.	Podbrezova, Slovakia
Paragon Industries	Sapulpa, OK		
Sharon Tube	Sharon, PA		
Stupp Corp.	Baton Rouge, LA		
Tex-Tube	Houston, TX		
USS- Div. of USX Corp.	Lorain, OH		
USS- Div. of USX Corp.	McKeesport, PA		
V&M Star	Houston, TX		
V&M Star	Youngstown, OH		
Wheatland Tube	Wheatland, PA		

Pipe manufactured by companies other than those listed above shall be purchased only with the written approval of the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative.

13.2 Manufacturers or vendors supplying pipe which do not conform to this specification and/or display poor workmanship shall not be acceptable for subsequent bids until written approval is received from the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative.

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13.0 APPROVED MANUFACTURERS (Continued)

- 13.3 The Company's Purchasing Department may canvass other pipe manufacturers and direct all potential pipe suppliers to the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative who will evaluate the manufacturer's product in accordance with the contents of this specification.
- 13.4 Manufacturers not approved in Section 13.1 may request consideration for approval by submitting quality control procedures, specifications, catalogs, and a certificate that all pipe supplied will meet the requirements of this specification. This shall be sent to the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative.

14.0 QUALITY CONTROL

- 14.1 The vendor shall submit written notification to the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative of any changes to be made by the manufacturer concerning the design, fabrication, material or marking of the pipe. This notification shall be made in advance of any changes and must receive written approval from the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative in order to be acceptable.
- 14.2 The vendor shall keep records of **all** materials supplied to Con Edison. The records shall include mill certificates, the material description, the manufacturer and the heat numbers. They shall be available to Con Edison upon request.
- 14.3 The vendor shall maintain a quality control program to insure that all pipe shipped to Con Edison meets referenced standards.
- 14.4 For pipe that is 8" and larger, dimensional data shall be recorded for a minimum of 10% of each item in each shipment. Dimensional data shall include outside diameter, wall thickness, roundness, bevel ends, etc. The vendor shall externally mark each inspected length of pipe with a **painted yellow dot** readily visible to Con Edison inspectors. The vendor shall maintain these records at their facility and make them available to Con Edison upon request.

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14.0 **QUALITY CONTROL**(Continued)

- 14.5 When an out-of-specification length of pipe is found by the vendor in a shipment, the entire shipment shall be inspected and documented before shipment to Con Edison. The vendor shall maintain these records at their facility and make them available to Con Edison upon request.
- 14.6 Any pipe to be used for transmission (>125psig) shall be toughness tested as per "Appendix A - Steel Pipe Toughness Standards For All New Pipe >125 Psig". This will be requested when required. These test results will be sent to Gas Transmission Engineering – Major Projects for approval prior to delivery to the pipe coater and Con Edison. One set of toughness tests is required for every 100 lengths per heat of pipe.

★ 15.0 **REFERENCES**

- [G-8003](#) - Transportation, Handling and Storage of Steel Pipe for Gas Mains and Services
- [G-8062](#) - Extruded Polyolefin Coating on Steel Gas Pipe
- G-8108 - Internal Epoxy Coating on Steel Gas Pipe

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APPENDIX A

STEEL PIPE TOUGHNESS STANDARDS FOR ALL NEW PIPE > 125 PSIG

PIPE SAMPLES:

1" through 10", cut 6" long pipe section

12" through 36", cut 8" x 8" coupons

Note: the test coupon must include the seam area on all welded pipe.

PIPE IDENTIFICATION:

Samples shall be from the same lot number or heat number.

CHARPY V-NOTCH (CVN) TOUGHNESS TESTS:

Full size samples shall be tested at a temperature of –10 degrees F and as per API 5L SR5A/SR5B, ASTM E23 and ASTM A370. Three CVN specimens shall be evaluated for each test: the Base Metal, the Weld, and the Heat Affected Zone (HAZ). Acceptable values for each test are as follows:

ABSORBED ENERGY: MINIMUM OF EACH TEST SPECIMEN ≥ 15 FT-LB

LATERAL EXPANSION: MINIMUM OF EACH TEST SPECIMEN ≥ 0.020 IN.

PERCENT SHEAR: MINIMUM OF EACH TEST SPECIMEN ≥ 20 %

Note: If subsize samples are used, the test temperature shall be lowered and absorbed energy adjusted to be equivalent to full size samples at –10 degrees F as per ASTM A370 and ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1, Subsection A, UG-84 requirements. Also for this condition (sub size samples) percent shear is not required.

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LAST REVIEW DATE: 12/7/17
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REVIEW CYCLE: 5 Years

SPECIFICATION: **G-8121-18a**

TITLE: **QUALIFICATION OF INSTALLERS JOINING
POLYETHYLENE (PE) PLASTIC PIPE/TUBING
AND FITTINGS FOR GAS MAINS AND
SERVICES**

VOLUME: **2 (Section 7.0), 10, & [Yellow Book](#)**

★ **COURSE ID:** **[GAS0268](#)**

★ **CORE GROUP(S):** **NONE**

★ **TARGET AUDIENCE:** **Gas Construction, Emergency Response Force (ERF), Gas Development Lab, Per Diem, Gas Contractors, and Construction**

REV 18a (4-9-18)

Table of Contents: Added "RECORDS" Section.

Section 3.2: Added "Con Edison" trained evaluators to qualify new and existing joiners and second inspectors of PE plastic pipe.

Section 3.4 (C): Removed "Mechanical Stab fitting" from Operator Qualification.

Section 7.3 (A) & (B): Removed temperature indicating crayons/sticks to verify the heating iron temperature.

Section 7.3 (C) & (D): Clarified "Alcohol Wipes" requirements for Electrofusion Coupling Joints & Electrofusion Saddle joints.

Section 10.0: Added new Records section. Renumbered subsequent sections.

REVISIONS (See ★)

1)	Cover Page	-	Changed "Registration No." to "Course ID". Added Core Groups designation. Changed "Target Training Groups" to "Target Audience".
2)	Section 3.2	-	Added "second".
3)	Section 3.3	-	Added "second".
4)	Section 3.6 C) 1.	-	Added "second".
5)	Section 3.6 C) 2.	-	Added "second" and updated examples of second inspector.

(Continued)

6)	Section 3.7	-	Changed “peer” to “second”.
7)	Section 3.8 A)	-	Added “second”.
8)	Section 3.8 B)	-	Added “second”.
9)	Section 3.8 B) 1.	-	Added “second” and updated examples of second inspectors.
10)	Section 3.8 B) 2.	-	Added “second”.
11)	Section 7.4 A)	-	Added “second”.
12)	Section 8.1	-	Added “second”.
13)	Section 8.3	-	Added “second” and updated examples of second inspectors.
14)	Section 9.1	-	Added “second”.
15)	Section 9.2	-	Added “second”.



Gas Operations Standards

TITLE: QUALIFICATION OF INSTALLERS JOINING POLYETHYLENE (PE) PLASTIC PIPE/TUBING AND FITTINGS FOR GAS MAINS AND SERVICES

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TITLE: QUALIFICATION OF INSTALLERS JOINING POLYETHYLENE (PE) PLASTIC PIPE/TUBING AND FITTINGS FOR GAS MAINS AND SERVICES

1.0 SCOPE

This specification establishes the procedure and evaluation requirements for initial Operator Qualification and the requalification (annual and three year) for joiners and inspectors of polyethylene (PE) plastic pipe/tubing and fittings for gas mains and services.

NOTE: “Annual” means once each calendar year at intervals not exceeding 15 months.

2.0 LEGAL REQUIREMENTS

Federal: 49 CFR Part 192, Sections 281, 283, 285, and 287.

State: 16 NYCRR Part 255, Sections 281, 283, 285, and 287.

3.0 OPERATOR QUALIFICATION

3.1 Joiners who tap an energized pipeline, weld steel, and join PE plastic pipe by heat fusion (butt fusion or branch saddle fusion), electrofusion, or with mechanical fittings shall be Operator Qualified.

All other “covered tasks” shall be completed by either Operator Qualified individuals or individuals under the direct observation of one who is Operator Qualified. “Direct observation” means that the Operator Qualified individual remains in direct visual and verbal contact at all times with the individual performing the task.

★ 3.2 Qualification of new and existing joiners and second inspectors of PE plastic pipe shall be performed and documented by **Con Edison** or Northeast Gas Association (NGA) trained evaluators.

★ 3.3 Disqualification of joiners and second inspectors will be documented in Industrial Training Services (ITS) as a suspension of the applicable covered task.

★ 3.4 To join PE plastic pipe by heat fusion (butt fusion or branch saddle fusion), electrofusion, or with mechanical fittings, joiners shall be qualified under the joining procedures in Gas Specifications [G-8123](#), “Heat Fusion Joining

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3.0 OPERATOR QUALIFICATION (Continued)

of Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services,” [IP-27](#), “Installation of Electrofusion Fittings on Plastic Pipe/Tubing and Molded Fittings Using a Universal Electrofusion Processor” and [IP-20](#), “Installation of Mechanical Fittings for Plastic Pipe and Tubing.”

The qualification for joiners includes all of the below:

A) Training

The individual must be appropriately trained or experienced in the joining procedures in Gas Specifications [G-8123](#), [IP-27](#), and [IP-20](#).

A manufacturer’s representative may do the initial training on a machine or equipment, but it must be documented (e.g. Hands-on-training (HOT)).

B) Knowledge Evaluation

Successful completion of the knowledge (written) evaluation to measure that an individual has the required knowledge of PE plastic pipe and the procedures to join PE plastic pipe.

★ **C) Skill and Ability Evaluation**

Successful completion of the skill and ability (practical) evaluations to assess that individuals can correctly demonstrate the joining of PE plastic pipe by fabricating specimen joints for each of the following:

- Butt fusion using manual machine.
- Butt fusion using hydraulic machine (McElroy 28, 412, or 618)
- Branch saddle fusion (Development Lab personnel only)
- Electrofusion coupling
- Electrofusion 16” coupling (optional)
- Electrofusion saddle
- Mechanical bolted fitting

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3.0 **OPERATOR QUALIFICATION** (Continued)

- Mechanical compression fitting
- Mechanical nut follower fitting

3.5 **Initial Qualification of Joiners**

Initial qualification requires joiners to be qualified under the joining procedures in Gas Specifications [G-8123](#), [IP-27](#), and [IP-20](#) and/or the [NGA Plastic Pipe Joining Manual](#) by meeting the requirements of:

- appropriate training or experience in the joining procedure(s),
- knowledge (written) evaluation, **and**
- skill and ability (practical) evaluation.

3.6 **Requalification of Joiners**

A) Following initial qualification, joiners who join PE plastic pipe shall be requalified under the joining procedures in Gas Specifications [G-8123](#), [IP-27](#), and [IP-20](#) and/or the NGA Plastic Pipe Joining Manual by meeting the requirements of:

- skill and ability (practical) evaluation annually **AND**
- knowledge (written) evaluation every three (3) years, not to exceed 39 months.

B) The annual skill and ability evaluation satisfies the requirements when during any 12-month period that person does not make any joints under the joining procedures in Gas Specifications [G-8123](#), [IP-27](#), and [IP-20](#).

C) At any time, joiners who join PE plastic pipe shall also be requalified under the joining procedures in Gas Specifications [G-8123](#), [IP-27](#), and [IP-20](#), and/or the NGA Plastic Pipe Joining Manual if either:

- ★ 1. Any production joint made under the applicable joining procedure is found unacceptable by a qualified second inspector,

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3.0 OPERATOR QUALIFICATION (Continued)

- ★ 2. Any production joint made under the applicable joining procedure that had been inspected by the qualified joiner is found visually unacceptable by another qualified second inspector (ie, Qualified management employee, Construction Representative (CR), Construction Inspector (CI), or independent 3rd party inspection). (See Section 7.4)
- 3. Any production joint made by heat fusion (butt fusion or branch saddle fusion), electrofusion, or with mechanical fittings is found unacceptable after pressure testing. (See Gas Specification [G-8204](#), “Pressure Testing Requirements for Gas Mains and Services” **OR**
- 4. Company management recommends that the joiner be requalified.

★ 3.7 Initial Qualification of Second Inspectors

To be initially qualified to second inspect plastic joints:

- A) A person must be either qualified as a joiner themselves, **or**
- B) Meet the requirements of:
 - appropriate training **and**
 - knowledge (written) evaluation.

★ 3.8 Requalification of Second Inspectors

- A) Following initial qualification, second inspectors shall be requalified by meeting the requirements of:
 - knowledge (written) evaluation at periods of three (3) years, not to exceed 39 months.
- B) At any time, second inspectors shall also be requalified, if either:

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3.0 OPERATOR QUALIFICATION (Continued)

1. When any production joint made under the applicable joining procedure that had been inspected by the qualified second inspector is found visually unacceptable by another qualified second inspector (ie, Qualified management employee, Construction Representative (CR), Construction Inspector (CI), or independent 3rd party inspection). (See Section 8.0)

OR

2. Company management recommends that the second inspector be requalified.

4.0 SKILL AND ABILITY EVALUATION TO JOIN PE PLASTIC BY HEAT FUSION

- 4.1 No person may join PE plastic pipe/tubing and fittings by heat fusion (butt fusion-manual, butt fusion- hydraulic, and branch saddle fusion) unless that person has been qualified under the applicable joining procedure by:

- A) Making specimen joints from pipe sections joined according to the procedure that passes the following inspection and test:
 - 1) The heat fusion specimen joints must be visually examined during and after joining and found to have the same appearance as a joint or photographs of a joint that is acceptable under the procedure.
 - 2) The heat fusion specimen joint must be destructively tested. The joints shall be cut into at least three longitudinal straps, each of which is visually examined and found not to contain voids or discontinuities on the cut surfaces of the joint area and deformed by bending, torque, or impact, and if failure occurs, it must not initiate in the joint area.

5.0 SKILL AND ABILITY EVALUATION TO JOIN PE PLASTIC BY ELECTROFUSION

- 5.1 No person may join PE plastic pipe/tubing and fittings by electrofusion (coupling and saddle) unless that person has been qualified under the applicable joining procedure by:

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5.0 SKILL AND ABILITY EVALUATION TO JOIN PE PLASTIC BY ELECTROFUSION (Continued)

- A) Making specimen joints from pipe sections joined according to the procedure that passes the following inspection and test.
- 1) The specimen electrofusion joints must be visually examined during and after joining and found to have the same appearance as a joint or photographs of a joint that is acceptable under the procedure.
 - 2) The specimen electrofusion joints must be destructively tested. The electrofusion joints shall be cut into at least three longitudinal straps, each of which is visually examined and found not to contain voids or discontinuities on the cut surfaces of the joint area and deformed by bending, torque, or impact, and if failure occurs, it must not initiate in the joint area.

6.0 SKILL AND ABILITY EVALUATION TO JOIN PE PLASTIC WITH MECHANICAL FITTINGS

- 6.1 No person may join PE plastic pipe/tubing with mechanical fittings unless that person has been qualified under the applicable joining procedure by:
- A) Making specimen joints from pipe sections joined according to the procedure and the manufacturer's installation guidelines that passes the following inspection and test.
- 1) The specimen mechanical joints must be visually examined during and after assembly and found to have the same appearance as a joint or photographs of a joint that is acceptable under the procedure.

7.0 DISQUALIFICATION FROM JOINING PE PLASTIC

- 7.1 In the event of disqualification, the joiner shall undergo remediation before being permitted to qualify/requalify.

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7.0 DISQUALIFICATION FROM JOINING PE PLASTIC (Continued)

7.2 Knowledge Evaluation

Failure of the knowledge (written) evaluation at either the initial qualification or the three year requalification will result in disqualification for that method of joining PE plastic.

7.3 Skill and Ability Evaluation

Reasons for failing the initial or annual skill and ability evaluation include, but are not limited to:

- ★ A) Butt Fusion Using Manual or Hydraulic Machine
- Failure to inspect the plastic pipe/tubing for scratches or defects.
 - Failure to clean the inside and outside of the pipe to be joined by wiping with a clean, dry, lint-free cloth.
 - Failure to check for pipe slippage at the proper fusion pressure prior to heating.
 - Failure to determine the drag pressure (if any) and calculate the proper fusion pressure.
 - Failure to verify the heating iron temperature with a calibrated contact pyrometer.
 - Pipe end misalignment.
 - Improper fusion pressure or pressure exerted during the heating cycle.
 - Insufficient or excessive melt bead.
 - Inadequate bead roll-back.
 - Failure to mark the pipe/tubing adjacent to the butt fused joint to identify the joiner.
 - The specimen joint differs in appearance as a specimen joint or photograph of joint that is acceptable under Gas Specification [G-8123](#).
 - Failure of the destructive test. (See Section 4.1(A)(2))

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7.0 DISQUALIFICATION FROM JOINING PE PLASTIC (Continued)

★ B) Branch Saddle Fusion Using Hydraulic Machine

- Failure to inspect the plastic pipe/tubing for scratches or defects.
- Failure to roughen both the pipe surface and the base of the branch saddle.
- Failure to clean the pipe surface and the base of the branch saddle by wiping with a clean, dry, lint-free cloth.
- Failure to verify the heating iron temperature with a calibrated contact pyrometer.
- Preheating the pipe.
- Lack of uniform pressure both during the heating or fusion cycles.
- Slippage or rotation of heater iron or fitting on pipe during heat cycle or fusion.
- Insufficient or excessive melt bead.
- Excessive fusion pressure causing the pipe to become out-of-round.
- Inadequate bead roll-back.
- The test joint differs in appearance from a sample joint.
- Failure to mark the branch saddle fitting or the pipe/tubing adjacent to the branch saddle fusion joint to identify the joiner.
- The specimen joint differs in appearance as a specimen joint or photograph of joint that is acceptable under Gas Specification [G-8123](#).
- Failure of the destructive test. (See Section 4.1(A)(2))

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7.0 DISQUALIFICATION FROM JOINING PE PLASTIC (Continued)

★ C) Electrofusion Coupling Joint

- Failure to inspect the plastic pipe/tubing for scratches or defects.
- Failure to measure and mark the area on pipe to be scraped.
- Insufficient or excessive pipe scraping.
- Failure to clean electrofusion fitting and pipe surface with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non- synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) with 99.9% liquid isopropyl alcohol (Class/Stock #630-1246) after scraping.
- Contamination of pipe ends after scraping.
- Contamination of fusion area inside coupling.
- Pipe end misalignment.
- Improper stab depth.
- Insufficient cool-down time before clamping fixture is removed.
- Failure to mark the electrofusion fitting or the pipe/tubing adjacent to the electrofusion joint to identify the joiner.
- The specimen joint differs in appearance as a specimen joint or photograph of joint that is acceptable under Gas Specification [IP-27](#)
- Failure of the destructive test. (See Section 5.1(A)(2))

★ D) Electrofusion Saddle Joint

- Failure to inspect the plastic pipe/tubing for scratches or defects.
- Failure to measure and mark the area on the pipe to be scraped.
- Insufficient or excessive pipe scraping.
- Contamination of pipe after scraping.
- Contamination of fusion area under branch saddle.
- Improper alignment of pipe ends

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7.0 DISQUALIFICATION FROM JOINING PE PLASTIC (Continued)

★ D) Electrofusion Saddle Joint (Continued)

- Failure to clean electrofusion fitting and pipe surface with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non- synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) with 99.9% liquid isopropyl alcohol (Class/Stock #630-1246) after scraping.
- Insufficient cool-down time before clamping fixture is removed.
- Failure to mark the electrofusion fitting or the pipe/tubing adjacent to the electrofusion joint to identify the joiner.
- The specimen joint differs in appearance as a specimen joint or photograph of joint that is acceptable under Gas Specification [IP-27](#)
- Failure of the destructive test. (See Section 5.1(A)(2))

★ E) Mechanical Fittings

- Failure to inspect the plastic pipe/tubing for scratches or defects.
- Failure to follow the installation procedure outlined in Gas Specification [IP-20](#) and the manufacturer's installation procedure.
- Failure to measure and mark the correct insertion depth on the plastic pipe/tubing.
- Installing the coupling without a stiffener or with the wrong stiffener (if required).
- Failure to fully insert the plastic pipe/tubing into the coupling/fitting.
- Failure to chamfer the edge of the plastic tubing prior to inserting into coupling/fitting (if applicable).
- Failure to mark the mechanical fitting or the pipe/tubing adjacent to the mechanical fitting to identify the joiner.
- The specimen joint differs in appearance as a specimen joint or photograph of joint that is acceptable under Gas Specification [IP-20](#).

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7.0 DISQUALIFICATION FROM JOINING PE PLASTIC (Continued)

7.4 Poor Work Performance

- ★ A) A joiner will be disqualified (suspended in ITS) from joining PE plastic when any production joint made under the applicable joining procedure is found visually unacceptable by a qualified second inspector. The joiner must be requalified in that method of joining (e.g. manual/hydraulic butt fusion, electrofusion, or mechanical joining), prior to performing any additional PE plastic joining of that method.
- B) At any time, Company management may disqualify an installer from joining PE plastic due to poor work performance (e.g., visually unacceptable production joints, non-compliance with joining procedures, etc.).

7.5 Main or Service Pressure Test Failure at a Joint

A joiner will be disqualified when any production joint made by heat fusion (butt fusion or branch saddle fusion), electrofusion, or with mechanical fittings is found unacceptable after pressure testing. (See Gas Specification [G-8204](#), "Pressure Testing Requirements for Gas Mains and Services")

- A) If a main or service pressure test fails at a PE plastic fuse or mechanical joint, the joiner must immediately notify their supervisor (Company employee) or Company Authorized Representative (gas contractor). The supervisor or Company Authorized Representative shall provide email notification of the disqualification to Gas Compliance (dl – Gas Quality Control)

- 7.6 Failure to requalify prior to the expiration dates of either the annual requalification (Skill and Ability Evaluation) or the three year requalification (Knowledge Evaluation) shall **immediately disqualify** the joiner from performing that type of PE plastic pipe joining. The disqualified installer must then be requalified.

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8.0 DISQUALIFICATION FROM INSPECTING PE PLASTIC JOINTS

- ★ 8.1 In the event of disqualification, the second inspector shall undergo remediation before being permitted to qualify/requalify.

8.2 Knowledge Evaluation

Failure of the knowledge (written) evaluation at either the initial qualification or the three year requalification will result in disqualification for that method of inspecting PE plastic joints.

★ 8.3 Poor Work Performance

A second inspector will be disqualified from inspecting PE plastic joints when any production joint made under the applicable joining procedure is found unacceptable by another second inspector (e.g., Qualified management employee, Construction Representative (CR), Construction Inspector (CI), 3rd party inspector). The second inspector must be requalified prior to performing any additional PE plastic joint inspection.

9.0 IDENTIFICATION OF OPERATOR QUALIFICATION

- ★ 9.1 Each Operator Qualified joiner or second inspector shall be issued a qualification card (or equivalent) identifying the covered tasks they are qualified to perform.

- ★ 9.2 The qualification card (or equivalent) shall be in the joiner's/second inspector's possession whenever performing/inspecting joining of PE plastic pipe by heat fusion, electrofusion, or mechanical fittings.

★ **10.0 RECORDS**

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.

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11.0 REFERENCES

- [G-8123](#) Heat Fusion Joining of Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services
- [G-8204](#) Pressure Testing Requirements for Gas Mains and Services
- [IP-20](#) Installation of Mechanical Fittings for Plastic Pipe and Tubing
- [IP-27](#) Installation of Electrofusion Fittings on PE Plastic Pipe/Tubing and Molded Fittings Using a Universal Electrofusion Processor

Con Edison's Operator Qualification Written Plan

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SPECIFICATION: G-8122-12**b**

TITLE: INSPECTION, HANDLING, STORAGE, AND
TRANSPORTATION OF POLYETHYLENE
(PE) PLASTIC PIPE, TUBING, AND
FITTINGS FOR GAS MAINS AND
SERVICES

★ **VOLUME:** 2 (Section 7.0), 10 & Yellow Book

★ **COURSE ID:** [GAS0343](#)

★ **CORE GROUPS:** Gas Construction, and **Emergency
Response Force Lead Mechanic**

★ **TARGET AUDIENCE** Gas Construction, Emergency Response
Force (ERF), Gas Development Lab, Gas
Contractors, Per Diem, Construction,
Stores Operations, and **Emergency
Response Force Lead Mechanic**

REV 12b (4/9/18):

- Incorporated Records Retention Section 6.0; renumbered Section 6:0 “References” to Section 7.0 and Section 7.0 “Attachments” to Section 8.0.
- Cover Page: Added “Emergency Response Force Lead Mechanic” to Core Groups and Target Audience.

REV 12a (12/18/17):

- Cover Page: Added specification to O&M Manual (Volume 10). Added Gas Construction to Core Group(s).
- Section 2.0: Added Case 14-G-0201 and 14-G-0212 to Legal Requirements.



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REVISIONS: (See ★)

- 1) Added Effective Date.
- 2) Cover Page - Changed "Registration Number" to "Course ID"; Added "Core Groups"; Changed "Target Training" to "Target Audience".
- 3) Section 3.2 (A) - Reformatted. Changed "2 years" to "10 years" in (A) (2).
- 4) Section 3.2 (B) - Added section and note referencing Appendix C.
- 5) Section 3.3 - Added requirement to utilize a pit gauge.
- 6) Section 4.3 (A) - Changed "2 years" to "10 years".
- 7) Section 4.4 (C) - Clarified restriction on dragging pipe on the ground.
- 8) Section 6.0 - Revised "ASTM D2315-99" to "ASTM D2513-09a". Updated Performance Pipe Bulletin to Sept, 2015.
- 9) Section 7.0 - Added Attachment C.
- 10) Attachments - Added Attachment C.



Gas Operations Standards

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**TITLE: INSPECTION, HANDLING, STORAGE, AND
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PLASTIC PIPE, TUBING, AND FITTINGS FOR
GAS MAINS AND SERVICES**

1.0 SCOPE

This specification applies to the inspection, handling, storage, and transportation, of polyethylene (PE) plastic pipe, tubing, and fittings (e.g. valves, elbows, reducers, transition fittings, service tees) for gas mains and services by Company and Gas Contractor forces.

★ **2.0 LEGAL REQUIREMENTS**

Federal: 49 CFR Part 192, Sections 311 and 321

New York State: 16 NYCRR Part 255, Sections 311 and 321

Case 14-G-0201 and 14-G-0212

3.0 INSPECTION AT COMPANY FACILITY, GAS CONTRACTOR YARD, AND JOB SITE

3.1 All loose and bundled/packaged PE plastic pipe, tubing, and fittings shall be inspected for PE plastic material requirements, age, and damage upon delivery to Company facilities, Gas Contractor yards, and job sites AND prior to installation.

Where PE plastic pipe is bundled upon delivery, the bundle shall be inspected for damage, PE Plastic material requirements, and age to the extent possible without unbundling. However, the pipe shall be fully inspected prior to installation.

★ **3.2 PE Plastic Material Requirements and Age**

★ A) Upon delivery to Company facility (when feasible) and Gas contractor yard, and prior to installation, inspect the print line on PE plastic pipe, tubing, and the label or imprint on PE fittings to verify:

1) PE plastic material is high density polyethylene (HDPE), PE3408/4710, and manufactured per ASTM D2513.

★ 2) PE plastic material is NOT older than 10 years old.

★ B) Refer to Appendix C for guidance in determining the date of manufacture of PE plastic pipe, tubing and other PE fittings.

★ EFFECTIVE DATE: 5/4/17			
NUMBER:	DATE APPROVED:	VOLUMES: 2 (Section 7.0), 10 & Yellow Book	PAGE 2
G-8122-12b	3/1/17	Construction Standards and O&M Manual	OF 8 PAGES



**TITLE: INSPECTION, HANDLING, STORAGE, AND
TRANSPORTATION OF POLYETHYLENE (PE)
PLASTIC PIPE, TUBING, AND FITTINGS FOR
GAS MAINS AND SERVICES**

3.0 **INSPECTION AT COMPANY FACILITY, GAS CONTRACTOR YARD, AND
JOB SITE** (Continued)

Note: Appendix C is not intended to be an all-inclusive listing. Refer to manufacturer's literature for additional information.

★ 3.3 **Damage**

Inspect packaged and loose PE plastic pipe, tubing, and fittings for damage greater than the maximum permissible defect depth utilizing a pit gauge (10% of the wall thickness, See Attachment A).

- A) Upon delivery to Company facilities and Gas contractor yards, any PE plastic pipe or tubing received damaged (e.g. kinks, buckles, dents, gouges, grooves, etc.) deeper than the maximum permissible defect depth **must** be returned. Any damage to PE plastic fittings deeper than the maximum permissible defect depth must also be returned.
- B) At the job site, any damage to PE plastic pipe or tubing (e.g. kinks, buckles, dents, gouges, grooves, etc.) deeper than the maximum permissible defect depth **must** be removed by cutting out the damaged section as a cylinder. The minimum cylinder length to be removed is one pipe diameter or 12 inches, whichever is greater. Any damage to PE plastic fittings deeper than the maximum permissible defect depth must not be installed.

4.0 **TRANSPORTATION, HANDLING, AND STORAGE**

4.1 **Transportation**

During transportation of the PE plastic pipe, tubing, and fittings by the Company/Gas Contractor to Company/Gas Contractor yard or job site, the following precautions shall be taken:

- A) Bed, rails or stanchions of the truck must be free from projections or sharp objects which could scratch or puncture the PE plastic pipe, tubing, and fittings.
- B) Straight lengths of PE plastic pipe are to be loaded and transported in a way that will prevent excessive movement, vibration, and avoid stress concentration due to binding or strapping.

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**TITLE: INSPECTION, HANDLING, STORAGE, AND
TRANSPORTATION OF POLYETHYLENE (PE)
PLASTIC PIPE, TUBING, AND FITTINGS FOR
GAS MAINS AND SERVICES**

4.0 **TRANSPORTATION, HANDLING, AND STORAGE** (Continued)

- C) PE plastic pipe shall not overhang more than 3 feet from the end of the truck. Stacking height must be limited to a height that produces no bending of the pipe overhang.

4.2 **Handling**

During handling of the PE plastic pipe, tubing, and fittings by the Company/Gas Contractor at the Company/Gas Contractor yard or job site, the following precautions shall be taken:

- A) Coils of PE plastic pipe and tubing supplied strapped by the manufacturer should remain strapped until the moment of installation, where practical.
- B) Individual pipe lengths or pallets shall not be dropped off the truck.
- C) Bundles of straight lengths of PE plastic pipe bundled by the manufacturer may be lifted by crane or fork lift.
- D) Web-type nylon, leather, rope or fabric slings shall be used for handling PE plastic pipe and tubing. Wire rope, chains, cables, tongs or other metallic equipment shall **not** be used for handling the PE plastic pipe and tubing. The cautious use of a fork truck to handle/lift the PE plastic pipe and tubing is permissible.
- E) Individual lengths of PE plastic pipe should be lifted manually. When this is not practical, a crane, fork lift, backhoe or similar equipment may be used. See Table 1 for weights of 40' lengths of PE plastic pipe.

★ EFFECTIVE DATE: 5/4/17			
NUMBER:	DATE APPROVED:	VOLUMES: 2 (Section 7.0), 10 & Yellow Book	PAGE 4
G-8122-12 b	3/1/17	Construction Standards and O&M Manual	OF 8 PAGES



**TITLE: INSPECTION, HANDLING, STORAGE, AND
TRANSPORTATION OF POLYETHYLENE (PE)
PLASTIC PIPE, TUBING, AND FITTINGS FOR
GAS MAINS AND SERVICES**

4.0 **TRANSPORTATION, HANDLING, AND STORAGE** (Continued)

Table 1, Approximate Weight of Individual Straight Lengths of PE Plastic Pipe

Diameter	SDR	Weight per 40' Length (Pounds)
2"	11	26
3"	11	56
	21 (PIM)	40
4"	11	92
6"	11	200
	26 (PIM)	89
8"	11	340
	26 (PIM)	152
10"	15.5	383
	32.5 (PIM)	190
12"	11	742
16"	11	1168
	15.5	848
	32.5 (PIM)	420

4.3 **Storage at Company/Gas Contractor Yard**

- ★ A) PE plastic pipe, tubing, and fittings shall be inventory controlled to prevent material older than 10 years old from being issued or used by field personnel for installation.
- B) New coils of PE plastic pipe and tubing shall be left on the original pallets
- C) Bundles of PE plastic pipe may be stacked evenly upon each other to an overall height of about six feet (6') high. If the storage site is not flat and level, limit the stacking height to about four feet (4') height.
- D) Bundles of PE plastic pipe shall be placed on evenly spaced wood pallets or steel I-Beam support racks. The I-Beams shall have padding or wood installed that will sufficiently cushion the PE plastic pipes against damage.
- E) Individual/loose straight lengths of PE plastic pipe may be stacked in rows. Pipes should be laid straight, not crossing over or entangled with each other. The base row must be placed on evenly spaced wood and installed to prevent sideways movement or shifting. (See Tables 2 and 3).



**TITLE: INSPECTION, HANDLING, STORAGE, AND
TRANSPORTATION OF POLYETHYLENE (PE)
PLASTIC PIPE, TUBING, AND FITTINGS FOR
GAS MAINS AND SERVICES**

4.0 **TRANSPORTATION, HANDLING, AND STORAGE** (Continued)

**Table 2, Maximum Number of Rows High for Stacking 20' - 40' Individual
Straight Lengths of PE Plastic Pipe**

Plastic Pipe Diameter	SDR	Maximum Number of Rows High
2"	11	24
3"	11	18
4"	11	12
6"	11	8
8"	11	6
10"	15.5	5
12"	11	4
16"	15.5	3
16"	11	3

**Table 3, Maximum Number of Rows High for Stacking 20' - 40' Individual
Straight Lengths of PE Plastic Pipe PIM Sleeve**

PE Plastic Pipe Diameter	SDR	Maximum Number of Rows High
3"	21	14
6"	26	10
8"	26	8
10"	32.5	6
16"	32.5	4

4.4 **Storage at Job Site**

- A) The storage area should provide adequate protection against physical damage. If possible, follow storage guidelines for Company/Gas Contractor yard (see Section 4.3).



TITLE: INSPECTION, HANDLING, STORAGE, AND TRANSPORTATION OF POLYETHYLENE (PE) PLASTIC PIPE, TUBING, AND FITTINGS FOR GAS MAINS AND SERVICES

4.0 TRANSPORTATION, HANDLING, AND STORAGE (Continued)

4.4 Storage at Job Site (Continued)

- B) Individual/loose straight pipes of PE plastic pipe may be stored directly on a smooth surface that will not cause cuts, gouges, indentations, or punctures. When field conditions exist that could cause this type of damage, the pipe shall be placed on evenly spaced sandbags, padding, or other suitable protective material.
- ★ C) Pipe shall not be dragged on the ground/surface that will cause cuts, gouges, indentations or punctures, unless protection is provided.

5.0 MISCELLANEOUS

- 5.1 The Gas Contractor is responsible for the PE plastic pipe, tubing, and fittings once in their possession. Any damage or loss incurred during transportation, storage, and/or handling operations shall be replaced at the Gas Contractor's expense.
- 5.2 All scrap PE plastic pipe and/or tubing that cannot be reused, shall be brought back to the Con Edison workout location for proper disposal/recycling.

★ 6.0 RECORDS RETENTION

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.

★ 7.0 REFERENCES

- [G-8104](#) - Polyethylene Pipe and Fittings for Gas Mains and Services
- ★ ASTM D2513-09a - Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings
- [Plastics Pipe Institute \(PPI\) Material Handling Guide \(2001\)](#)
- ★ [Performance Pipe Bulletin PP-901 Sept, 2015\)](#)

★ EFFECTIVE DATE: 5/4/17			
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**TITLE: INSPECTION, HANDLING, STORAGE, AND
TRANSPORTATION OF POLYETHYLENE (PE)
PLASTIC PIPE, TUBING, AND FITTINGS FOR
GAS MAINS AND SERVICES**

★ 8.0 **ATTACHMENTS**

[Attachment A](#) – PE Plastic Pipe/Tubing Chart Maximum Permissible Damage

[Attachment B](#) – PE Plastic Pipe and Tubing Information

[Attachment C](#) – Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

★ EFFECTIVE DATE: 5/4/17			
NUMBER:	DATE APPROVED:	VOLUMES: 2 (Section 7.0), 10 & Yellow Book	PAGE 8
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ATTACHMENT A

PE PLASTIC PIPE/TUBING CHART MAXIMUM PERMISSIBLE DAMAGE

<u>Nominal Size</u>	<u>SDR</u>	<u>Outside Diameter</u>	<u>Minimum Wall Thickness Of Pipe / Tubing</u>	<u>Maximum Permissible Defect Depth</u>
1/2" CTS	7.0	0.625"	0.090"	0.009"
1" CTS	12.5	1.125"	0.090"	0.009"
1 1/4" CTS	15.3	1.375"	0.090"	0.009"
1" IPS	11	1.315"	0.119"	0.011"
1 1/4" IPS	11	1.660"	0.151"	0.015"
2" IPS	11	2.375"	0.215"	0.021"
3" IPS	11	3.500"	0.318"	0.031"
4" IPS	11	4.500"	0.409"	0.040"
6" IPS	11	6.625"	0.602"	0.060"
8" IPS	11	8.625"	0.785"	0.078"
10" IPS	11	10.750"	0.977"	0.097"
10" IPS	15.5	10.750"	0.694"	0.069"
12" IPS	11	12.750"	1.159"	0.115"
16" IPS	11	16.000"	1.455"	0.145"

ATTACHMENT B

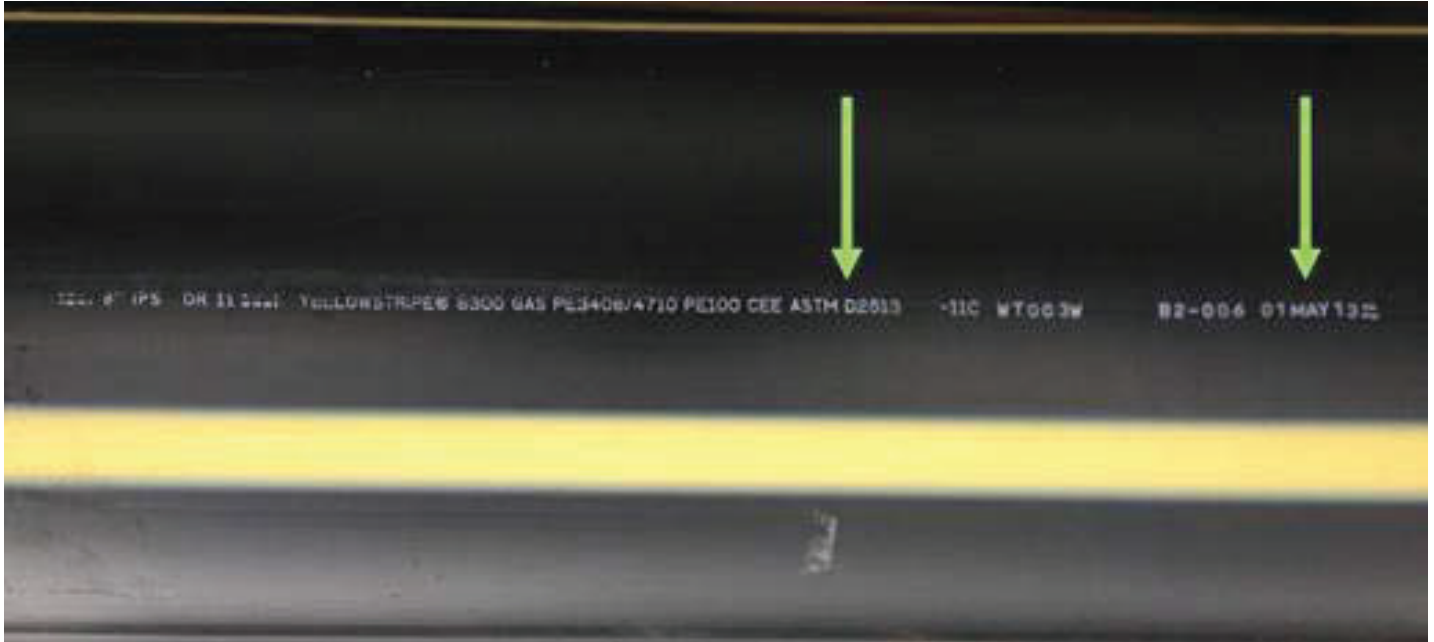
PE PLASTIC PIPE AND TUBING INFORMATION

C/S #	DESCRIPTION							
<u>8300 COILED TUBING / PIPE</u>		Lbs per Foot	Coil Weight	Feet per Truck	Weight per Truck	Coils per Pallet	Pallets per Truck	Packaging
360-0947	1/2" CTS (.090 WT) - 500' coils	0.066	33	156,000	10,296	12	26	Pallet
360-0988	1" CTS (.090 WT) - 500' coils	0.13	65	104,000	13,520	8	26	Pallet
360-0954	1-1/4" CTS (.090 WT) - 500' coils	0.16	80	72,000	11,520	6	24	Pallet
328-0351	1" IPS (SDR 11) - 500' coils	0.20	100	78,000	15,600	6	26	Pallet
328-0369	1-1/4" IPS (SDR 11) - 500' coils	0.31	155	42,000	13,020	12	7	Pallet
328-0377	2" IPS (SDR 11) - 350' coils	0.64	224	—	—	—	—	Pallet
<u>8300 PIPE - 40 FOOT LENGTHS</u>		Lbs per Foot	Lbs per Length	Feet per Truck	Weight per Truck	Lengths per Bundle	Bundles per Truck	Bundle Style
328-0856	2" IPS Pipe (SDR 11)	0.64	25.6	49,280	31,539	88	14	Hard
328-0385	3" IPS Pipe (SDR 11)	1.40	56.0	28,000	39,200	50	14	Soft
328-0393	4" IPS Pipe (SDR 11)	2.30	92.0	16,240	37,352	29	14	Soft
328-0401	6" IPS Pipe (SDR 11).	5.01	200.4	7,280	36,473	13	14	Soft
328-0518	8" IPS Pipe (SDR 11)	8.49	339.6	3,600	30,564	9	10	Soft
328-0658	10" IPS Pipe (SDR 15.5)	9.58	383.2	2,520	24,142	5 & 4	7 & 7	Bulk
328-0641	12" IPS Pipe (SDR 11)	18.55	742.0	1,920	35,616	4	12	Bulk
328-0831	16" IPS Pipe (SDR 15.5)	21.21	848.4	1,200	25,452	3	10	Bulk
320-0053	16" IPS Pipe (SDR 11)	29.21	1168.4	1,200	35,052	3	10	Bulk
<u>8300 PIPE - 20 FOOT LENGTHS</u>		Lbs per Foot	Lbs per Length	Feet per Truck	Weight per Truck	Lengths per Bundle	Bundles per Truck	Bundle Style
328-0591	2" IPS Pipe (SDR 11)	0.64	12.80	49,280	31,539	88	28	Hard
328-0583	3" IPS Pipe (SDR 11)	1.40	28.00	28,000	39,200	50	28	Soft
328-0575	4" IPS Pipe (SDR 11)	2.30	46.00	16,240	37,352	29	28	Soft
328-0567	6" IPS Pipe (SDR 11).	5.01	100.20	7,280	36,473	13	28	Soft
328-0559	8" IPS Pipe (SDR 11)	8.49	169.80	3,600	30,564	9	20	Soft
328-0849	12" IPS Pipe (SDR 11)	18.55	371.00	1,920	35,616	4	24	Bulk

★ ATTACHMENT C

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Polyethylene Gas Pipe or Tubing



Pipe / tubing was manufactured per ASTM D2513 (gas piping).
The date of manufacture is indicated as May 1, 2013

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Fitting With Label



Date of Manufacture: The date can be found on the label and is shown as the month/year. In the photo above 4/14 (April, 2014).

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings
2 inch IPS Metfit Mechanical Coupling



Date of Manufacture: The date is indicated by the year in the center of the dial with the arrow pointing to the month. In the photo above 9/14 (Sept, 2014)

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Central 4" IPS Cap



Date of manufacture: The date can be found on the label and is shown as the month/year. In the photo above 10/14 (October, 2014)

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Central Plastics 2" x 1-1/4" IPS PE Reducer



Date of manufacture: The date can be found on the label and is shown as the month/year. In the photo above 3/15 (March, 2015)

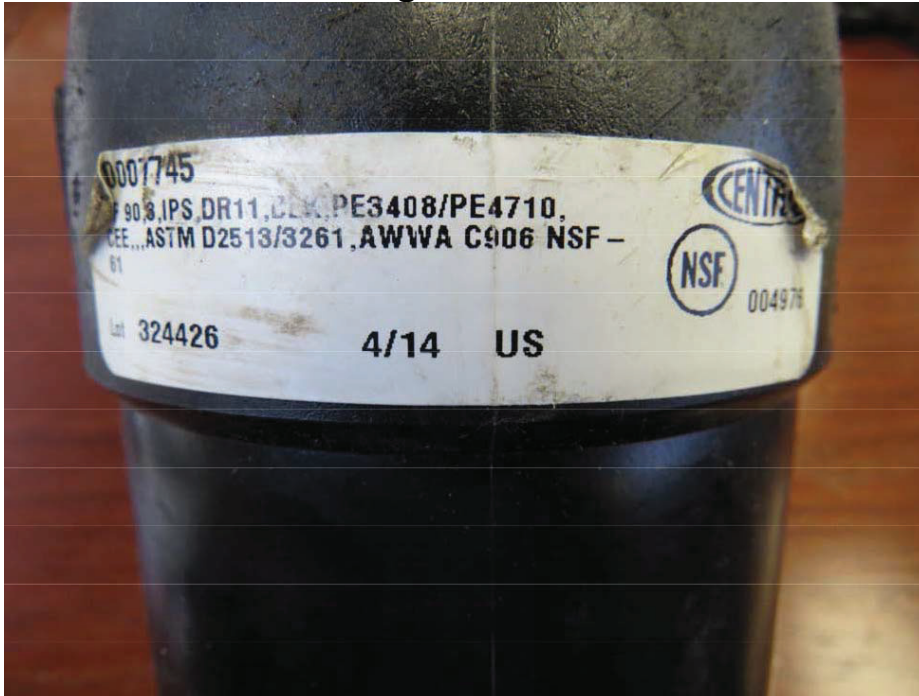


Date of manufacture: The date can also be indicated by the year in the center of the dial and the arrow pointing to the month. In the photo above 3/15 (March, 2015)

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Central Plastics 90 Degree PE Elbow



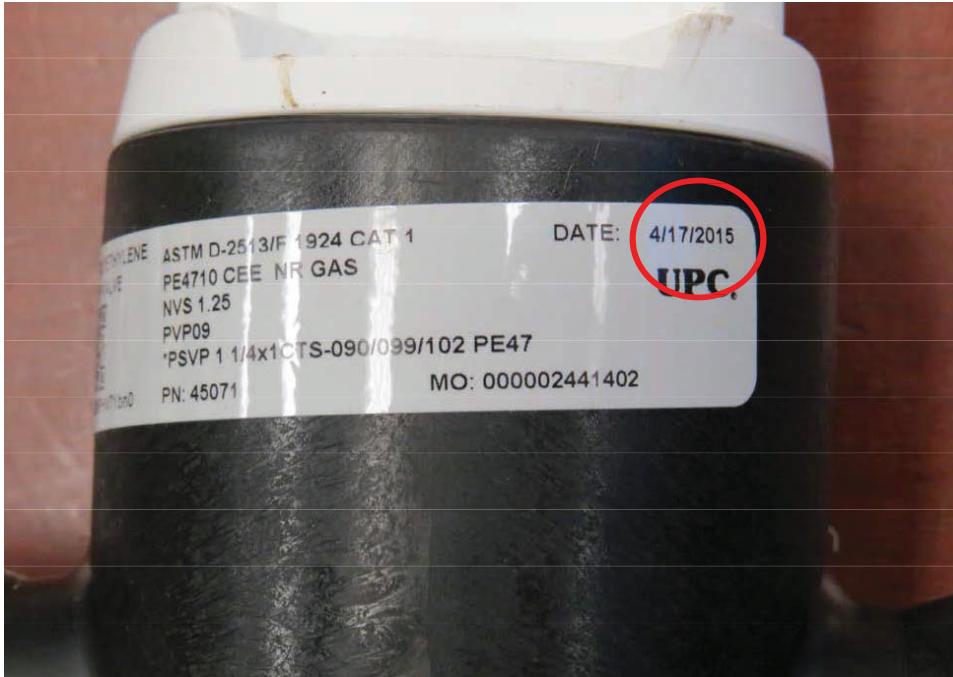
Date of manufacture: The date can be found on the label and is shown as the month/year. In the photo above 4/14 (April, 2014)



Date of manufacture: The date can also be indicated by the year in the center of the dial and the arrow pointing to the month. In the photo above 4/15 (April, 2014)

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings
Elster Perfection PE Ball Valve



The date on the sticker is the **assembly and test date**. In this case 4/17/2015.



Date of Manufacture: The date is indicated by the year in the center of the dial with the arrow pointing to the month. In the photo above 1/15 (Jan, 2015.) The expiration date should be taken as 10 years from the oldest month/year. For the valve shown above, the expiration date should be January, 2017

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Central Plastics 1.25" x 1" Electrofusion Reducer



Date of manufacture: The date can be found on the label and is shown as the month/year. In the photo above 10/14 (October, 2014)



Date of manufacture: The date can also be indicated by the year in the center of the dial and the arrow pointing to the month. In the photo above 10/14 (October, 2014)

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

2" Polyvalve PE Valve



The label does not have information regarding the date of manufacture. (See below).



Date of Manufacture: The date is branded onto the body of the valve as YY/MM/DD. In the photo above, November, 4, 2014.

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

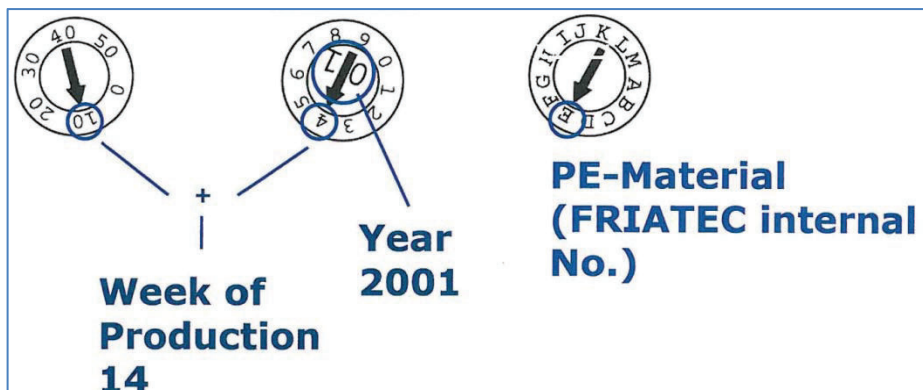
Frialen 2" IPS Electrofusion Coupling



The label does not have information regarding the date of manufacture. (See below).



Date of Manufacture is indicated as described below. For the coupling above, it was manufactured the week 44 of 2013.



Note: This diagram is not associated with the photographs above.

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Performance Pipe Fittings

How to Read a Fitting Label

6500 Series

PerformancePipe.com
MADE IN USA¹

PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

cNSFusGasUPCode² CSA B137.4³

65M 2X3/4 IPS 11 RTB BTT .80!⁴

1050407⁵ P-987654321-14-07⁹ -

ASTM D2513-11C¹² /CEE ASTM D3261¹⁴

PE2406/2708¹⁵

280¹⁶ /0¹⁷ /140¹⁸

PE5ban4V4B811Yy0²⁰

8100 Series

PerformancePipe.com

PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

81M 6" IPS-11 BUTT 90D ELL²²

1006440⁵ R-101234567-14-07-08¹⁰-13¹¹

ASTMD2513-11¹² CEE ASTM3261¹⁴ AWWAC906²¹

PE3408/4710 PE100¹⁵

MADE IN USA¹

PE5ban4V/H514Py0²⁰

Legend

1. Origin of Manufacture Certified to the Universal
2. Plumbing Code
3. Certified CSA B137.4
4. Description: 6500 Series Molded 2" Base w/ 1/4" IPS SDR 11 Outlet, Rectangle Base, Butt Tap Tee, w/ .80 Cutter
5. Unique Part Number
6. Resin Code
7. Production Run Number
8. Manufactured Year
9. Manufactured Month
10. Manufactured Day
11. Manufacturing Standard
12. Pipe Category Code (D2513)
13. Complies with Generic Fusion Procedures
14. D-3261 = Butt or D-2683 = Socket
15. Material Designation
16. Bead-Up Force (lbs.)
17. Heat Soak Force (lbs.)
18. Joining Force (lbs.)
19. ASTM F2897 Bar Code (Lot Number)
20. ASTM F2897 16 Digit Code
21. AWWA Standard
22. Description: 8100 Series Molded 6" SDR11 Butt 90 Ell

NOTE: Label Shown As a Sample Only. Series 6500 (Medium Density) Fittings Are Not Approved By Con Ed.

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Frialen XL Couplers

Batch coding for FRIALEN XL couplers

Batch code stamped into the coupler, unremoveable



D Material

Pressure rating

① ② ③ ④ ⑤ ⑥

1. Week pipe/blank
2. Year
3. Initial PE-raw material
4. Worker no.
5. Machine no.
6. Production week

Revised August 8, 2016

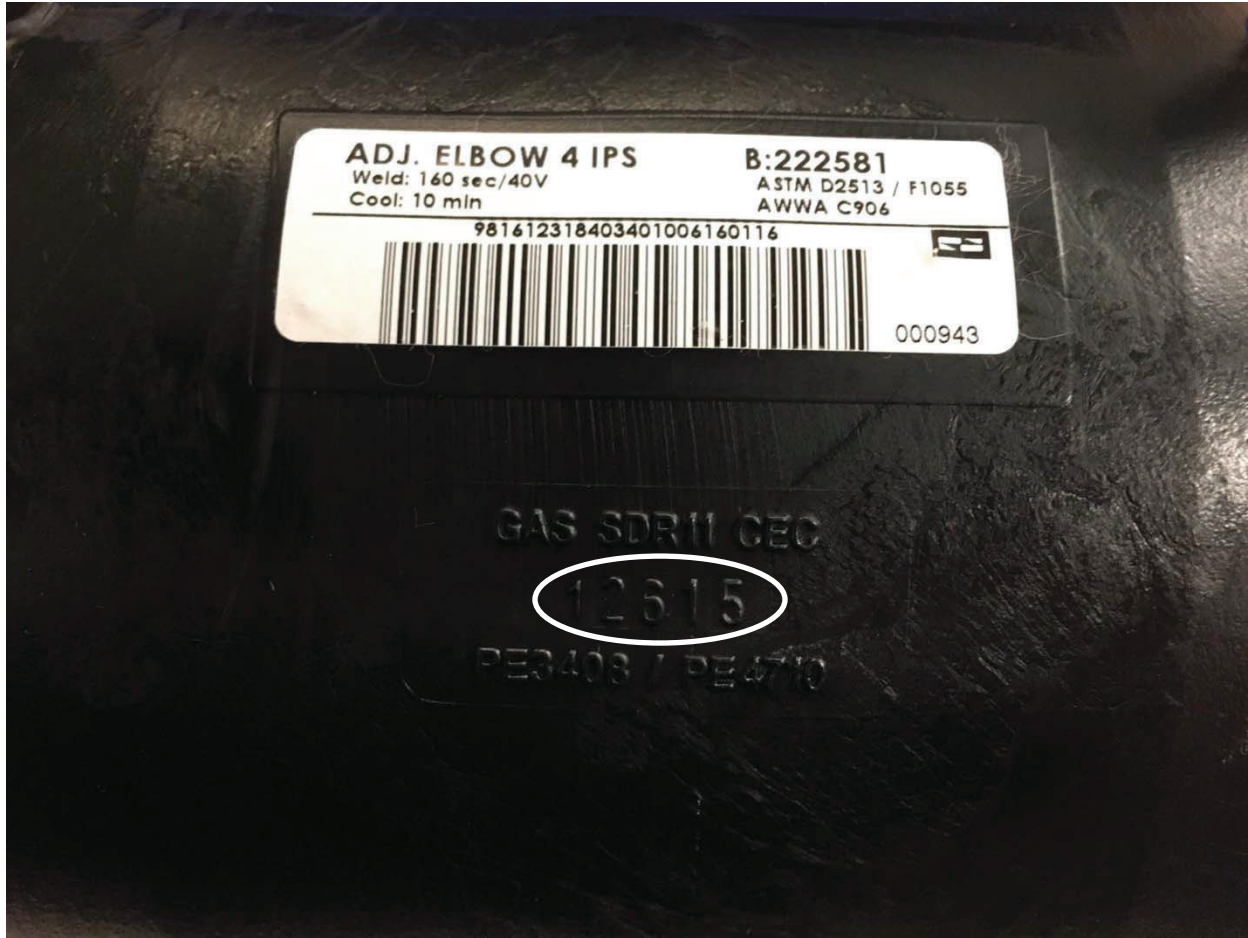
FRIALEN® XL



★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

Plasson Molded Fittings



Date of manufacture: The date is indicated by the five digit number embossed onto the body of the valve below the sticker. The first digit is the number of the machine that molded the fitting. The next two digits are the week that the fitting was manufactured and the last set of digits is the year of manufacture. In this case the number “12615” indicates the fitting was manufactured in week 26 of 2015.

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

IPEX Electrofusion Fittings

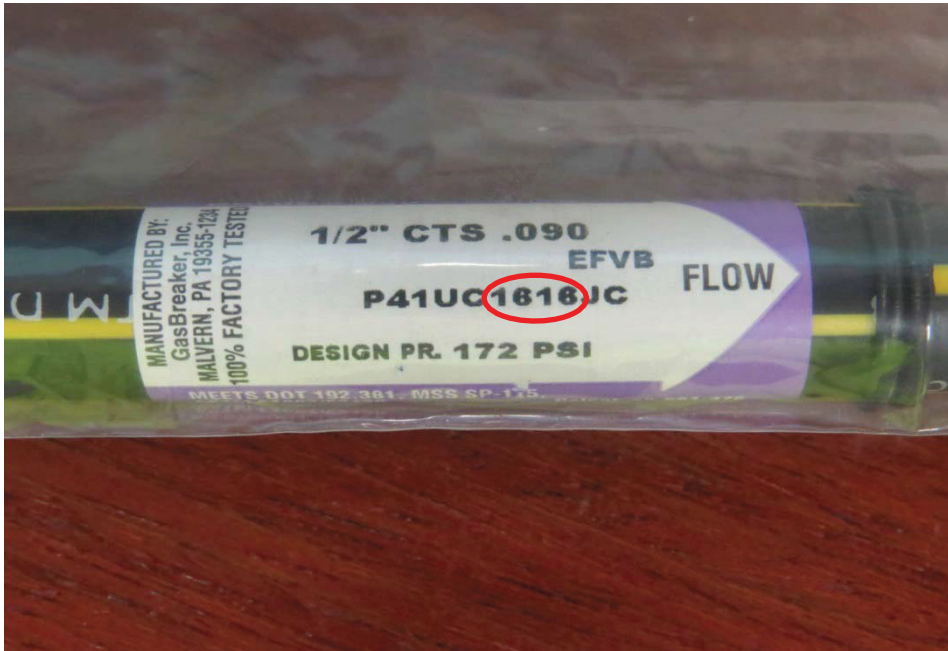


Date of manufacture is indicated by the digits imprinted next to the sticker. The first two digits are the week that the fitting was manufactured while the second set of digits show the year of manufacture. In this case, “4414” indicates that the body of the fitting was manufactured in week 44 of 2014.

★ ATTACHMENT C (Continued)

Guidelines for Determining the Age of PE Pipe, Tubing and Fittings

GasBreaker Excess Flow Valve



Date of manufacture: The manufacture date is determined by the four digits circled above. The first two digits provide the week of manufacture and the second set of digits provide the year of manufacture. In this case the fitting was manufactured in week 16 of 2016.

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LAST REVIEW DATE: 12/7/17
EFFECTIVE DATE: 2/8/18

REVIEW CYCLE: 5 Years

SPECIFICATION: G-8123-20a

TITLE: HEAT FUSION JOINING OF POLYETHYLENE (PE) PLASTIC PIPE/TUBING AND FITTINGS FOR GAS MAINS AND SERVICES

VOLUME: 2 (Section 7.0), 10, and Yellow Book

COURSE ID: [GAS0452](#)

CORE GROUP: Gas Construction

TARGET AUDIENCE: Gas Construction, Emergency Response Force (ERF), Gas Development Lab, Construction, Per Diem, and Gas Contractors

REV 20a (4-9-18)

Table of Contents: Added "RECORDS" Section.

Section 4.1 & 4.3: Updated Company approved markers.

Section 4.4: Updated section to reference GAS6006 for marking PE joints.

Section 11.0: Added new Records section. Renumbered subsequent sections.

REVISIONS (See ★):

1)	Table of Contents, Section 4.0	-	Changed "Peer" to "Second".
2)	Section 3.3	-	Changed "Peer" to "Second".
3)	Section 4.0	-	Changed "Peer" to "Second".
4)	Section 4.2	-	Changed "Peer" to "Second".
5)	Section 4.3	-	Changed "Peer" to "Second" and defined "P" as "Pass".
6)	Section 4.4	-	Changed "Peer" to "Second".



Gas Operations Standards

TITLE: HEAT FUSION JOINING OF POLYETHYLENE (PE) PLASTIC PIPE/TUBING AND FITTINGS FOR GAS MAINS AND SERVICES

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★	11.0 RECORDS	13
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EFFECTIVE DATE: 2/8/18				
EH&S REVIEW BY: J. Fox		OPERATIONS REVIEW BY: R. McGrath (Gas Constr.)		
AUTHOR:	APPROVED BY:	DATE APPROVED:	VOLUME: 2 (Section 7.0), 10, and Yellow Book	PAGE 1
Mark Baldovin	Tomas Hernandez Chief Engineer Gas Distribution Engineering	12/7/17	Construction Standards and O&M Manual	OF 14 PAGES



TITLE: HEAT FUSION JOINING OF POLYETHYLENE (PE) PLASTIC PIPE/TUBING AND FITTINGS FOR GAS MAINS AND SERVICES

1.0 **SCOPE**

This specification details the requirements for heat fusion joining of polyethylene (PE) plastic pipe, tubing, and molded fittings for gas mains and services by butt fusion and branch saddle fusion.

See Gas Specification [IP-27](#), "Installation of Electrofusion Fittings on Polyethylene (PE) Plastic Pipe/Tubing and Molded Fittings Using a Universal Electrofusion Processor" for the requirements to join PE plastic pipe, tubing, and molded fittings by electrofusion.

See Gas Specification [IP-20](#), "Installation of Mechanical Fittings for Polyethylene (PE) Plastic Pipe and Tubing" for the requirements to join PE plastic pipe and tubing with mechanical fittings.

2.0 **LEGAL REQUIREMENTS**

Federal: 49 CFR Part 192, Sections 273, 281, 283, 285, and 287.

State: 16 NYCRR Part 255, Sections 273, 281, 283, 285, and 287.

National Safety Transportation Board (NTSB) Accident DCA14MP002, Safety Recommendations P-15-034 and P-15-035

3.0 **OPERATOR QUALIFICATION**

3.1 **Installers who tap an energized pipeline, weld steel, and join PE plastic pipe must be Operator Qualified.**

All other "covered tasks" shall be completed by either Operator Qualified individuals or individuals under the direct observation of one who is Operator Qualified. "Direct observation" means that the Operator Qualified individual remains in direct visual and verbal contact at all times with the individual performing the task.

3.2 **Installers who join PE plastic pipe/ tubing and fittings must be Operator Qualified **and** in compliance with the annual requalification requirements of Gas Specification [G-8121](#), "Qualification of Installers Joining Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services."**

A) All heat fusion joints must be fabricated in accordance with the fusion

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3.0 **OPERATOR QUALIFICATION** (Continued)

procedures outlined in this specification, the [Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#), and the manufacturers' operating manual for the approved heat fusion joining equipment. (See Sections 7.1 and 8.2)

- B) All electrofusion joints must be fabricated in accordance with the fusion procedures outlined in [IP-27](#), "Installation of Electrofusion Fittings on Polyethylene (PE) Plastic Pipe/ Tubing and Molded Fittings Using a Universal Electrofusion Processor."
- C) All mechanical joints must be fabricated in accordance with the installation procedures outlined in Gas Specification [IP-20](#), "Installation of Mechanical Fittings for Polyethylene (PE) Plastic Pipe and Tubing".

★ 3.3 Second Inspectors of PE Plastic Joints

- ★ A) Second inspectors who inspect PE plastic pipe joints (heat fusion, electrofusion, or with mechanical fittings) shall be Operator Qualified and in compliance with the annual requalification stipulated in Gas Specification [G-8121](#) **OR** Operator Qualified to visually inspect PE plastic joints (e.g. Covered Task 52 or equivalent) and current with 3 year requalification.

★ 4.0 **REQUIREMENTS FOR INSTALLERS AND SECOND INSPECTORS**

- ★ 4.1 All installers (Company, Contractor, Per Diem) of heat fusion joints on PE plastic pipe, tubing, and molded fittings shall identify the installer by marking the plastic pipe, tubing, or fittings adjacent to the heat fusion joint at 12 o'clock (or as close to 12 o'clock as is possible) with a **Company approved marker (e.g. PX-20 White Paint Marker (C/S # 024-7106) or Silver Sharpie).**
 - A) Company installers shall clearly print "J" for joiner **AND** their 5 digit employee number.
 - B) Contractor and Per Diem installers shall clearly print "J" for joiner **AND** their respective NGA Industrial Training Service (ITS) Operator Qualification identification number.
- ★ 4.2 After the heat fusion joints have cooled and solidified, the Operator Qualified

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★ 4.0 **REQUIREMENTS FOR INSTALLERS AND SECOND INSPECTORS** (Continued)

installer **and** the Operator Qualified second inspector shall visually inspect all heat fusion joints around the entire circumference of the joint and compare against visually acceptable butt fusion joints in the [NGA Plastic Pipe Joining Manual](#).

- A) Butt fusion joints should have uniform double fusion beads rolled over to the surface, be uniformly rounded, and consistent in size all around the joint. The PE plastic pipe, tubing, and fittings must be properly aligned (NOT angled or mitered).

NOTES:

When butt fusing to molded fittings, the fitting side bead may have an irregular appearance. This is acceptable provided the pipe side bead is correct.

This bead configuration DOES NOT apply to joints made with Dupont Aldyl A MDPE, Uponor Aldyl A MDPE or Phillips Driscopipe 7000 and 8000 HDPE.

- B) Branch saddle fusion joints should have a characteristic three (3) bead shape and all beads should be uniformly sized all around the fitting base. The first bead (fitting base melt bead) and the third or center bead (main pipe melt bead) should be about the same size all around the fitting base. The PE plastic pipe must be properly aligned.

- ★ 4.3 All second inspectors (Company, Contractor, Per Diem) of heat fusion joints on PE plastic pipe, tubing, and molded fittings shall identify the second inspector by marking the plastic pipe, tubing, or fittings adjacent to the heat fusion joint at 12 o'clock (or as close to 12 o'clock as is possible) with a **Company approved marker (e.g. PX-20 White Paint Marker (C/S # 024-7106) or Silver Sharpie).**

- A) Company second inspectors shall clearly print "P" for second inspector, CE (for Con Edison), **AND** their 5 digit employee number.
- B) Contractor and Per Diem second inspectors shall clearly print "P" for "Pass" **AND** their respective Learning Center Operator Qualification identification number (as noted on Con Edison Operator Qualification card) or NGA ITS Operator Qualification identification number.

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★ 4.0 **REQUIREMENTS FOR INSTALLERS AND SECOND INSPECTORS** (Continued)

- ★ 4.4 All PE plastic joints, joiners, and second inspectors shall be **marked and** documented as per DOJT [GAS6006](#), "Documentation and Inspection of Polyethylene (PE) Plastic Joints on Gas Mains and Services."

5.0 **QUALIFICATION OF HEAT FUSION JOINING PROCEDURES**

The heat fusion joining procedures outlined in this specification have been qualified in conjunction with:

- [TR-33](#), "Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe"
- [TR-41](#), "Generic Saddle Fusion Joining Procedure for Polyethylene Gas Piping," and
- the [NGA Plastic Pipe Joining Manual](#)
- [GT-14-048-1](#) Procedure for Qualifying Sidewall Plastic Pipe Joints
- [GT-14-048-3A](#) Procedure for Qualifying Manual Butt Fusion Plastic Pipe Joints
- [GT-14-048-3B](#) Procedure for Qualifying Hydraulic Butt Fusion Plastic Pipe Joints

6.0 **GENERAL GUIDELINES**

- 6.1 The preferred methods to join PE plastic pipe and tubing are heat fusion and electrofusion. (See Gas Specification [IP-27](#))

When heat fusion or electrofusion is not practical or available, only approved restraining-type mechanical fittings shall be installed on PE plastic pipe and tubing per Gas Specification [IP-20](#). All steel mechanical fittings shall be cathodically protected per Gas Specification [G-8209](#), "Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures."

- 6.2 All approved manual and hydraulic heat fusion joining equipment are for Dura-Line Polypipe GDB5, Performance Pipe 8300, JM Eagle UAC 3700, and ENDOT PE-100/PE-4710 high density PE pipe/tubing (PE 3408/4710).

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6.0 GENERAL GUIDELINES (Continued)

See [Operation of Fusion Equipment](#) for approved heat fusion joining equipment.

See Gas Specification [G-8104](#), "Polyethylene Pipe, Tubing, and Fittings for Gas Mains and Services" for approved PE plastic pipe, tubing, and fittings.

NOTES:	M8000 pipe was all black and replaced in 1997 with Performance Pipe 8100.
	Performance Pipe 6800 is black with two thick yellow stripes at three different points on the pipe's surface.
	Performance Pipe 8100 has a "yellow shell" around black pipe. This is the equivalent of Performance Pipe 8300 and JM Eagle (US Poly) UAC3700.
	Performance Pipe 8300 is black with one thick yellow stripe at four different points on the pipe's surface and print line indicates PE 100. This is the equivalent of Performance Pipe 8100 and JM Eagle (US Poly) UAC 3700.
	JM Eagle (US Poly) UAC3700 is black with one yellow stripe at three different points on the pipe's surface and the print line states PE100. This is the equivalent of Performance Pipe 8100 and 8300.
	ENDOT EN PE 4710 (Gas) is black with one thin yellow stripe at three different points on the pipe's surface. This equivalent to Performance Pipe 8300 and JM Eagle (US Poly) UAC 3700.
	Dura-Line Polypipe GDB50 is black with either one thin yellow stripe at three different points on the pipe's surface (similar to JM Eagle and ENDOT) or one yellow stripe at six different points on the pipe's surface.

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6.0 **GENERAL GUIDELINES** (Continued)

6.3 Inspect PE plastic pipe, tubing, and fittings prior to installation to verify:

- A) No cuts, gouges, deep scratches, or other defects.
- B) PE plastic material is high density polyethylene (HDPE), PE3408/4710, and manufactured per ASTM D2513.
- C) PE plastic material is NOT older than 10 years old.

(See Gas Specification [G-8122](#), "Transportation, Handling, and Storage of Polyethylene Plastic Pipe/Tubing, and Fittings for Gas Mains and Services")

6.4 Quality fusion requires using all of the required tools and equipment, and following all of the steps in the procedure in the correct sequence. Faulty fusion is caused by improper or defective equipment, or not following the procedure (omitting steps or performing steps out of sequence).

6.5 PE plastic molded fittings (without pup lengths) **can only** be joined to PE plastic pipe, tubing and other molded fittings by butt fusion, electrofusion, or MetFit fittings. (See Gas Specification [G-8104](#) for approved fittings with pup lengths of PE plastic pipe or tubing). (See [G-100,285](#) for approved MetFit fittings). With the exception of MetFit fittings, mechanical fittings **cannot** be installed directly onto a PE plastic molded fitting without pup lengths of pipe or tubing.

Install and inspect MetFit mechanical fittings as per manufacturer's procedures. Molded fittings shall **not** be altered in order to utilize MetFit fittings.

6.6 Heat fusion of PE plastic pipe, tubing, and fittings of different SDR wall thickness shall only be performed between **one change in SDR**.

SDR	7	↔	9/ 9.3	↔	11	↔	13.5	↔	15.5
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Joining of PE plastic pipe, tubing, and fittings with SDR wall thickness **greater than one change in SDR** shall be electrofused. Approved restraining-type mechanical couplings may only be used for joining PE plastic pipe and tubing when an electrofusion coupling is unavailable. See Gas Specifications [IP-20](#) and [G-8209](#).



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6.0 GENERAL GUIDELINES (Continued)

6.7 Table 1, **Approved Joining Methods for PE Plastic Pipe/Tubing** (Note: this table does not apply to valves and other fittings)

PE Plastic Pipe	SDR	Vintage	Distribution Pressure *	Heat Fusion	Electrofusion	Mechanical Joints
0.5" CTS	7	All	IP, MP, HP	YES	YES	YES, stiffener = 0.090" WT
1"-1.25" CTS		All	LP, IP, MP, HP (1" ≤ 89 psi) HP (1.25" ≤ 71 psi)	YES	YES	YES, stiffener = 0.090" WT
1" – 8", 12" IPS	11	All	LP, IP, MP, HP	YES	YES	YES, stiffener = black
1"-4" IPS	9.3	Pre-1990	LP, IP, MP, HP	YES	YES	YES, stiffener = blue
Up to 4"IPS Aldyl-A	9.3	1970's	LP, IP, MP, HP (≤ 80 psi)	NO	YES	NO
	26	2000's (Subcoil)	LP	NO	YES, reduce electrofusion cycle time by 15%	NO
6" IPS	23.5	1970's	LP, IP, MP	NO	YES, reduce electrofusion cycle time by 10%	YES, stiffener = orange
6" IPS	26	1970's	LP, IP, MP	NO	YES, reduce electrofusion cycle time by 15%	NO
6" IPS	26	ONLY as sleeve for Trenchless Technology	LP, IP, MP, HP	YES	YES	NO
6" IPS	32.5	1970's	LP, IP, MP	NO	YES, reduce electrofusion cycle time by 25%	NO
22.5" IPS Subline	23.5	2000's	HP	NO	YES, reduce electrofusion cycle time by 10%	NO

* LP = low pressure, IP = intermediate pressure, MP = medium pressure, HP = high pressure



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6.0 **GENERAL GUIDELINES** (Continued)

6.8 It is important that the pipe is clean and dry before installing in the fusion machine to avoid contaminating fusion machine parts that contact the pipe, such as the heating iron or the facer. If the heating iron or facer becomes contaminated, the contamination may be transferred back to the pipe, possibly compromising fusion joint quality.

- A) Clean the pipe outside diameter (OD), inside diameter (ID), and ends with a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687)

If the contamination cannot be removed in this way, wash the pipe with water and a clean, lint-free, non-synthetic cloth/paper towel to remove the contamination. Then rinse the pipe with water and dry thoroughly with a clean, lint-free, non-synthetic cloth/paper towel. **Do NOT use soap water (leak detection solution) to clean the pipe.**

- B) **Prior to installing the pipe in the fusion machine, the pipe shall be cleaned with 96% alcohol wipes** (Class/Stock # 689-3135 and 025-3724) **or 99.9% liquid isopropyl alcohol** (Class/Stock # 630-1246) **with a clean, lint-free, non-synthetic cloth/paper towel.** *Never use alcohol wipes after facing (for butt fusion) or after abrading with emery cloth (for branch saddle fusion).*

Wear nitrile gloves when using alcohol wipes. Wear nitrile gloves and goggles when using the liquid isopropyl alcohol with a clean, lint-free, non-synthetic cloth/paper towel. When using liquid isopropyl alcohol, place plastic sheeting and absorbent pads underneath the fitting. The used wipes/cloth/absorbent pads shall be disposed as non-hazardous industrial waste. Liquid isopropyl alcohol shall be disposed as flammable hazardous waste. Contact EH&S Operations for guidance when disposing liquid isopropyl alcohol.

- C) If the pipe becomes contaminated after being placed in the fusion machine, remove the pipe and clean per sections 6.8 A and B. **Do NOT use the facer to remove contamination.**

6.9 All scrap PE plastic pipe, tubing, and/or fittings that cannot be reused, shall be brought back to the workout location for proper disposal/ recycling.

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7.0 **BUTT FUSION JOINING GUIDELINES**

- 7.1 The Butt Fusion Joining Procedure in the [NGA Plastic Pipe Joining Manual](#) and the manufacturers' operating manual for the approved butt fusion joining equipment shall be followed.
- 7.2 See the [Operation of Fusion Equipment](#) for approved manual and hydraulic butt fusion joining equipment. See Appendix A of the [Operation of Fusion Equipment](#) for manufacturers' hydraulic fusion machine proper fusion pressures (hydraulic chart pressure + drag pressure).
- 7.3 PE plastic pipe shall not be joined by a field fabricated miter (angled) joint. Only use approved fabricated or molded fittings per Gas Specification [G-8104](#).
- 7.4 Whenever practical, no more than one length (40 feet) of PE plastic pipe (properly supported with rollers at 12' intervals) should be placed in the movable jaw of the fusion unit. If the first length (40') of PE plastic pipe is not properly supported **OR** if it becomes necessary to place more than one length of pipe in the movable jaw of the fusion unit, the hydraulic chart pressure must be increased by the **drag pressure** (force required to move the pipe once clamped in the machine) to compensate for the additional weight of the pipe material. A drag pressure of 30 psig was used to calculate the gauge pressures in the hydraulic chart pressures found in the Appendices of the [Operation of Fusion Equipment](#).

When fusing more than one length of PE plastic pipe in the moveable side of the carriage, the drag pressure above 30 psig must be added to the hydraulic chart pressure. **Use equations in the box below**

The measured drag pressure is determined by clamping the pipe into the movable jaw, placing the travel control lever in the closed position, and slowly increasing the hydraulic pressure until the pipe **just** begins to move. This pressure on the hydraulic gauge is the measured drag pressure.

Drag Pressure = Measured drag pressure – 30 psig

Proper Fusion Pressure = Hydraulic Chart Pressure + Drag Pressure

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7.0 BUTT FUSION JOINING GUIDELINES (Continued)

NOTE:

To minimize drag pressure when placing more than one 40' length of PE plastic pipe in the movable jaw, properly support the pipe at 12' intervals. If this is impractical (due to numerous lengths of plastic pipe extending from the movable jaw), then at approximately 60' back from the movable jaw, "droop" the plastic pipe between the rollers.

The amount of "droop" is determined by the distance the movable jaw has to travel to bring the pipe ends together for fusion. Therefore, the movable jaw will only have to drag (or pull) the 60 feet plus the "droop" of the pipe between the rollers, thereby minimizing drag pressure.

- 7.5 When making the final tie-in to existing PE plastic pipe in the ground, use electrofusion coupling(s) to make the final tie-in, rather than trying to butt fuse in the excavation to make the final connection.

8.0 BRANCH SADDLE FUSION INSTALLATION GUIDELINES

- 8.1 Branch saddle fusion shall **only** be performed by the Development Lab.
- 8.2 The Saddle Fusion Joining Procedure in the [NGA Plastic Pipe Joining Manual](#) and the manufacturers' operating manual for the approved branch saddle fusion joining equipment shall be followed.
- 8.3 See the [Operation of Fusion Equipment](#) for approved branch saddle fusion joining equipment. See Appendix B of the [Operation of Fusion Equipment](#) for manufacturers' proper branch saddle fusion melt and fusion pressures.

9.0 HEAT FUSION EQUIPMENT

- 9.1 All fusion equipment (i.e., butt and branch saddle fusion machines, heater irons/plates, electric facers, contact pyrometers, electrofusion processors) shall be inspected by the Gas Development Lab prior to initial use and prior to the inspection due date (once every 6 months). Otherwise, the fusion equipment shall not be used.

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9.0 **HEAT FUSION EQUIPMENT** (Continued)

EXCEPTION: Contact pyrometers are to be inspected once every 6 months, not to exceed a year.

- 9.2 Prior to performing heat fusion, the fusion equipment (i.e, fusion machines, heating tools, electric facers) shall be checked for damage and to verify they are in good working order. If any part of the fusion equipment is found to be damaged or defective, the equipment shall be not be used.
- 9.3 Heating tool surfaces (i.e. heater iron/adaptor plate) must be undamaged, clean, and at the correct surface temperature.
- A) Prior to heating (when the heating tool is cold), the surfaces of the heater iron/adaptor plates shall be **cleaned** to remove any plastic build-up or contaminants (e.g., dirt, grease).
1. To remove PE plastic pipe residue build-up on the heater iron/adaptor plate surface, clean with a non-abrasive scotch pad (Class/Stock # 023-2181) and then wipe with a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687).
 2. To remove other contaminants on the iron/adaptor, wipe the heater iron/adaptor plate surface with a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687).
- B) When the thermometer on the heating tool reaches approximately 425° F, use a Company approved contact pyrometer (e.g. Cooper Atkins AquaTuff) to verify the heating iron surface temperature is within 400° - 450°F. See HOT [GAS6027](#), "Use of Contact Pyrometers for Heat Fusion."
1. To adjust the heater iron/adaptor plate temperature, follow the manufacturers' guidelines for adjusting heater temperature. Allow the heater iron/adaptor plate to stabilize at the new temperature and recheck.
- 9.4 Heating irons and electric facers are **not** intrinsically safe and should not be used in a hazardous environment.
- 9.5 In order to prevent damage to the fusion equipment, it is important that the electrical power service and extension wires are properly sized for each unit.

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10.0 HEAT FUSION DURING COLD AND/OR INCLEMENT WEATHER

10.1 Heat fusion during cold and/or inclement weather is permitted provided the following are observed:

A) Temperatures below 40°F

1. The specified heating tool surface temperature shall be maintained. **Do NOT increase heating tool surface temperature.**
2. Store heating iron in thermally insulated protective box or bag.
3. Pipe and fittings should be about the same temperature when they are fused together.

B) During inclement weather (rain or snow)

1. Store heater iron in protective box.
2. The pipe must clean and dry before, during, and after heat (butt or branch saddle) fusion or electrofusion.
3. Approved fire resistant tents (Class/Stock # 689-3929, 10' x 8' or Class/Stock # 659-3945, 6' x 6') shall only be used to protect the PE plastic pipe at the point of joining during inclement weather and shall **not** be used when there is escaping gas. **Gas must be allowed to rise and vent unobstructed.**

★ **11.0 RECORDS**

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.

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12.0 **REFERENCES**

- ASTM F2620-13 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
- DOJT [GAS6006](#) Documentation and Inspection of Polyethylene (PE) Plastic Joints on Gas Mains and Services
- HOT [GAS6027](#) Use of Contact Pyrometers for Heat Fusion
- [G-8104](#) Polyethylene Pipe, Tubing and Fittings for Gas Mains and Services
- [G-8121](#) Qualification of Installers Joining Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services
- [G-8122](#) Inspection, Handling, Storage, and Transportation of Polyethylene (PE) Plastic Pipe, Tubing, and Fittings for Gas Mains and Services
- [G-8209](#) Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures
- [IP-20](#) Installation of Mechanical Fittings for Polyethylene (PE) Plastic Pipe and Tubing
- [IP-27](#) Installation of Electrofusion Fittings on Polyethylene (PE) Plastic Pipe/Tubing and Molded Fittings Using a Universal Electrofusion Processor
- [Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#)
- [Con Edison Operation of Fusion Equipment](#)
- [TR-33](#) Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe (Plastic Pipe Institute, 2012)
- [TR-41](#) Generic Saddle Fusion Joining Procedure for Polyethylene Gas Piping (Plastic Pipe Institute, 2002)
- [GT-14-048-1](#) Procedure for Qualifying Sidewall Plastic Pipe Joints
- [GT-14-048-3A](#) Procedure for Qualifying Manual Butt Fusion Plastic Pipe Joints
- [GT-14-048-3B](#) Procedure for Qualifying Hydraulic Butt Fusion Plastic Pipe Joints

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REVIEW CYCLE: 5 Years

SPECIFICATION: G-8129-9a

TITLE: PURGING GAS MAINS, SERVICES AND
REGULATOR STATIONS

VOLUME: 2 (Section 8.0), 10

★ **COURSE ID:** [GAS0150](#)

★ **CORE GROUP(S):** Gas Construction and Emergency
Response Force Lead Mechanic

TARGET AUDIENCE: Gas Construction, Emergency Response
Force (ERF), Gas Transmission
Engineering, Pressure Control, Per Diem,
Gas Contractors, Construction, and
Emergency Response Force Lead
Mechanic

REV 9a: Incorporated Records Retention Section 11.0; renumbered subsequent sections. Reformatted cover page and footer to align with current specification standard and format. Changed “Registration No.” to “Course ID”; “Target Training Groups” to “Target Audience”; and added “Core Group(s)”. Added “Emergency Response Force Lead Mechanic” to Target Audience. (4/9/18)

REVISIONS:

This specification has been revised to incorporate comments made by GTI’s technical experts and Con Edison’s subject matter experts.



Gas Operations Standards

TITLE: PURGING GAS MAINS, SERVICES AND REGULATOR STATIONS

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ENVIRONMENTAL, HEALTH & SAFETY REVIEW BY: James Fox

PREPARED BY:	APPROVED BY:	DATE APPROVED:	VOLUME: 2 (Section 8.0) and 10	PAGE 1
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TITLE: PURGING GAS MAINS, SERVICES AND REGULATOR STATIONS

1.0 SCOPE

This specification covers the requirements for purging operations for gas mains, services and regulator stations.

See Gas Specification [IP-9](#), "Requirements for Written Procedures and Contingency Plans" for inert purge barrier requirements for welded tie-ins or torch cutting metallic mains.

2.0 LEGAL REQUIREMENTS

Federal: 49 CFR Part 192, Section 629.

State: 16 NYCRR Part 255, Section 629.

3.0 OPERATOR QUALIFICATION

Installers who tap an energized pipeline, weld steel, and join Polyethylene (PE) plastic pipe by butt fusion, branch saddle fusion, electrofusion, or with mechanical fittings must be Operator Qualified.

All other "covered tasks," including purging operations, shall be completed by either Operator Qualified individuals or individuals under the direct observation of one who is Operator Qualified. "Direct observation" means that the Operator Qualified individual remains in direct visual and verbal contact at all times with the individual performing the task.

NOTE: Company Chemists may take natural gas readings using a calibrated combustible gas indicator under the direct observation of an Operator Qualified individual.

4.0 ENVIRONMENT, HEALTH, AND SAFETY (EHS) REQUIREMENTS

4.1 Refer to Gas Specification [IP-42](#), "Requirements for Airline Respirator (ALR), Flame Retardant Coveralls (FRC), Harness and Line (H&L) and Harness and Gantry" for all personal protective equipment (PPE) requirements when purging gas mains, services and regulator stations.

4.2 Prior to purging, ensure that the piping to be purged is dry as per [GEHSI E06.11](#) "Liquids and Solids from Natural Gas Mains during Main Cut-Outs."



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4.0 **ENVIRONMENT, HEALTH, AND SAFETY (EHS) REQUIREMENTS** (Continued)

- 4.3 When nitrogen is used to purge a pipe into or out of service, atmospheric testing for oxygen deficiency shall be performed in excavations prior to and during occupation by any personnel.

5.0 **GENERAL REQUIREMENTS**

- 5.1 Purging is the act of removing the content of a gas pipe or equipment and replacing with another gas.
- A) When a gas main, service, or regulator station is taken out of service or abandoned, it must be purged out of service. (See Section 8.0)
 - B) When a gas main, service, or regulator station is replaced, reactivated, or installed, it must be purged into service. (See Section 9.0)
- 5.2 Purging by completely filling the gas main or service requires, at a minimum, the amount of air/inerts equal to 1.25 times the internal volume of the pipe segment being purged. Purging is complete when the requirements of Sections 8.3, 9.2, and 10.0 are achieved.
- A) 4" and smaller diameter mains and services **may be** purged out of service and into service using only air.
 - B) 6" and larger diameter mains and services **shall be** purged out of service and into service with inerts. (See Section 7.0)

NOTE: Purging an additional 25%-50% volume of inerts as a safety margin ensures that the pipe is void of flammable mixture

- 5.3 Purging shall be designed so that the flow path of the purge gas (inert or air) is direct from the point of injection to the vent location.
- 5.4 When purging PE **plastic** mains or services:
- A) Assure that the pressure in the PE plastic main or service does not exceed 200 psig.
 - B) Bulk N₂ in liquid form shall not be used.



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5.0 **GENERAL REQUIREMENTS** (Continued)

- 5.5 Whenever practical, consideration should be given to not releasing natural gas to the atmosphere (e.g. use of no-blow tools, natural gas recovery trailer).

6.0 **PURGE EQUIPMENT AND PURGE PIPE REQUIREMENTS**

- 6.1 Prior to thermit welding, the excavation and banks of the excavation shall be checked for gas readings.
- 6.2 Purging equipment and purge pipes shall be electrically bonded or grounded to the main/service, as required.
- 6.3 **Purging Equipment**
- A) *For metallic pipe*, the purging equipment shall be electrically bonded to the pipe (being purged) in order to dissipate static charges. Metal tubing or metallically reinforced rubber hose is sufficient. If unreinforced rubber hose is used, an electrical bond shall be made between the cylinder(s) and the main using a bonding wire *not thinner* than #14 AWG (e.g. #19 AWG is thinner than #14 AWG and shall not be used). The bonding wire shall be attached by thermit weld, clamp or magnetic connectors. The *preferred* connection of the bonding wire to the purging equipment (cylinders) is a magnetic connection.
- B) *For plastic pipe*, the purging equipment shall be electrically bonded to the ground in order to dissipate static charges. The plastic pipe to be purged shall also be electrically bonded to the ground by using the ASG ground (Class/Stock # 025-2569) or by placing soapy wet (and keep rags wet) rags around the pipe at the inlet and outlet, making sure that the soapy wet rags touch the soil.
- 6.4 **Purge Pipes**
- A) *Metallic purge pipes* **not threaded directly** into the metallic main must be electrically bonded to the main prior to purging, using a bonding wire *not thinner* than #14 AWG (e.g. #19 AWG is thinner than #14 AWG and shall not be used). The bonding wire shall be attached by thermit weld, clamp or magnetic connectors. Metallic purge pipes attached to plastic tapping tees for plastic mains must be grounded.



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6.0 PURGE EQUIPMENT AND PURGE PIPE REQUIREMENTS (Continued)

- B) *For plastic purge pipes*, the entire surface area of the plastic purge pipe shall be wet with soapy water and the plastic purge pipe inlet and outlet shall be grounded by using the ASG ground (C/S# 025-2569) or by wrapping the inlet and outlet with soapy wet (and keep rags wet) rags, making sure that the soapy wet rags touch the soil.

NOTE: The outlet of a plastic purge pipe must be metallic.

- C) All purge pipes must extend a **minimum** of 6' above street grade.

7.0 APPROVED INERT MATERIALS

- 7.1 The inert gas approved for use is commercial grade nitrogen gas (N₂).

NOTE: Liquid nitrogen changes to gaseous nitrogen at minus 320 degrees Fahrenheit and is unacceptable unless approved in advance, in writing by Gas Transmission Engineering – Major Projects. This written approval is predicated on the contractor supplying all information on the heat exchanger to be used and also the minimum temperature of the nitrogen gas at the outlet of the heat exchanger.

- 7.2 Bulk deliveries of nitrogen for purging metallic mains shall be checked by the company Chemist prior to use.

- 7.3 Cylinders of nitrogen shall be properly marked as to their contents.

- A) Full N₂ Cylinder = 225 cubic feet @ 2200 psig

- 7.4 To calculate the minimum amount of inerts needed when purging by completely filling the gas main or service (see Section 5.2):

Volume of inerts (ft³) = (0.0082 x d² x L) + safety margin (25-50%)

d = diameter of pipe, in inches

L = length of pipe, in feet



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7.0 APPROVED INERT MATERIALS (Continued)

Table 1: Inert Amounts

**Pipe Size and Minimum Amount of Inerts Needed
When Purging by Completely Filling Line**

Nominal Pipe Size	Volume (ft ³) of Inerts Per 100 ft
6"	30 cubic feet
8"	55 cubic feet
10"	80 cubic feet
12"	120 cubic feet
16"	210 cubic feet
18"	260 cubic feet
20"	330 cubic feet
24"	470 cubic feet
30"	740 cubic feet
36"	1060 cubic feet

7.4 Table 1: Inert Amounts (Continued)

For example: A 160 foot long section of 12" main/service needs to be inerted.

$$\begin{aligned}\text{Minimum Volume of Inerts (ft}^3\text{)} &= (0.0082 \times d^2 \times L) + \text{safety margin} \\ &= (0.0082 \times (12)^2 \times 160) + \text{safety margin} \\ &= (0.0082 \times 144 \times 160) + \text{safety margin} \\ &= (188 \text{ ft}^3 \text{ of inerts}) + \text{safety margin} \\ &= 188 \text{ ft}^3 + \text{safety margin} \\ &= 188 \text{ ft}^3 + (0.25 \times 188 \text{ ft}^3) \\ \text{Minimum Volume of Inerts} &= 188 \text{ ft}^3 + 47 \text{ ft}^3 = 235 \text{ ft}^3\end{aligned}$$

8.0 PURGING A GAS MAIN OR SERVICE OUT OF SERVICE

8.1 Purging a gas main or service out of service is replacing the natural gas with

- air (pipe less than or equal to 4" diameter) or
- inerts (pipe greater than 4" diameter). (See Section 7.0)



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8.0 **PURGING A GAS MAIN OR SERVICE OUT OF SERVICE** (Continued)

- 8.2 All services shall be purged to outside the building.
- 8.3 Purging is complete when a reading of *less than* 3% natural gas is obtained using a calibrated combustible gas indicator (e.g. GMI FR2).at the purge vent.
- 8.4 All gas pipe(s) to be taken out of service (abandoned) shall be physically disconnected from all sources of gas and the open ends sealed.
- 8.5 If the gas pipe (main or service) is purged with inerts, the pipe shall then be purged with air **when** either the gas pipe is to be used as a sleeve or abandoned in place. This is done to ensure that personnel are not exposed to nitrogen when working on a sleeve or abandoned pipe.
- 8.6 Each abandoned vault must be filled with a suitable compacted material.
- 8.7 For each abandoned pipeline facility that crosses over, under or through a commercially navigable waterway, the last operator of that facility shall file a report upon abandonment of that facility in accordance with 49 CFR 192.727(g).

9.0 **PURGING A GAS MAIN OR SERVICE INTO SERVICE**

- 9.1 Purging a gas main or service into service (gassing in) is the task of replacing air with:
- natural gas (pipe less than or equal to 4" diameter) or
 - inerts (pipe greater than 4" diameter) (see Section 7.0) and then replacing the inerts with natural gas.
- 9.2 Purging into service (gassing in) is complete when a reading of 100% natural gas is obtained using a calibrated combustible gas indicator (e.g. GMI FR2) at the purge vent.
- 9.3 Inerts left in the main or service shall be maintained at approximately 3 psig upon completion of inerting or pressure drop test until tie-in operations are ready to commence.



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10.0 **PURGING GAS REGULATOR STATIONS**

10.1 Purging a gas regulator station out of service is replacing the natural gas with

- air (pipe less than or equal to 4" diameter) or
 - inerts (pipe greater than 4" diameter). (See Section 7.0)
- A) Street inlet and outlet valves must be closed and purge equipment and purge pipes installed.
- B) Check inlet and outlet valves for leakage prior to starting the purge. If valves leak, station piping may require physical disconnection from the gas distribution system.
- C) The use of a non-combustible Coppus blower to exhaust any residual gas to atmosphere is acceptable when a bubble tight (100%) shut down of a regulator station is required and cannot be attained through a station inlet or outlet valve.

10.2 Purging a regulator station out of service is complete when a reading of less than 3% natural gas is obtained using a calibrated combustible gas indicator.

10.3 Torch cutting or welding methods shall only be utilized when the regulator station has been purged down to 0% (verified using a calibrated combustible gas indicator) and an inert barrier is installed per the requirements in Gas Specification [IP-9](#).

10.4 Purging a regulator into service is complete when a reading of 100% natural gas is attained using a calibrated combustible gas indicator at the purge vent.

★ 11.0 **RECORDS RETENTION**

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.



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12.0 REFERENCES

- [G-8005](#) General Specification for the Installation of Gas Distribution Mains
- [G-8100](#) General Specification for the Installation of Gas Distribution Services
- [IP-7](#) Cut-Outs and Tie-Ins of Existing Gas Mains
- [IP-9](#) Requirements for Written Procedures and Contingency Plans
- [IP-42](#) Requirements for Airline Respirator (ALR), Flame Retardant Coveralls (FRC), Harness and Line (H&L) and Harness and Gantry

[GEHSI E06.11](#) Liquids and Solids from Natural Gas Mains During Main Cut-Outs

[American Gas Association's "Purging Principles and Practice" Third Edition, June, 2001](#)

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SPECIFICATION: G-8204-8c

TITLE: PRESSURE TESTING REQUIREMENTS FOR GAS MAINS AND SERVICES

★ **VOLUME: 2 (Section 8.0), 10, & Yellow Book**

★ **COURSE ID: GAS0219**

★ **CORE GROUP(S): Gas Construction and Emergency Response Force Lead Mechanic**

★ **TARGET AUDIENCE: Gas Construction, Emergency Response, Force (ERF), Gas Transmission Engineering, Gas Distribution Engineering, Per Diem, Gas Contractors, Construction and Emergency Response Force Lead Mechanic**

REV 8c (4/2518):

- Section 12.1(c), 12.2 (c), and 12.3(b): Revised both statements to reference CI-870-1.

REV 8b (4/9/18):

- Cover Page: Added Emergency Response Force Lead Mechanic to Core Group(s) and Target Audience
- Section 12.4: Added Records Retention reference.

REV 8a (12/18/17):

- Cover Page: Added to Yellow Book; Changed Registration No. to Course ID; Added Core Group(s) designation; Changed Target Training Groups to Target Audience.
 - Section 2.0: Added Case 14-G-0201 and 14-G-0212 to Legal Requirements.
 - Section 6.8: Added new section to General Procedures for clarity.
 - Sections 9.1, 9.2, 9.3 and 9.4: Clarified documentation requirements.
 - Appendix C: Updated the As-Constructed Emergency Sketch sample form.
-

REVISIONS (See ★):

- 1) Table of Contents - Section 7.0 (previous Section 8.0) renamed.
- 2) Section 6.5 - New section; renumbered subsequent sections. Removed previous section 6.5 (duplicate of Section 5.3).



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(Continued)

- | | | |
|-----|---------------------|--|
| 3) | Section 7.0 | - Revised title of section. |
| 4) | Section 8.0 | - Added new section, contents previously located in 7.7 - 7.9. |
| 5) | Sections 8.1 | - A(1), B(2), C(2), D(2), and D(3) reworded for clarity. Added class and stock # of 2 psig test gauge to C(2) and D(1). Added alternate requirements for PE insertions greater than 1000 feet and less than or equal to 1500 feet. |
| 6) | Section 8.2(B) | - Reworded for clarity. |
| 7) | Sections 8.3 | - Revised section. |
| 8) | Section 8.4 | - New section. |
| 9) | Section 8.5 | - Revised section to include test pressures for Cured-in-Place liners. |
| 10) | Section 10.3 (NOTE) | - Reworded for clarity. |
| 11) | Section 12.0 | - Revised record keeping requirements for pressure testing distribution services, distribution mains, and transmission mains/services. |
| 12) | Section 13.0 | - Added CI-870-1 and PSC Case 03-G-1507. |
| 13) | Section 14.0 | - Added Appendix C. |
| 14) | Appendix A | - Revised to add alternate requirements for PE insertions greater than 1000' and less than or equal to 1500 '. |
| 15) | Appendix C | - Added as new attachment. |



Gas Operations Standards

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EH&S REVIEW BY: J. Fox				
AUTHOR:	APPROVED BY:	DATE APPROVED:	VOLUME: 2 (Section 8.0), 10, & Yellow Book	PAGE 1
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TITLE: PRESSURE TESTING REQUIREMENTS FOR GAS MAINS AND SERVICES

1.0 SCOPE

This specification details the requirements for pressure testing new/replacement gas mains and new/replacement and temporarily disconnected gas services, including cured-in-place liners.

★ 2.0 LEGAL REQUIREMENTS

Federal: 49 CFR Part 192, Sections 501-517, 725.

State: 16 NYCRR Part 255, Sections 503-517, 725,

Case 14-G-0201 and 14-G-0212

PSC Order dated 6/29/83 and PSC Correspondence dated 10/20/93 and 3/2/95
(Requirement that 10% of all pressure tests be randomly witnessed by a Company Supervisor)

3.0 DEFINITIONS

3.1 Distribution Pressure Main/Service – a gas main or service operating at less than (<) 125 psig

- A) Low Pressure (LP) - Pressure up to and including (\leq) 12" water column (WC)
- B) Intermediate Pressure (IP)/Ossining System - Pressure greater than (>) 1 psig and up to and including (\leq) 5 psig.
- C) Medium Pressure (MP) - Pressure greater than (>) 2 psig and up to and including (\leq) 15 psig.
- D) High Pressure (HP) - Pressure greater than (>) 15 psig and up to but less than (<) 125 psig.

3.2 Transmission Pressure Main/Service – a gas main or service operating at or more than (\geq) 125 psig.

4.0 OPERATOR QUALIFICATION

4.1 Installers who tap an energized pipeline, weld steel, and join PE plastic pipe by butt fusion, branch saddle fusion, electrofusion, or with mechanical fittings must be Operator Qualified.

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4.0 OPERATOR QUALIFICATION (Continued)

All individuals preparing for or performing a main/service pressure test shall be Operator Qualified (or under the direction and observation of one who is qualified) to perform the "covered task" of pressure testing.

5.0 ENVIRONMENT, HEALTH, & SAFETY (EHS) REQUIREMENTS

- 5.1 See Gas Specifications [G-8005](#), "General Specification for the Installation of Gas Distribution Mains" and [G-8100](#), "General Specification for the Installation of Gas Distribution Services" for all distribution main and service EH&S requirements.
- 5.2 All pressure testing shall be performed with due diligence for the safety of Company employees, gas contractors, the general public, and public property.
- 5.3 All Company personnel, Per Diem, and Gas Contractors shall remain outside the excavation while the pressure test is initiated, except for personnel who are directly responsible for initiating the pressure test. Once the test pressure is reached, all personnel directly responsible for initiating the pressure test shall exit and remain outside the excavation.

6.0 GENERAL REQUIREMENTS

- 6.1 The minimum test pressure (after stabilization) for distribution pressure mains and services (see Section 3.1) shall be as follows:
 - A) 90 psig for LP, IP, and MP
 - B) 150 psig for HP
- 6.2 The source of the pressure shall be isolated and the proper pressure stabilized before the required duration of the pressure test can commence.
- 6.3 When testing with air or nitrogen, after the test pressure is reached and stabilized for at least 15 minutes, all exposed fittings and joints shall be checked for leakage with a leak detecting solution.

For hydrostatic testing, all exposed facilities under test shall be visually inspected for leakage.

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6.0 **GENERAL REQUIREMENTS** (Continued)

6.4 Prior to pressure testing PE plastic pipe/tubing and fittings joined by heat fusion (e.g. butt fusion or saddle fusion) or electrofusion, the joints must be allowed sufficient time to properly cool. (See Gas Specification [G-8123](#), "Heat Fusion Joining of Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services")

★ 6.5 During the pressure test of PE plastic pipe/tubing and fittings, the temperature of the PE material may not be more than 100°F.

6.6 If any pressure test does not indicate a sound, gas-tight piping system, corrective measures shall be taken to eliminate potential testing errors, and then another pressure test shall be conducted.

NOTE: If a main or service pressure test fails at any production PE plastic joint made by butt fusion, branch saddle fusion, electrofusion, or with mechanical fittings, the joiner is immediately disqualified from that method of joining PE plastic pipe. (See Gas Specification [G-8121](#), "Qualification of Installers Joining Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services")

6.7 Gas mains or services where the flow of gas is interrupted (but not physically disconnected) due to water main breaks, contractor damage to a main (not service), human error or some other unplanned work do **not** require a pressure test prior to reinstating the flow of gas.

At a minimum, a leak survey (using a DPIR or similar sensitive equipment) of the affected gas mains and services shall be performed and documented after reinstating the flow of gas. The respective Gas Operations organization should review the cause and extent of the outage as well as the number and age of gas services affected to determine if additional leak surveys are to be performed.

★ 6.8 The test medium must be relatively free of sedimentary materials.

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★ 7.0 **APPROVED END CLOSURES FOR PRESSURE TESTING DISTRIBUTION MAINS/SERVICES**

7.1 Approved End Closures for Pressure Testing Steel Distribution Mains/Services

- A) Welded line (end) cap: all sizes.
- B) Blind flange: all sizes.
- C) Threaded line (end) cap: only sizes up to and including 4".
- D) Restraining type compression line (end) cap: ¾" through 12", except for 10".
- E) Non-restraining type compression line (end) cap: all sizes.

7.2 Approved End Closures for Pressure Testing Polyethylene (PE) Plastic Distribution Mains/Services

- A) Fused PE plastic end cap: all IPS sizes.
- B) Service head or stab end adapter with stiffener and with an end closure (threaded end cap or valve): sizes up to and including 2" IPS.
- C) Met-Fit, LycoFit, or Perfection caps: sizes up to and including 1 ¼" CTS.
- D) McElroy Test Caps: sizes up to and including 2" IPS.
- E) Restraining type compression end cap: IPS sizes up to and including 12", except for 10".

7.3 Approved End Closures for Pressure Testing Copper Distribution Services

- A) Restraining type compression end cap (IPS size) with gasket adapter for CTS: sizes 1" and 1 ¼".
- B) Service head or stab end adapter (for copper only) with an end closure (threaded end cap or valve): sizes up to 1 ¼" CTS.
- C) Restraining type compression coupling (for copper to IPS), with a PE plastic pipe and compression line (end) cap. The coupling is not restraining on the copper size.

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★ 7.0 APPROVED END CLOSURES FOR PRESSURE TESTING DISTRIBUTION MAINS/SERVICES (Continued)

7.4 Compression Line (End) Caps

- A) All **restraining type** compression line (end) caps **shall be braced** to prevent movement or pullout during the pressure test. See Gas Specification [G-8153](#), “Reinforcing Compression Fittings.”

NOTE: The reuse of a **restraining type compression line** (end) cap is permissible, provided that the cap is inspected for wear, tear, and damage **before each reuse**. The cap shall be replaced if there are any worn/damaged parts (e.g. gasket, grip ring, back up ring, bolts, etc.).

- B) For 90 psig pressure test, **non-restraining type** compression line (end) caps shall be secured as follows:
- 1) Line cap sizes $\frac{3}{4}$ " to 2" shall be **braced**.
 - 2) Line cap sizes 3" to 30" and greater shall be **reinforced per Gas** Drawing [EO-16031-B](#), “Reinforcement of Non-Restraining Type Compression Line Caps on 3" to 30" Dia. Steel Gas Mains and Services.”
- C) For 150 psig pressure test, **non-restraining type** compression line (end) caps shall be secured as follows:
- 1) Line cap sizes $\frac{3}{4}$ " to 1 $\frac{1}{4}$ " shall be **braced**.
 - 2) Line cap sizes 1 $\frac{1}{2}$ " and greater shall be **reinforced** per Gas Drawing [EO-16031-B](#).
- D) See Gas Specifications [G-8153](#) and [G-100,285](#), “Compression End Couplings, Tees, Elbows, Line Caps, and Riser Tees for Gas Pipe and Tubing” for approved compression couplings, caps, and fittings.

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★ 7.0 APPROVED END CLOSURES FOR PRESSURE TESTING DISTRIBUTION MAINS/SERVICES (Continued)

7.5 Compression Fittings

- A) Exposed **non-restraining type** compression fittings (couplings, tees, elbows, and riser tees) to be included in a pressure test shall first **be reinforced** per Gas Drawing [EO-16880-B](#), "Reinforcement of Non-Restraining Compression Couplings for 2" to 24" Dia. Mains."
- B) Exposed **restraining type** compression fittings do not require reinforcement.
- C) When Company M&S plates or layouts indicate that **buried (non-exposed) non-restraining type** compression fittings will be included in a pressure test, the embedment calculation shall be performed to determine if reinforcement is required. See Gas Specification [G-8153](#).

★ 8.0 PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/SERVICES

★ 8.1 Distribution Mains

A) Tie-in Joint/Weld

- ★ 1) Each tie-in joint (e.g. mechanical coupling, electrofusion coupling) or weld used to tie-in a tested segment of distribution main shall be given a leakage test (i.e., soap tested) at operating pressure when placed into service.

B) New and Replacement Sections of Steel or PE Plastic Main Less than or Equal to (≤) 1000'

- 1) The test medium shall be air or an inert gas. Water shall be used only when directed by Gas Transmission Engineering or Gas Distribution Engineering.
- ★ 2) The test pressure must be maintained at or above the test pressure for at least one (1) hour after stabilization. A calibrated pressure gauge that will indicate two (2) psig increments or less shall be used for testing (Class & Stock #459-7050). (See Section 6.1)

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★ 8.0 PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/SERVICES (Continued)

C) New and Replacement Sections of Steel or PE Plastic Main Greater Than (>) 1000'

- 1) The test medium shall be air or an inert gas. Water shall be used only when directed by Gas Transmission Engineering or Gas Distribution Engineering.
- ★ 2) The test pressure must be maintained at or above the test pressure for at least two (2) hours after stabilization. A calibrated pressure gauge that will indicate two (2) psig increments or less shall be used for testing (Class & Stock #459-7050). (See Section 6.1)

D) PE Plastic Main Insertions

- ★ 1) A calibrated pressure gauge that will indicate two (2) psig increments or less shall be used for testing (Class & Stock #459-7050). (See Section 6.1)
- ★ 2) For insertions 1000' or less, the test pressure must be maintained at or above the test pressure for a minimum of one (1) hour. (See Section 6.1)

Alternatively, the test duration may be **30 minutes prior to insertion**, followed by a **30 minute test after insertion** and a visible inspection of the PE plastic pipe for damage (i.e., gauges, scrapes, dents) per Gas Specification [G-8005](#).

- ★ 3) For insertions greater than (>) 1000', the test pressure must be maintained at or above the test pressure for a minimum of two (2) hours. (See Section 6.1)

Alternatively, for insertions greater than (>) 1000' and ≤ 1500' the test duration may be **1 ½ hours prior to insertion**, followed by a **30 minute test after insertion** and a visible inspection of the PE plastic pipe for damage (i.e., gauges, scrapes, dents) per Gas Specification [G-8005](#).

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★ 8.0 PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/SERVICES (Continued)

- 4) All "aboveground" pressure testing shall be performed with "extra due diligence" to secure the pipe during the pressure test for the safety of employees, contractors, and the general public.

"Aboveground" pressure tests shall be limited to less than or equal to (\leq) 4" diameter PE plastic pipe (straight and coiled).

"Aboveground" pressure tests on greater than or equal to (\geq) 6" diameter PE plastic pipe (straight and coiled) must be reviewed and approved by Gas Distribution Engineering.

8.2 New, Replacement, and Temporarily Disconnected Distribution Services

- A) The test medium shall be air or inert gas. The test indicator must be such that any loss of pressure can be readily detected.
- ★ B) The test pressure must be maintained at or above the test pressure for the following minimum times. (See Section 6.1)
- 1) 2" diameter and smaller - **15 minutes**
 - 2) Greater than 2" diameter - **30 minutes**
- C) The limits of the pressure test shall be as follows. The service connection to the main need not be included in these tests if it is not feasible to do so. However, it must be given a leakage test (i.e., soap tested) at operating pressure and documented as part of the pressure test when placed into service (See Section 12.0).
- 1) New and replacement services:
 - a) Inside meter/meter-regulator
From the main to the first fitting inside the wall of the customer's structure through which the service enters.
 - b) Outside meter/meter-regulator
From the main to the meter riser valve, if any, or the first fitting on the riser upstream of the regulator where one is installed; or

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TITLE: PRESSURE TESTING REQUIREMENTS FOR GAS MAINS AND SERVICES

★ 8.0 PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/SERVICES

(Continued)

- c) Inside meter with an outside regulator
From the main to the first fitting on the riser upstream of the regulator.
- 2) Temporarily disconnected services:
 - a) Inside meter/meter-regulator
From the point of disconnection to the first fitting inside the wall of the customer's structure through which the service enters.
 - b) Outside meter/meter-regulator
From the point of disconnection to the meter riser valve, if any, or the first fitting on the riser upstream of the regulator where one is installed.
 - c) Inside meter with an outside regulator
From the point of disconnection to the first fitting on the riser upstream of the regulator.
- 3) Removal/replacement/installation of first fitting inside the wall of the customer's structure (e.g. service head valve)
 - a) Inside meter/meter-regulator
From the point of gas isolation (e.g. curb valve, squeeze-off location) to the new first fitting inside the wall of the customer's structure through which the service enters.
 - b) Inside meter with an outside regulator
From the point of gas isolation (e.g. curb valve, squeeze-off location) to the new first fitting inside the wall of the customer's structure through which the service enters.

NOTE: If provisions are made to maintain continuous service (e.g. installation of a bypass), any part of the original service line used to maintain continuous service need **not** be tested.

- D) Steel services temporarily disconnected shall be maintained or replaced per Gas Specification [G-8149](#), "Responsibility for Maintenance and Replacement of Gas Services."

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★ 8.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/SERVICES** (Continued)

★ 8.3 **PE Plastic and Welded Metallic Tapping Fittings**

The test pressure for PE plastic heat fusion or electrofusion fittings (i.e., electrofusion tapping tees, SPA saddles) or welded metallic fittings used for stopper, purge, and bypass connections must be maintained at or above the following test pressures for a minimum of 15 minutes prior to drilling and/or tapping:

- 1) 90 psig for LP, IP and MP.
- 2) 150 psig for HP.

★ 8.4 **Mechanical Metallic Tapping Fittings**

The test pressure for metallic reinforcement tapping sleeves (e.g. Style 50, Style 80, green sleeve) must be maintained at or above the following test pressures for a minimum of 15 minutes prior to drilling and/or tapping:

- 1) 5 psig for LP
- 2) 20 psig for IP and MP.
- 3) 150 psig for HP.

NOTE: Threaded service connections at the main must be given a leakage test at the operating pressure when placed in service (ie, soap test).

★ 8.5 **Cured-In-Place (CIP) Liners**

A) The test pressure for cast iron or steel mains and services with Cured-In-Place (CIP) liners must be maintained at or above the following test pressures for a minimum of two (2) hours:

- 1) 10 psig for LP.
- 2) 90 psig for IP and MP.
- 3) 150 psig for HP.

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★ 8.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/SERVICES** (Continued)

- B) For pressure testing mains/ services with cured in place liners, all buried non-restraining compression couplings or joints must be reinforced per Gas Specification [G-8153](#). Reinforcement welding on pipe or couplings shall be completed prior to insertion of the CIP liner. If impractical to reinforce the compression couplings or joints, **the end of the pipe must be anchored or braced to prevent movement or pullout during the pressure test.** Contact Gas Distribution Engineering to design the required anchoring or blocking the ends of the pipe.

9.0 **WITNESS REQUIREMENTS FOR PRESSURE TESTING DISTRIBUTION MAINS/ SERVICES**

- ★ 9.1 Pressure tests performed by Company crews and Per Diem on all **distribution mains (10" diameter and less) and services** shall be witnessed and documented (including employee name and number or ITS number) by any of the following:
- A) Company management employee (e.g. Gas Operations Gas Supervisor, Gas Planner, Construction Management Chief Construction Inspector, Project Specialist, Construction Services Supervisor)
 - B) Company Operator Qualified (OQ) Gas Mechanic
 - C) Per Diem OQ Gas Mechanic
- ★ 9.2 A Company management employee must witness and document (including employee name and number or ITS number) at least **fifty percent (50%)** of all pressure tests on distribution services performed by Company crews, Per Diem, and Gas Contractors managed by Gas Operations. This fifty percent (50%) shall be randomly selected without prior notification to the person performing the actual construction and gassing-in of the service line.
- ★ 9.3 Pressure tests performed by Company crews and Per Diem on all **distribution mains 12" and larger** shall be witnessed and documented (including employee name and number or ITS number) by a Company Operator Qualified (OQ) management employee.

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9.0 WITNESS REQUIREMENTS FOR PRESSURE TESTING DISTRIBUTION MAINS/ SERVICES (Continued)

- ★ 9.4 Pressure tests performed by all OQ Gas Contractors on all **distribution mains and services** shall be witnessed and documented (including employee name and number or ITS number) as follows:
- A) Distribution Services (all sizes)
 - 1) Company management employee, Construction Representative (CR), or Company Construction Inspector (CI) shall witness and document **at least fifty percent (50%)** of all OQ Gas Contractor performed pressure tests on services. (See Section 8.2)
 - 2) The **remaining fifty percent (50%)** shall be witnessed and documented by an OQ Gas Contractor Mechanic
 - B) Distribution Mains (10" and smaller)
 - 1) Company management employee, CR, CI, or CCI shall witness and document **one hundred percent (100%)** of OQ Gas Contractor performed pressure tests on distribution mains 10" and less in diameter.
 - C) Distribution Mains (12" and larger)
 - 1) Company Operator Qualified (OQ) management employee shall witness and document **one hundred percent (100%)** of OQ Gas Contractor performed pressure test on mains 12" and larger in diameter.

10.0 PRESSURE TESTING REQUIREMENTS FOR TRANSMISSION MAINS/SERVICES

10.1 Notification

At least five (5) business days prior to starting the pressure test, Gas Transmission Engineering shall notify the Gas and Water Division of the Department of Public Service (PSC). In order to maintain continuity of service during emergencies, shorter notice is permissible. Pressure tests are not considered satisfactory, unless certified by a designated PSC inspector.

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10.0 PRESSURE TESTING REQUIREMENTS FOR TRANSMISSION MAINS/SERVICES (Continued)

10.2 The test medium shall be water.

The discharge of water from a hydrostatic pressure test (process or industrial wastewater) to publicly owned sewer systems is regulated. Refer to [CEHSP E02.04](#), "Wastewater Discharges to Publicly Owned Sewer Systems or On-Site Septic Disposal Systems" for the requirements for proper discharge of this wastewater. A pig, sphere, or similar equipment shall be used to remove any remaining water from the tested pipe, where practical, and shall be disposed of in the proper manner. Contact EHS Operations for assistance.

Note: Elevation variations can significantly impact pressure tests with water and shall be taken into consideration (See Section 12.3 (A) (6)).

- ★ 10.3 Each segment of a new/replaced steel transmission main/service must be strength tested in accordance with this section to substantiate the proposed MAOP.

NOTE: The section of pipe to be used for the "tie-in piece" shall have been previously strength tested in accordance with this section.

The "tie-in welds" shall be given a leakage test at the operating pressure when placed in service (ie, soap test).

10.4 The minimum test pressure shall be 1 ½ times the maximum allowable operating pressure (MAOP).

10.5 Test Duration (after pressure stabilization)

- A) 12 hours
- B) 4 hours for a short length of pipeline (100 feet or less), which has not been backfilled and where, throughout its entire length, its entire circumference can be readily examined visually for the detection of leaks.

NOTE: Contact the PSC for concurrence to perform a 4 hour test for exposed lengths greater than 100 feet.

- C) 2 hours for transmission service lines 2" diameter and smaller.

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10.0 PRESSURE TESTING REQUIREMENTS FOR TRANSMISSION MAINS/SERVICES (Continued)

10.6 A calibrated recording pressure gauge with increments of 5 psig or less, and a dead-weight tester shall be used. Dead-weight tester readings shall be taken at least hourly for the first and last two hours of the test. Calibrated pressure, temperature (pipe and ambient), and dead-weight tester readings shall be recorded per Section 12.3.

11.0 WITNESS REQUIREMENTS FOR PRESSURE TESTING TRANSMISSION MAINS/SERVICES

An engineer from Gas Transmission Engineering must witness and document (including employee number and his/her signature) the results of all pressure tests performed on **transmission mains/ services**. An inspector from the PSC shall also certify the satisfactory completion of the pressure test. (See Section 10.1)

12.0 RECORDS AND RETENTION

12.1 Distribution Services

- A) A record of **distribution service** pressure tests shall be made and shall contain at least all of the following information:
- ★ 1) Name and employee number of Company Operator Qualified gas mechanic, or name and ITS # of Operator Qualified gas contractor mechanic performing the pressure test.
 - ★ 2) Name and employee number of Company employee, or name and ITS # of gas contractor mechanic who witnesses the pressure test (as required per Section 9.0).
 - 3) Test medium used
 - 4) Test pressure
 - 5) Test duration
 - 6) Location and date of test

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12.0 RECORDS AND RETENTION (Continued)

12.1 Distribution Services (Continued)

- ★ 7) Length, diameter, material, and line pressure (e.g. LP, IP, MP, or HP) of the service tested
- 8) Limits of the service pressure test indicating if the service connection to the main was included in the pressure test. (See Section 8.2.C)
- ★ B) Pressure test results for installed, replaced, inserted, or reconnected **distribution services** shall be recorded on the "As-Constructed/Emergency Sketch" drawing.
- ★ C) The respective Area Gas Operations organization where the distribution service is installed shall retain the pressure test records for distribution services **in accordance with CI-870-1**.

★ 12.2 Distribution Mains

- A) A record of **distribution main** pressure tests shall be made and shall contain at least all of the following information:
 - 1) Name and employee number of Company Operator Qualified gas mechanic, or name and ITS # of Operator Qualified gas contractor mechanic performing the pressure test.
 - 2) Name and employee number of Company employee, or name and ITS # of gas contractor mechanic who witnesses the pressure test (as required per Section 9.0).
 - 3) Test medium used
 - 4) Test pressure
 - 5) Test duration
 - 6) Pressure recording charts, or other record of pressure readings (e.g. "As-Constructed/Emergency Sketch")
 - 7) Elevation variations, whenever significant for the particular test

NOTE: Pressure tests with air or inert gas are not impacted by elevation variations. (See Section 12.3(A)(7))

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12.0 **RECORDS AND RETENTION** (Continued)

★ 12.2 Distribution Mains (Continued)

- 8) Location and date of test
 - 9) Length, diameter, material, and line pressure (e.g. LP, IP, MP, or HP) of the main tested
 - 10) Leaks and failures notes and their disposition.
- B) Pressure test results for installed, replaced, inserted, or reconnected **distribution mains** shall be recorded on the "As-Constructed/ Emergency Sketch" drawing.
- C) The respective Area Gas Operations organization where the distribution main is installed shall retain the pressure test records **in accordance with CI-870-1**.

★ 12.3 Transmission Mains/Services

- A) A record of **transmission main/services** pressure tests shall be made and shall contain at least all of the following information:
- 1) Name and employee number of employee performing the pressure test (e.g. Pressure Control mechanic) and the name of any test company used
 - 2) Name and employee number of Engineer from Gas Transmission Engineering who witnesses the pressure test (as required per Section 11.0).
 - 3) Test medium used
 - 4) Test pressure
 - 5) Test duration
 - 6) Pressure recording charts, or other record of pressure readings (e.g. temperature (pipe and ambient) chart, and pressure/temperature table).
 - 7) Elevation variations, whenever significant for the particular test

NOTE: Pressure tests with water can be significantly impacted by elevation variations (See Section 10.2).

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12.0 **RECORDS AND RETENTION** (Continued)

★ 12.3 Transmission Mains/Services (Continued)

- 8) Location and date of test
 - 9) Length, diameter, material of the main tested
 - 10) Leaks and failures notes and their disposition.
- B) Gas Transmission Engineering shall retain the transmission mains/services pressure test records as per CI-870-1 "[Records Management](#)".

12.4 Records Management

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.

★ 13.0 **REFERENCES**

CI-870-1	Records Management
G-8005	General Specification for the Installation of Gas Distribution Mains
G-8100	General Specification for the Installation of Gas Services
G-8121	Qualifications of Installers Joining Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services
G-8123	Heat Fusion Joining of Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services
G-8149	Responsibility for Maintenance and Replacement of Gas Services
G-8153	Reinforcing Buried Compression Fittings
G-8218	Gas Transmission Records Management and Retention

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★ 13.0 **REFERENCES** (Continued)

[G-100,285](#) Compression End Couplings, Tees, Elbows, Line Caps, and Riser Tees for Gas Pipe and Tubing

[CEHSP E02.04](#) Wastewater Discharges To Publicly Owned Sewer Systems or On-Site Septic Disposal Systems

PSC Case 15686, order dated 6/29/83 and issued 7/11/83 – Order directing Con Edison to revise its construction standards to require a Company Supervisor to witness and endorse the record of each service line pressure test.

PSC Case 03-G-1507, order dated 5/14/04 and issued 6/3/04 – Order granting New York members of the Northeast Gas Association a waiver of the requirements of 16 NYCRR 255.756 and 255.757 to conduct a pilot program to allow limited application of cured-in-place (CIP) cast iron pipe liners in lieu of replacement of sections of cast iron mains affected by excavation activities

[PHMSA 49 CFR Part 192, Sections 513 Interpretation Letter dated September 16, 1992.](#)

PSC Case 94-G-0650, AVP Mr. V. Richard Conforti letter dated 10/20/93 to the Honorable John J. Kelliher, Secretary, State of New York, Public Service Commission (Letter petitions relief from 100% service witness by Company Supervisor)

PSC Recommendation at the Session of 2/22/95. Issued and effective 3/2/95
Recommendation reduces 100% service pressure test witness by Company Supervisor to 10% random witness.

In January, 2003, Construction Management Best Practices Committee recommended the pressure test witnessing be increased as discussed in Section 9.0.

ASME B31.8 (2014)

★ 14.0 **ATTACHMENTS**

[APPENDIX A](#) Pressure Testing Requirements

[APPENDIX B](#) Witness Requirements for Pressure Testing

[APPENDIX C](#) Sample “As-Constructed/Emergency Sketch”



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★ APPENDIX A
Pressure Testing Requirements for New and Replacement Steel and Direct Buried PE Plastic Distribution Mains

MATERIAL	LENGTH	TEST METHOD	TEST PRESSURE	PRESSURE DURATION
				(after stabilization)
Steel & PE Plastic Mains	Tie-In Section	Soap test all joints/welds used at tie-in locations (e.g. welds, mechanical couplings & electrofusion couplings) when placed into service	Line Pressure	N/A
Steel & PE Plastic Mains	≤ 1000'	Pressure test with air or inert gas	90 psig for LP, IP, & MP 150 psig for HP *	One (1) hour
Steel & PE Plastic Mains	> 1000'	Pressure test with air or inert gas	90 psig for LP, IP, & MP 150 psig for HP *	Two (2) hours

Pressure Testing Requirements for New and Replacement PE Plastic Distribution Main Insertion

MATERIAL	LENGTH	TEST METHOD	TEST PRESSURE	PRESSURE DURATION
				(after stabilization)
PE Plastic Main Insertion	Tie-In Section	Soap test all joints/welds used at tie-in locations (e.g. welds, mechanical couplings & electrofusion couplings)	Line Pressure	N/A
PE Plastic Main Insertion	≤ 1000'	Pressure test with air or inert gas	90 psig for LP, IP, & MP 150 psig for HP *	One (1) hour OR 30 minutes prior to insertion AND 30 minutes after insertion
★ PE Plastic Main Insertion	> 1000' to ≤ 1500'	Pressure test with air or inert gas	90 psig for LP, IP, & MP 150 psig for HP *	Two (2) hours OR 1 ½ hours prior to insertion AND 30 minutes after insertion
★ PE Plastic Main Insertion	> 1500'	Pressure test with air or inert gas	90 psig for LP, IP, & MP 150 psig for HP *	Two (2) hours

Pressure Testing Requirements for New, Replacement, and Temporarily Disconnected Distribution Services

MATERIAL	Service Size	TEST METHOD	TEST PRESSURE	PRESSURE DURATION
				(after stabilization)
PE Plastic or Steel	≤ 2"	Pressure test with air or inert gas	90 psig for LP, IP, & MP 150 psig for HP *	15 minutes
Copper	≤ 2"	Pressure test with air or inert gas	90 psig for LP, IP, & MP *	15 minutes
PE Plastic or Steel	> 2"	Pressure test with air or inert gas	90 psig for LP, IP, & MP 150 psig for HP *	30 minutes
At line pressure, soap test service connection to main.				

* LP = low pressure, IP = intermediate pressure, MP = medium pressure, HP = high pressure

APPENDIX B

Witness Requirements for Pressure Testing Distribution Main/Services


PRESSURE TEST PERFORMED BY	SERVICES	MAINS ≤ 10"	MAINS ≥ 12"
Company Personnel	≥ 50% random witness by Company management Remainder by Company OQ Gas Mechanic	100% by Company management <u>OR</u> Company OQ Gas Mechanic	100% by Company OQ management
Per Diem	≥ 50% random witness by Company management Remainder by Per Diem OQ Gas Mechanic	100% by Company management <u>OR</u> Per Diem OQ Gas Mechanic	100% by Company OQ management
Gas Contractors Managed by Gas Ops	≥ 50% random witness by Company management Remainder by Contractor OQ Gas Mechanic	100% by Company management	100% by Company OQ management
Gas Contractors Managed by Construction Management	≥ 50% random witness by Company CR, CI, <u>OR</u> management Remainder by Contractor OQ Gas Mechanic	100% by Company CR, CI, <u>OR</u> management	100% by Company OQ management

OQ = Operator Qualified, CR = Construction Representative, CI = Construction Inspector

★ APPENDIX C


Sample "As-Constructed/Emergency Sketch" Form

Click on the following hyperlink for the latest [As-Constructed Emergency Sketch](#) forms.



AS-CONSTRUCTED/ EMERGENCY SKETCH

☐ WORK IN PROGRESS
☐ FINAL SKETCH

M&S PLATE: 

TICKET/ LEAK #: _____

LOCATION: _____

LAYOUT #: _____

	PURGE & ABANDON	INSTALLATION	PRESSURE TEST
GAS MAIN	MATERIAL _____ LENGTH _____ SIZE _____ COVER _____ YEAR _____ <input type="checkbox"/> N2 OR <input type="checkbox"/> AIR END CAP LOCATION 1 _____ END CAP LOCATION 2 _____	<input type="checkbox"/> LP <input type="checkbox"/> IP <input type="checkbox"/> MP <input type="checkbox"/> HP METHOD _____ LENGTH _____ MATERIAL _____ COVER _____ SIZE _____ PITCH _____ BUDG/REGISTER # _____ ALSO SUPPLIES _____ <input type="checkbox"/> LP <input type="checkbox"/> IP <input type="checkbox"/> MP <input type="checkbox"/> HP METHOD _____ MATERIAL _____ SIZE _____ POE LOCATION _____ VALVE LOCATION _____ MAIN CONNECTION _____	DATE _____ <input type="checkbox"/> N2 OR <input type="checkbox"/> AIR TEST PRESSURE* _____ PERFORMED BY (NAME & EMP#/ITS #) _____ WITNESSED BY (NAME & EMP#/ITS #) _____ DURATION IN HOURS* <input type="checkbox"/> 1 (<1000') <input type="checkbox"/> 2 (>1000') DESCRIPTION & DISPOSITION OF LEAK &/OR FAILURE: _____
GAS SERVICE	MATERIAL _____ LENGTH _____ SIZE _____ COVER _____ YEAR _____ <input type="checkbox"/> N2 OR <input type="checkbox"/> AIR	<input type="checkbox"/> LP <input type="checkbox"/> IP <input type="checkbox"/> MP <input type="checkbox"/> HP METHOD _____ MATERIAL _____ SIZE _____ POE LOCATION _____ VALVE LOCATION _____ MAIN CONNECTION _____	DATE _____ <input type="checkbox"/> N2 OR <input type="checkbox"/> AIR TEST PRESSURE* _____ PERFORMED BY (NAME & EMP#/ITS #) _____ WITNESSED BY (NAME & EMP#/ITS #) _____ DURATION IN MINUTES* <input type="checkbox"/> 15 (<2") <input type="checkbox"/> 30 (>2") MAINT O-SERVICE CONNECTION INCLUDED IN TEST? <input type="checkbox"/> YES <input type="checkbox"/> NO (SOAP TESTED AT LINE PRESSURE)
NOTES:			
*FOR CURED-IN-PLACE LINERS (CIP): DURATION = 2 HOURS TEST PRESSURE <input type="checkbox"/> 10 PSIG (LP) <input type="checkbox"/> 80 PSIG (IP/MP) <input type="checkbox"/> 150 PSIG (HP)			
CONSTRUCTING ORGANIZATION: _____ EMP # /ITS # _____ DATE: _____			
ENERGIZING ORGANIZATION: _____ EMP # /ITS # _____ DATE: _____			

GAS DISTRIBUTION ENGINEERING 12/7/17



LAST REVIEW DATE:
11/27/12

REVIEW CYCLE:
5 Years

SPECIFICATION: **IP-20-6**

TITLE: **INSTALLATION OF MECHANICAL FITTINGS
FOR PLASTIC PIPE AND TUBING**

VOLUME: **2 (Section 4.0) and 10**

REGISTRATION NO: **GAS0099**

★ **TARGET TRAINING
GROUPS:** **Gas Construction, Emergency Response
Force (ERF), Gas Development Lab,
Construction Management, Per Diem, and
Other Gas Contractors**

REVISIONS: (See ★)

- 1) Target Training - Added Gas Development Lab.
- 2) Table of Contents - Renamed Section 6.0.
- 3) Section 2.0 - Revised references to Federal and State regulations.
- 4) Section 3.0 - Moved Sections 3.3 and 3.7 to Section 5.0. Moved Sections 3.4, 3.5, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, and 3.14 to Section 4.0.
- 5) Section 3.1 - New Section.
- 6) Section 3.2 - Previous Section 3.1; Reworded for clarity and added reference to G-8199.
- 7) Section 3.3 - Previous Section 3.2; Added manufacturer's installation guidelines.
- 8) Section 3.4 - Previous Section 3.6; Added reference to G-8209.
- 9) Section 4.1 - Combined Sections 4.1 and 4.2; Reworded for clarity.
- 10) Section 4.2 - Previous Section 3.8.
- 11) Section 4.3 - Previous Section 3.13; Reworded for clarity and added stab depth.

(Continued)

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|-----|--------------|--|
| 12) | Section 4.4 | - Previous Section 3.11; Added reference to G-100,291. |
| 13) | Section 4.5 | - Previous Section 3.12; Added color coding for SDR 11 and SDR 9.3 stiffeners; Added reference to G-100,291; Changed notes to numbers; Added electrofusion cycle time for SDR 23.5 and SDR 26 plastic pipe; Added C. |
| 14) | Section 4.6 | - Previous Section 3.4; Reworded for clarity. |
| 15) | Section 4.7 | - Previous Section 3.10, Reworded for clarity. |
| 16) | Section 4.8 | - Previous Section 3.14, Reworded for clarity. |
| 17) | Section 4.9 | - Previous Section 3.5; Removed pipe material and black marker; Revised responsible organization to maintain contractor 3 letter code listing to Gas EH&S. |
| 18) | Section 4.10 | - Previous Section 3.9; Reworded for clarity. |
| 19) | Section 5.0 | - Removed reference to obsolete listing of approved mechanical fittings on Outlook. |
| 20) | Section 5.1 | - Previous Section 3.3; Added Volume 6 gas specifications that include restraining-type mechanical fittings approved by the Development Lab. |
| 21) | Section 6.0 | - Renamed Section; Added G-8104. |



Gas Operations Standards

TITLE: INSTALLATION OF MECHANICAL FITTINGS FOR PLASTIC PIPE AND TUBING

EFFECTIVE DATE: December 27, 2012

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ENVIRONMENTAL REVIEW BY: N. Giraldi		SAFETY REVIEW BY: N. Giraldi		
PREPARED BY:	APPROVED BY:	DATE:	VOLUME: 2 (Section 4.0) and 10	PAGE 1
V. S. Weidemann	Tomas Hernandez Acting Chief Gas Distribution Engineer	11/27/12	Construction Standards, O&M Manual	OF 5 PAGES



TITLE: INSTALLATION OF MECHANICAL FITTINGS FOR PLASTIC PIPE AND TUBING

1.0 SCOPE

This specification details the requirements for the installation of approved mechanical fittings on plastic pipe and tubing.

★ 2.0 LEGAL REQUIREMENTS

This specification is in full compliance with the applicable sections of:

- Code of Federal Regulations Title 49, Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards"
- Official Compilation of Codes, Rules and Regulations of the State of New York (NYCRR) Public Service Part 255, "Transmission and Distribution of Gas"

3.0 GENERAL REQUIREMENTS

- ★ 3.1 The preferred methods to join plastic pipe and tubing are butt fusion and electrofusion. Mechanical fittings may be installed when butt fusion or electrofusion are not practical or available.
- ★ 3.2 Only installers Operator Qualified and in compliance with the 12 month requalification stipulated in Specification G-8199, "Qualification of Installers Who Join Plastic Pipe/Tubing with Mechanical Couplings/Fittings" shall join plastic pipe/tubing with mechanical fittings.

NOTE: An installer who is not Operator Qualified or out of compliance with the 12 month qualification **cannot** perform mechanical joining of plastic pipe/tubing and fittings, even if under the direction and observation of one who is qualified to perform mechanical joining of plastic pipe/tubing and fittings.

- ★ 3.3 The installation procedures outlined in this specification and the manufacturer's installation guidelines shall be followed during the qualification test for installers of plastic pipe/tubing.
- ★ 3.4 All steel mechanical fittings shall be cathodically protected per Specification G-8209, "Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures."

NOTE: If the backfilling of the steel fitting(s) is not performed the same day as the installation of the steel fitting(s), then the cathodic protection of the steel fitting(s) shall be rechecked prior to backfilling.



TITLE: INSTALLATION OF MECHANICAL FITTINGS FOR PLASTIC PIPE AND TUBING

★ 4.0 INSTALLATION REQUIREMENTS

- ★ 4.1 Each individual manufacturer's installation instruction is to be completely and thoroughly followed. All mechanical fittings are required to be "individually packaged" with the fitting's proper installation instructions included.
- ★ 4.2 The sealing area of the plastic pipe/tubing shall be free of any scratches, gouges, grooves, dirt, debris, or other foreign material.
- ★ 4.3 Ensure "measure and mark" for proper stab depth is performed when required by the manufacturer's installation instruction.
- ★ 4.4 For plastic tubing in CTS sizes, ensure that the stiffener(s) is marked 0.090. See Specification G-100, 291, "Adapters and Stiffeners" for approved rigid internal tubular stiffeners.
- ★ 4.5 For plastic pipe in IPS sizes, ensure that the SDR marked on the plastic pipe(s) corresponds to the SDR marking on the stiffener(s). See Specification G-100, 291, for approved rigid internal tubular stiffeners.
 - A) Plastic pipe in sizes 1" IPS through 8" IPS, and 12" IPS is SDR 11. The stiffener for SDR 11 is color coded black.
 - B) Prior to 1990, 4" and smaller IPS plastic pipe was SDR 9.3. The stiffener for SDR 9.3 is color coded blue.
 - C) In the 1970's, thin walled 6" IPS SDR 23.5 and SDR 26 plastic pipe was installed on the low pressure gas distribution system. **Do not butt fuse 6" IPS SDR 23.5 or SDR 26 plastic pipe.**
 - 6" IPS SDR 23.5 plastic pipe shall **only** be joined by either an electrofusion coupling or a mechanical restraining coupling with SDR 23.5 stiffener (color coded orange). Reduce electrofusion cycle time by 10%.
 - 6" IPS SDR 26 plastic pipe shall **only** be joined by an electrofusion coupling. Reduce electrofusion cycle time by 15%.

EXCEPTION: 6" IPS SDR 26 installed as a sleeve for Trenchless Technology may be joined by either butt fusion or an electrofusion coupling.



TITLE: INSTALLATION OF MECHANICAL FITTINGS FOR PLASTIC PIPE AND TUBING

★ 4.0 **INSTALLATION REQUIREMENTS** (Continued)

- ★ 4.6 Mechanical fittings **cannot** be installed **directly** onto a plastic molded fitting without pup lengths of pipe or tubing. Plastic molded fittings (without pup lengths) **can only** be joined to plastic pipe, tubing and other molded fittings by butt fusion or electrofusion.
- ★ 4.7 Ensure that the proper chamfer tool is used for mechanical fittings that require the plastic pipe/tubing to be chamfered.
- ★ 4.8 A torque wrench is to be used when the manufacturer's installation instruction requires a specific torque (ft-lbs) to tighten the fitting.
- ★ 4.9 All installers (Company, Contractor, Per Diem) of mechanical fittings on plastic pipe or tubing shall identify the installer by marking the fitting itself or the plastic pipe/tubing adjacent to the fitting at "12 o'clock" (or as close to 12 o'clock as is possible) with a white marker (Class/Stock #024-7106). Company installers shall clearly print CE (for Con Edison) and their 5 digit employee number. Contractor and Per Diem installers shall clearly print their designated contractor 3 letter code (to identify the Contractor; e.g. HAL for Hallen) and their respective Learning Center training ID number. Gas EH&S will establish the designated contractor 3 letter code for new contractors upon approval of the contractor's Drug and Alcohol Plan. Gas EH&S will notify the Learning Center of any new designations and will maintain the listing of contractor 3 letter codes on Outlook.
- ★ 4.10 See Specification G-8100, "General Specification for the Installation of Gas Distribution Services," Appendices H-1 and H-2 for the installation requirements for molded threaded brass base service tee.

★ 5.0 **APPROVED MECHANICAL FITTINGS FOR PLASTIC PIPE/TUBING**

- ★ 5.1 Only restraining-type mechanical fittings approved by the Development Lab and included in the following Volume 6, Purchase and Test, specifications shall be installed on plastic pipe and tubing:
 - G-100,285, "Compression End Coupling ,Tees, Elbows, Line Caps and Riser Tees for Gas Pipe & Tubing"
 - G-100, 291, "Adapters and Stiffeners"
 - G- 8104, "Polyethylene Pipe, Tubing and Fittings for Gas Mains and Services"



**TITLE: INSTALLATION OF MECHANICAL
FITTINGS FOR PLASTIC PIPE AND TUBING**

★ 6.0 **REFERENCES**

- G- 8100 - General Specification for the Installation of Gas Distribution Services
- ★ G-8104 - Polyethylene Pipe, Tubing, and Fittings for Gas Mains and Services
- G-8153 - Reinforcing Compression Fittings
- G-8199 - Qualification of Installers Who Join Plastic Pipe/Tubing with Mechanical Couplings/Fittings
- G-8209 - Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures
- G-100,285 - Compression End Coupling ,Tees, Elbows, Line Caps, and Riser Tees for Gas Pipe & Tubing
- G-100,291 - Adapters and Stiffeners

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LAST REVIEW DATE:
8/31/15

REVIEW CYCLE:
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SPECIFICATION: **IP-27-5**

TITLE: **INSTALLATION OF ELECTROFUSION
FITTINGS ON PE PLASTIC PIPE/TUBING
AND MOLDED FITTINGS USING A
UNIVERSAL ELECTROFUSION
PROCESSOR**

VOLUME: **2 (Section 4.0) and 10**

REGISTRATION NO: **GAS0173**

**TARGET TRAINING
GROUPS:** **Gas Construction, Emergency Response
Force (ERF), Gas Development Lab,
Construction, Per Diem, and Gas
Contractors**

REVISIONS:

This specification has been revised to incorporate comments made by GTI's technical experts and Con Edison's subject matter experts.



Gas Operations Standards

TITLE: INSTALLATION OF ELECTROFUSION FITTINGS ON PE PLASTIC PIPE/TUBING AND MOLDED FITTINGS USING A UNIVERSAL ELECTROFUSION PROCESSOR

EFFECTIVE DATE: September 30, 2015

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PREPARED BY:	APPROVED BY:	DATE:	VOLUME:	PAGE 1 OF
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**TITLE: INSTALLATION OF ELECTROFUSION FITTINGS ON PE
PLASTIC PIPE/TUBING AND MOLDED FITTINGS USING
A UNIVERSAL ELECTROFUSION PROCESSOR**

1.0 SCOPE

This specification describes the requirements for the installation of approved electrofusion fittings on polyethylene (PE) plastic pipe, tubing, and molded fittings using a universal electrofusion processor.

See Gas Specification [G-8123](#), "Heat Fusion Joining of Polyethylene (PE) Plastic Pipe/Tubing and Fittings for Gas Mains and Services" for the requirements to join PE plastic pipe, tubing, and molded fittings by butt fusion and branch saddle fusion.

See Gas Specification [IP-20](#), "Installation of Mechanical Fittings for Plastic Pipe and Tubing" for the requirements to join PE plastic pipe and tubing with mechanical fittings.

2.0 LEGAL REQUIREMENTS

Federal: 49 CFR Part 192, Sections 273, 281, 283, 285, and 287.

State: 16 NYCRR Part 255, Sections 273, 281, 283, 285, and 287.

3.0 OPERATOR QUALIFICATION

3.1 Installers of PE Plastic Pipe

- A) Installers who tap an energized pipeline, weld steel, and join PE plastic pipe by heat fusion (butt fusion or branch saddle fusion), electrofusion, or with mechanical fittings shall be Operator Qualified.

All other "covered tasks" shall be completed by either Operator Qualified individuals or individuals under the direct observation of one who is Operator Qualified. "Direct observation" means that the Operator Qualified individual remains in direct visual and verbal contact at all times with the individual performing the task.

- B) Installers who join PE plastic pipe/tubing and fittings by heat fusion (butt fusion or branch saddle fusion) shall be Operator Qualified **and** in compliance with the annual requalification requirements of Gas Specification [G-8121](#), "Qualification of Installers Performing Heat Fusion or Electrofusion of Polyethylene Plastic Pipe/Tubing and Fittings for Gas Mains and Services."

All heat fusion joints must be fabricated in accordance with the fusion procedures outlined in Gas Specification [G-8123](#).



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3.0 OPERATOR QUALIFICATION (Continued)

- C) Installers who join PE plastic pipe/tubing and fittings by electrofusion shall be Operator Qualified **and** in compliance with the annual requalification requirements of Gas Specification [G-8121](#).

All electrofusion joints must be installed in accordance with the electrofusion procedures outlined in this specification, the [2015 Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#), and manufacturer's assembly instructions included with the electrofusion fitting.

- D) Installers who join PE plastic pipe/tubing with mechanical fittings, shall be Operator Qualified **and** in compliance with the annual requalification requirements of Gas Specification [G-8199](#), "Qualification of Installers Who Join Plastic Pipe/Tubing with Mechanical Fittings."

All mechanical joints must be installed in accordance with the installation procedures outlined in Gas Specification [IP-20](#).

3.2 Peer Inspectors of PE Plastic Joints

- A) Peer inspectors who inspect PE plastic pipe joints (heat fusion, electrofusion, or with mechanical fittings) shall be Operator Qualified and in compliance with the annual requalification stipulated in Gas Specifications [G-8199](#) and [G-8121](#) **OR** Operator Qualified to visually inspect PE plastic joints (e.g. CCM 0003, GAS6016) and current with 3 year requalification.
- B) Peer inspectors who are required to wear corrective lenses, must wear same to ensure proper inspection of PE plastic joints.

4.0 REQUIREMENTS FOR INSTALLERS AND PEER INSPECTORS

- 4.1 All installers (Company, Contractor, Per Diem) of heat fusion joints on PE plastic pipe, tubing, and molded fittings shall identify the installer by marking the plastic pipe, tubing, or fittings adjacent to the heat fusion joint at 12 o'clock (or as close to 12 o'clock as is possible) with a Company approved marker (e.g. Class/Stock # 024-7106).
- A) Company installers shall clearly print their 5 digit employee number and "J" for joiner.



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4.0 REQUIREMENTS FOR INSTALLERS AND PEER INSPECTORS (Continued)

- B) Contractor and Per Diem installers shall clearly print their respective Learning Center Operator Qualification identification number (as noted on Con Edison Operator Qualification card) **and** “J” for joiner.
- 4.2 Following completion of the electrofusion cycle, the Operator Qualified installer and the Operator Qualified peer inspector shall visually inspect the entire area of the electrofusion fitting and compare against visually acceptable electrofusion fittings in the [2015 Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#) and the manufacturers’ recommended appearance guidelines.
- A) The electrofusion fitting must closely resemble visually acceptable electrofusion fittings in the [2015 Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#) and the manufacturers’ recommended appearance guidelines. Misalignment, melt out, and exposed wire are unacceptable.
- B) If there is any reason to believe the electrofusion fitting is defective, it shall be removed and replaced.
- 4.3 All peer inspectors (Company, Contractor, Per Diem) of electrofusion fittings on PE plastic pipe, tubing, and molded fittings shall identify the inspector by marking the plastic pipe, tubing, or fittings adjacent to the electrofusion fitting at 12 o'clock (or as close to 12 o'clock as is possible) with a Company approved marker (e.g. Class/Stock # 024-7106).
- A) Company inspectors shall clearly print CE (for Con Edison), their 5 digit employee number **and** “P” for peer inspector.
- B) Contractor and Per Diem inspectors shall clearly print their respective Learning Center Operator Qualification identification number (as noted on Con Edison Operator Qualification card) **and** “P” for peer inspector.
- 4.4 All PE plastic joints, joiners, and peer inspectors shall be documented as per [GAS6006](#), “Documentation and Inspection of Polyethylene (PE) Plastic Joints on Gas Mains and Services.”



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5.0 GENERAL GUIDELINES

- 5.1 The preferred methods to join PE plastic pipe and tubing are heat fusion and electrofusion. (See Gas Specification [G-8123](#))

When heat fusion or electrofusion is not practical or available, only approved restraining-type mechanical fittings shall be installed on PE plastic pipe and tubing per Gas Specification [IP-20](#). All steel mechanical fittings shall be cathodically protected per Gas Specification [G-8209](#), "Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures."

- 5.2 All approved electrofusion fittings are for use with all legacy PE plastic pipe as well as currently approved high density PE 3408/4710 plastic pipe and tubing.

See Specification [G-8104](#), "Polyethylene Pipe, Tubing, and Fittings for Gas Mains and Services" for all approved PE plastic pipe, tubing, and fittings.

See the [GasHub](#) for manufacturer's installation instructions and approved electrofusion processors' operating manuals.

NOTES: **M8000** pipe was all black and replaced in 1997 with Performance Pipe 8100.

Performance Pipe 6800 is black with two thick yellow stripes at three different points on the pipe's surface.

Performance Pipe 8100 has a "yellow shell" around black pipe. This is the equivalent of Performance Pipe 8300 and JM Eagle (US Poly) UAC3700.

Performance Pipe 8300 is black with one thick yellow stripe at three different points on the pipe's surface. This is the equivalent of Performance Pipe 8100 and JM Eagle (US Poly) UAC 3700.

JM Eagle (US Poly) UAC3700 is black with one thin yellow stripe at three different points on the pipe's surface and the print line states PE100. This is the equivalent of Performance Pipe 8100 and 8300.

- 5.3 Quality fusion requires using all of the required tools and equipment, and following all of the steps in the procedure in the correct sequence. Faulty fusion is caused by improper or defective equipment, or not following the procedure (omitting steps or performing steps out of sequence).



**TITLE: INSTALLATION OF ELECTROFUSION FITTINGS ON PE
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5.0 GENERAL GUIDELINES (Continued)

- 5.4 Electrofusion fittings **must** be installed at least three (3) pipe diameters or 12", whichever is **greater**, from a squeeze-off point.
- 5.5 Inspect PE plastic pipe, tubing, and fittings prior to installation to verify:
- No cuts, gouges, deep scratches, or other defects.
 - PE plastic material is high density polyethylene (HDPE), PE3408/4710, and manufactured per ASTM D2513.
 - PE plastic material is NOT older than 2 years old.
- (See Gas Specification [G-8122](#), "Transportation, Handling, and Storage of Polyethylene Plastic Pipe/Tubing, and Fittings for Gas Mains and Services")
- 5.6 Before beginning the process to install an electrofusion fitting, ensure the pipe is clean and dry. Clean the pipe outside diameter (OD), inside diameter (ID), and ends with a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687).

If the contamination cannot be removed in this way, wash the pipe with water and a clean, lint-free, non-synthetic cloth/paper towel to remove the contamination. Then rinse the pipe with water and dry thoroughly with a clean, lint-free, non-synthetic cloth/paper towel. **Do NOT use soap water (leak detection solution) to clean the pipe.**

If the contamination still cannot be removed with water and a clean, lint-free, non-synthetic cloth/paper towel, then 96% alcohol wipes (Class/Stock # 689-3135 and 025-3724) or 99.9% liquid isopropyl alcohol (Class/Stock # 630-1246) with a clean, lint-free, non-synthetic cloth/paper towel (e.g. NS0209687) may be used to clean extremely dirty pipe or cutting oil.

Wear nitrile gloves when using alcohol wipes. Wear nitrile gloves and goggles when using the liquid isopropyl alcohol with a clean, lint-free, non-synthetic cloth/paper towel. When using liquid isopropyl alcohol, place plastic sheeting and absorbent pads underneath the fitting. The used wipes/cloth/absorbent pads shall be disposed as non-hazardous industrial waste. Liquid isopropyl alcohol shall be disposed as flammable hazardous waste. Contact EH&S Operations for guidance when disposing liquid isopropyl alcohol.



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5.0 GENERAL GUIDELINES (Continued)

- 5.7 All scrap PE plastic pipe, tubing, and/or fittings that cannot be reused, shall be brought back to the workout location for proper disposal/ recycling.

6.0 ELECTROFUSION COUPLING INSTALLATION GUIDELINES

- 6.1 When making the final tie-in to existing PE plastic pipe in an excavation, electrofusion coupling(s) should be used to make the final tie-in, rather than trying to butt fuse or use mechanical fittings in the excavation. Use of two (2) electrofusion couplings with a short length of plastic pipe will facilitate pipe lineup. If electrofusion fittings cannot be used due to a hazardous environment, mechanical fittings are permitted. (See Section 9.2)
- 6.2 Misaligned PE plastic pipe shall **not** be joined using electrofusion couplings, butt fusion, or mechanical fittings in order to prevent mechanical stress on the pipe and joint during and after the joining process. PE plastic pipe alignment in the field can be corrected prior to joining to other PE plastic, steel, or cast iron pipe in the following manner:
- A) For all pipe diameters, use approved molded fittings. (See Gas Specification [G-8104](#) for approved molded fittings)
- B) For smaller diameter pipe, and where practical for larger diameters, expose sufficient pipe at the tie-in point to take advantage of PE plastic pipe flexibility. (See Gas Specifications [G-8005](#), “General Specification for the Installation of Gas Distribution Mains” and [G-8100](#), “General Specification for the Installation of Gas Distribution Services for plastic pipe bending radii)
- 6.3 Plastic molded fittings without pup lengths **can only** be joined to PE plastic pipe, tubing and other molded fittings by heat fusion or electrofusion. (See Gas Specification [G-8104](#) for approved fittings with pup lengths of PE plastic pipe or tubing)

Mechanical fittings **cannot** be installed **directly** onto a plastic molded fitting without pup lengths of PE plastic pipe or tubing.



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6.0 ELECTROFUSION COUPLING INSTALLATION GUIDELINES (Continued)

- 6.4 Heat fusion of PE plastic pipe, tubing, and fittings of different SDR shall only be performed between **one change in SDR**. **SDR is found on the print line of the PE plastic pipe and tubing, or on the fitting label.**

SDR	7	↔	9/9.3	↔	11	↔	13.5	↔	15.5
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Joining of PE plastic pipe/fitting with SDR wall thickness **greater than one change in SDR** shall only be done using electrofusion. Approved restraining-type mechanical couplings may only be used for joining PE plastic pipe when an electrofusion coupling is unavailable. (See Gas Specifications [IP-20](#) and [G-8209](#))

- A) Plastic pipe in sizes 1" IPS through 8" IPS, and 12" IPS is SDR 11.
- B) Prior to 1990, 4" and smaller IPS plastic pipe was SDR 9.3.
- C) Medium density Aldyl-A PE plastic pipe (tan or green) shall only be joined by electrofusion.
- D) In the 1970's, thin walled 6" IPS SDR 23.5, SDR 26, and SDR 32.5 plastic pipe was installed on the low and medium pressure gas distribution systems. **Do not butt fuse 6" IPS SDR 23.5, SDR 26, or SDR 32.5 PE plastic pipe.**
- 6" IPS SDR 23.5 PE plastic pipe shall **only** be joined by either an electrofusion coupling or a mechanical restraining coupling with SDR 23.5 stiffener (color coded orange). Reduce electrofusion fusion time by 10% of the time displayed when the coupling is scanned.
 - 6" IPS SDR 26 or SDR 32.5 PE plastic pipe shall **only** be joined by an electrofusion coupling. For SDR 26, reduce electrofusion cycle time by 15%. For SDR 32.5, reduce electrofusion fusion time by 25% fusion time of the time displayed when the coupling is scanned.

EXCEPTION: 6" IPS SDR 26 installed as a sleeve for Trenchless Technology may be joined by either butt fusion or an electrofusion coupling.

- E) In the 2000's, thin walled 6" IPS SDR 23 or thinner Subcoil pipe was installed on the low pressure gas distribution system and 22.5" IPS SDR 23 Subline was installed on the high pressure gas distribution system. Do not heat fuse to Subcoil or Subline PE plastic pipe.



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6.0 ELECTROFUSION COUPLING INSTALLATION GUIDELINES (Continued)

- 6.5 The following installation guidelines detail the steps necessary to install an electrofusion coupling using a universal electrofusion processor and inspect the completed joint.

For detailed instructions on installing electrofusion couplings, refer to the manufacturer's assembly instructions included with the fitting and the [2015 Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#).

For detailed instructions on using the universal electrofusion processor, refer to the manufacturer's operating manual. (See Section 9.1)

- A) Inspect PE plastic pipe, tubing, and fittings for cuts, gouges, deep scratches or other defects prior to installation of electrofusion fittings. (See Gas Specification [G-8122](#))
- B) Keep electrofusion coupling in the plastic bag provided until needed to avoid accidental contamination.

Visually inspect the inside of the coupling for defects and then check the coupling for electrical continuity (e.g. fluke meter). If any defects are noted, or if there is no electrical continuity, the electrofusion coupling shall not be installed.

- C) **Cut the pipe ends to ensure a square**, even surface. Remove any burrs or shavings with a clean knife.
- D) **Check pipe for out-of-round.** Use a re-rounding clamp or other device to bring the pipe back to round.
- E) **Clean pipe ends and surface area to be scraped** by removing dirt, mud, and other debris with clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687). (See Section 5.6)
- F) **Measure and mark the pipe insertion depth** (half the length of the coupling). Marks should be approximately 1" outside the footprint of the fitting. Use only a Company approved marker (e.g. Class/Stock # 024-7106). Do not use keel or a lumber crayon to mark the PE plastic pipe.



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6.0 ELECTROFUSION COUPLING INSTALLATION GUIDELINES (Continued)

- G) **Scrape the marked area on the outside of the pipe to remove surface oxidation** using an approved scraping tool (e.g. universal scraper, spring loaded scraper, and half-moon scraper). **Do not** use a file or sandpaper.

Chamfer the pipe ends and bevel the outer edge more than the inner edge.

- H) Remove any debris from the inside of the pipe with a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687)
- I) Clean the scraped area of the pipe and the inside of the fitting with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) with 99.9% liquid isopropyl alcohol (Class/Stock #630-1246). Make sure pipe and fitting surfaces are completely dry before assembly.

(See Section 5.6 for EH&S requirements for protective gloves and alcohol disposal requirements)

Never clean electrofusion molded fittings with leak detection solution.

- J) **Remark the stab depth**, if required, by measuring half the length of the coupling and remark each pipe end.
- K) If the electrofusion fitting or the surface of the scraped pipe becomes contaminated with dirt, debris, water, finger marks or other foreign substances, clean again with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) with 99.9% liquid isopropyl alcohol (Class/Stock #630-1246). Make sure pipe and fitting surfaces are completely dry before assembly.

(See Section 5.6 for EH&S requirements for protective gloves and alcohol disposal requirements)

- L) **Install the coupling to the marked insertion depth on pipe.** PE plastic pipe and coupling should be kept clean, supported, and free of any external stresses.



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A UNIVERSAL ELECTROFUSION PROCESSOR**

6.0 ELECTROFUSION COUPLING INSTALLATION GUIDELINES (Continued)

If there is excessive resistance while sliding the coupling onto the pipe, use a re-rounding clamp or other device to bring the pipe back to round. Clean pipe as needed after removing the re-rounding clamp.

- M) Insert the plastic pipe into the opposite end of the coupling. Check both measurement marks for the proper stab depth when this is completed.

NOTE: If it is difficult to install the two pipe ends into the electrofusion coupling because of lack of movement that occurs with short pieces or larger pipe sizes, it may be necessary to slide one coupling completely onto one of the pipe ends, bring the two pipes together, then slide the coupling from the fully stabbed pipe back to the other until the proper insertion depth is reached on both pipes. For additional details on this technique, see Section 8.0.

- N) While maintaining the marked stab depth, keep the pipe secured from movement and the coupling supported during both the fusion and cooling cycles. Cooling time is noted as “CT” on the fitting label.
- O) Connect the universal electrofusion processor to an adequate AC power source. If using a generator, turn the generator on and allow it to run for 30 seconds before connecting the universal electrofusion processor. Turn on the universal electrofusion processor.
- P) Connect fusion plugs to the contact pins on the fitting.

NOTE: Couplings 12” and larger are bi-filament and each side of the coupling must be fused independently.



**TITLE: INSTALLATION OF ELECTROFUSION FITTINGS ON PE
PLASTIC PIPE/TUBING AND MOLDED FITTINGS USING
A UNIVERSAL ELECTROFUSION PROCESSOR**

6.0 **ELECTROFUSION COUPLING INSTALLATION GUIDELINES** (Continued)

16” electrofusion couplings require pre-heating each side of the coupling prior to the fusion cycle.

Seal the annular gap between the 16” coupling and the pipe with tape. If installing the coupling one side at a time, the annular gap can be sealed with tape or by securing the plastic bag around the coupling and the pipe. Connect the fusion plugs to the contact pins on the coupling and scan the pre-heating **(yellow)** barcode. On completion of the pre-heating cycle, allow 10 minutes to warm through. If annular gap is still not sealed, scan the pre-heating (yellow) barcode again. On completion of additional pre-heating cycle, allow 10 minutes to warm through.

Start the fusion process by scanning the coupling (white) barcode. Repeat the pre-heating and fusion process on the other side of the coupling.

- Q) Following the applicable universal electrofusion processor’s operating manual, scan the fitting barcode (verify the fitting information), and begin the fusion process. (See Section 6.4 for electrofusion to different SDR PE plastic pipe)
- R) Keep the pipe secured from movement and the coupling supported during both the fusion and cooling cycles. Do not handle, pressure test, or backfill the coupling until completion of the cooling cycle(s). Cooling time is noted as CT on the fitting label.
- S) Following completion of the fusion cycle, the entire area of the electrofusion joint shall be visually inspected by the Operator Qualified installer and by an Operator Qualified peer inspector. (See Section 4.2)
- T) Mark the designated installer and peer inspector identification next to the coupling. (See Sections 4.1 and 4.3)



**TITLE: INSTALLATION OF ELECTROFUSION FITTINGS ON PE
 PLASTIC PIPE/TUBING AND MOLDED FITTINGS USING
 A UNIVERSAL ELECTROFUSION PROCESSOR**

7.0 PE PLASTIC PIPE REPAIR GUIDELINES

- 7.1 Damaged PE pipe, sizes 3" to 16" IPS, may be repaired by an electrofusion repair patch installed by the Development Lab. Repair patches may be installed on live low pressure PE pipe that is damaged. Damaged elevated pressure (intermediate, medium, and high pressure) PE plastic pipe must have the flow of gas stopped prior to installation of the repair patch. (See Gas Specification [G-8178](#), "Shut-Off of Polyethylene Plastic Pipe/Tubing Used for Gas Mains and Services")
- 7.2 Damaged PE plastic pipe, sizes 1/2" CTS to 16" IPS, may be repaired by cutting out the damaged section of PE plastic pipe and installing a replacement piece of pipe with two electrofusion couplings.
- 7.3 The following installation guideline details the steps necessary to cut-out and replace a damaged section of PE plastic pipe with two electrofusion couplings using a universal electrofusion processor and to inspect the completed joints.

Electrofusion control units are not intrinsically safe and must not be used until the gas flow has been stopped.

For detailed instructions on installing electrofusion couplings, refer to the [2015 Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#) and the manufacturer's assembly instructions included with the fitting. For detailed instructions on using the universal electrofusion processor, refer to the manufacturer's operating manual. (See Section 9.1)

- A) For damaged PE plastic gas mains, safely stop off and control the flow of gas by operating an isolation valve or stop off using the approved methods in Gas Specification [G-8178](#).
- B) For damaged PE plastic gas services, safely stop-off and control the flow of gas by operating an isolation valve or stop-off using the approved methods in Gas Specification [G-8178](#). If feasible, replace the entire section of damaged service pipe (e.g., main to valve, valve to building).
- C) Cut-out and remove the damaged section of pipe per Gas Specifications [IP-40](#), "Cut-Outs and Tie-Ins of Existing Plastic or Plastic / Metallic Gas Mains" and [IP-9](#), "Requirements for Written Procedures and Contingency Plans." Be sure the pipe ends on the pipe are square and evenly cut. Remove any burrs or shavings from the pipe ends that may have developed during the cutting process.



**TITLE: INSTALLATION OF ELECTROFUSION FITTINGS ON PE
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7.0 PE PLASTIC PIPE REPAIR GUIDELINES (Continued)

- D) Measure the repair section of pipe to fit within 1/16 of the open section length.

For PE plastic gas main replacement, use pretested pipe or pressure test the replacement piece prior to installation. (See Gas Specification [G-8204](#), “Pressure Testing Requirements For New and Replacement Gas Mains and Services”)

- E) Clean the pipe ends inside and out with a dry, clean lint-free cloth to remove all dirt and contaminants.

- F) **Measure and mark the pipe insertion depth on the existing pipe and the repair segment** Marks should be approximately 1” outside the footprint of the fitting. Mark half the length of the coupling on the existing pipe ends and a full coupling length on **both** ends of the repair segment.

- G) **Follow the scraping procedure** in Section 7.5(G) for the existing pipe ends, and the ends of the repair segment.

- H) Once scraping is completed, use a clean knife to remove any burrs. Remove any debris from the inside of the pipe with a dry, clean lint-free cloth.

- I) Clean the scraped area of the pipe and the inside of the fitting with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) with 99.9% liquid isopropyl alcohol (Class/Stock #630-1246). Make sure pipe and fitting surfaces are completely dry before assembly.

(See Section 5.6 for EH&S requirements for protective gloves and alcohol disposal requirements)

- J) **Remark the stab depths** if needed at both tie-in points on the existing pipe, and the repair segment.



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PLASTIC PIPE/TUBING AND MOLDED FITTINGS USING
A UNIVERSAL ELECTROFUSION PROCESSOR**

7.0 PE PLASTIC PIPE REPAIR GUIDELINES (Continued)

- K) Keep electrofusion coupling in the plastic bag provided until needed to avoid accidental contamination.

Visually inspect the inside of the coupling for defects and then check the coupling for electrical continuity (e.g. fluke meter). If any defects are noted, or if there is no electrical continuity, the electrofusion coupling shall not be installed.

If the electrofusion coupling(s) or the surface of the scraped pipe becomes contaminated with dirt, debris, water, finger marks or other foreign substances, clean with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) with 99.9% liquid isopropyl alcohol (Class/Stock #630-1246) Make sure pipe and fitting surfaces are completely dry before assembly.

(See Section 5.6 for EH&S requirements for protective gloves and alcohol disposal requirements)

- L) For most gas main repairs, remove the center stops in both couplings. Slide each coupling onto the repair segment for the full length of the coupling. Place the repair segment between the two pipe ends, and slide both electrofusion EF couplings onto the existing pipe to the correct insertion depth.

For most service repairs where sufficient material is exposed, there is enough flexibility in the pipe/tubing to install electrofusion couplings without removing center stops.

If there is excessive resistance while sliding either coupling onto the pipe, use a re-rounding clamp or other device to bring the pipe back to round. Clean pipe as needed after removing the re-rounding clamp.

- M) Connect the universal electrofusion processor to an adequate AC power source. If using a generator, turn the generator on and allow it to run for 30 seconds before connecting the universal electrofusion processor. Turn on the universal electrofusion processor.
- N) Connect fusion plugs to the contact pins on the first coupling.

NOTE: Couplings 12" and larger are bi-filament and each side of the coupling must be fused independently.



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PLASTIC PIPE/TUBING AND MOLDED FITTINGS USING
A UNIVERSAL ELECTROFUSION PROCESSOR**

7.0 PE PLASTIC PIPE REPAIR GUIDELINES (Continued)

- O) Following the applicable universal electrofusion processor's operating manual, scan the fitting barcode (verify the fitting information) and begin the fusion process for each coupling. (See Section 7.4 for electrofusion to different SDR PE plastic pipe)
- Keep the pipe secured from movement and the coupling supported during both the fusion and cooling cycles. Do not handle, pressure test, or backfill the coupling until completion of the cooling cycle(s). Cooling time is noted as "CT" on fitting label.
- P) Following completion of the fusion cycle, the entire area of the electrofusion joint shall be visually inspected by the Operator Qualified installer and by an Operator Qualified inspector. (See Section 4.2)
- Q) Following completion of the cooling cycle, the repaired PE plastic gas service replacement shall be pressure tested from the point of disconnect to the service head valve. (See Gas Specification [G-8204](#))
- R) Mark the designated installer and peer inspector identification next to the coupling. (See Sections 4.1 and 4.3)
- S) For repaired PE plastic gas main replacement, all tie-in joints/welds shall be soap tested for leakage with leak detecting solution **only after** the line has been gassed-in and the line pressure has been achieved. (See Gas Specification [G-8204](#))

8.0 ELECTROFUSION TAPPING TEE AND SPA SADDLE INSTALLATION GUIDELINES

- 8.1 The following installation guideline details the steps necessary to install an electrofusion tapping tee or a SPA saddle (up to 8") on a PE plastic gas main using a universal electrofusion processor and to inspect the completed joints.

For detailed instructions on installing electrofusion tapping tees and SPA saddles, refer to the [2015 Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#), and the manufacturer's assembly instructions included with the fitting. For detailed instructions on using the universal electrofusion processor, refer to the manufacturer's operating manual. (See Section 9.1)



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8.0 **ELECTROFUSION TAPPING TEE AND SPA SADDLE INSTALLATION GUIDELINES**
(Continued)

- A) Inspect PE plastic pipe, tubing, and fittings for cuts, gouges, deep scratches or other defects prior to installation of electrofusion fittings. (See Gas Specification [G-8122](#))
- B) **Clean the pipe** with a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) to remove any dirt, mud, or other debris. (See Section 5.6)
- C) Keep electrofusion tapping tee/SPA saddle in the plastic bag provided until needed to avoid accidental contamination.

Visually inspect the bottom of the tapping tee/SPA saddle for defects and then check the tapping tee/SPA saddle for electrical continuity (e.g. fluke meter). If any defects are noted, or if there is no electrical continuity, the electrofusion fitting shall not be installed.

- D) Center the tapping tee/SPA saddle on the pipe and mark the surface area covered by the base of the tee on the PE plastic pipe. Marks should be approximately 1" outside the footprint of the fitting. Use only a Company approved marker (e.g. Class/Stock # 024-7106). Do not use keel or a lumber crayon to mark the PE plastic pipe.
- E) **Check pipe for out-of-round.** Use a re-rounding clamp or other device to bring the pipe back to round.
- F) **Scrape the marked area on the outside of the pipe to remove surface oxidation** using an approved scraping tool (e.g. universal scraper, spring loaded scraper, and half-moon scraper). **Do not** use a file or sandpaper.
- G) Clean the scraped area of the pipe and the inside of the fitting with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) and 99.9% liquid isopropyl alcohol (Class/Stock #630-1246). Make sure pipe and fitting surfaces are completely dry before assembly.

(See Section 5.6 for EH&S requirements for protective gloves and alcohol disposal requirements)



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8.0 ELECTROFUSION TAPPING TEE AND SPA SADDLE INSTALLATION GUIDELINES
(Continued)

- H) Remove the tee/SPA saddle from the bag, visually inspect for dirt or contaminants, and center the tapping tee on the freshly scraped pipe surface.

If the electrofusion fitting or the surface of the scraped pipe becomes contaminated with dirt, debris, water, finger marks or other foreign substances, clean with either 96% alcohol wipes (Class/Stock #689-3135 and 025-3724) or a clean, dry, lint-free non-synthetic (e.g. cotton) cloth or paper towel (e.g. NS0209687) with 99.9% liquid isopropyl alcohol (Class/Stock #630-1246) Make sure pipe and fitting surfaces are completely dry before assembly.

(See Section 5.6 for EH&S requirements for protective gloves and alcohol disposal requirements)

1. For Central Plastics tapping tees, a removable saddle clamp must be placed under the pipe adjacent to the tapping tee prior to fusing. Slide the saddle clamp onto the edges of the tapping tee until the saddle clamp is squarely aligned beneath the tee. Tighten the saddle clamp to secure the tee to the plastic pipe.
 2. For IPEX/Friatec tapping tees and SPA saddles, release the pre-assembled screws on one side of the tee. Using the side of the tapping tee that is still bolted together as a hinge, open the upper and lower sections of the tapping tee. Place the tapping tee onto the scraped and cleaned area of the PE plastic pipe. Evenly tighten all four screws to the stops. The bottom section of the tapping tee will remain on as a permanent component of the tee.
- I) Connect the universal electrofusion processor to an adequate AC power source. If using a generator, turn the generator on and allow it to run for 30 seconds before connecting the universal electrofusion processor. Turn on the universal electrofusion processor.
- J) Connect fusion plugs to the contact pins on the tapping tee.
- K) Following the applicable universal electrofusion processor's operating manual, scan the fitting barcode (verify the fitting information) and begin the fusion process for the tapping tee. (See Section 7.4 for electrofusion to different SDR PE plastic pipe)



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8.0 ELECTROFUSION TAPPING TEE AND SPA SADDLE INSTALLATION GUIDELINES
(Continued)

- L) Keep the pipe secured from movement during both the fusion and cooling cycles. Do not handle, pressure test, tap, or backfill the tapping tee until completion of the cooling cycle. Cooling time is noted as CT on the fitting label.
1. For Central Plastics tapping tees, keep the saddle clamp in place until completion of the cooling time(s). When the tapping operation is to be performed, the saddle clamp **must** be reinstalled.
- M) Following completion of the fusion cycle, the entire area of the electrofusion joint shall be visually inspected by the Operator Qualified installer and by an Operator Qualified inspector. (See Section 4.2)
- N) Mark the designated installer and peer inspector identification next to the coupling. (See Sections 4.1 and 4.3)

9.0 ELECTROFUSION EQUIPMENT

9.1 The following universal electrofusion processors are approved for use:

- EF Technologies - Phoenix Electrofusion Processor
- Georg Fischer Central Plastics – Easy Fuse Electrofusion Processor
- Georg Fischer Central Plastics – Emie Electrofusion Processor
- Georg Fischer Central Plastics – MSA 340 Polyvalent Electrofusion Processor
- IPEX - Friamat 1 and 2 Electrofusion Processor
- IPEX - Genesis F3 Electrofusion Processor

The operating manuals are located in the [GasHub](#).

- 9.2 Electrofusion processor units are not intrinsically safe and shall not be used in a hazardous environment.
- 9.3 Due to the high amperage draw of electrofusion fittings, the electrical source should not be loaded down by other equipment when an electrofusion is being performed and the use of an extension cord is not encouraged. In the event an extension cord is needed, the following is recommended:



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9.0 ELECTROFUSION EQUIPMENT (Continued)

Cord Length

≤ 25 ft.

25 ft.

50 ft.

100 ft

Wire Gauge

12/3

10/3

8/3

DO NOT USE

NOTE: Extension cords should not be used for electrofusion 16" couplings.

- 9.4 The following are requirements and precautions regarding the electrical equipment required to perform electrofusion:

<u>Fitting</u>	<u>Fitting Size</u>	<u>AC Power</u>	<u>AMPS</u>	<u>Minimum Generator Wattage</u>	<u>Minimum Allowable Generator Output Voltage</u>
Central Plastics	1/2" CTS to 8" IPS	110V	20	3,500	90 VAC
Friatec	2" to 6" IPS	110V	20	3,500	90 VAC
Friatec	8" IPS to 20" IPS	110V	30	4,500	95-135 VAC

10.0 ELECTROFUSION DURING COLD AND/OR INCLEMENT WEATHER

- 10.1 Extreme weather conditions may affect the quality of the electrofusion joint. The recommended ambient temperature range is as follows:

TEMPERATURE RANGE	FITTINGS	ELECTROFUSION PROCESSOR
-10°F to 120°F	Central Plastics	MSA 340
	Frialen	Genesis
-4°F to 122°F	-	Friamat
0°F to 120°F	-	Phoenix

10.2 Temperatures below 40°F

- A) Pipe and fittings should be about the same temperature when they are electrofused.

10.3 During inclement weather (rain or snow)

- A) Protect universal electrofusion processor and leads from the rain or snow.



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10.0 ELECTROFUSION DURING COLD AND/OR INCLEMENT WEATHER

- B) The pipe must clean and dry before, during, and after electrofusion.
- C) Approved fire resistant tents (Class/ Stock # 689-3929, 10' x 8' or Class/ Stock # 659-3945, 6' x 6') shall only be used to protect the PE pipe at the point of joining during inclement weather and shall **not** be used when there is escaping gas.

If gas is escaping, it must be allowed to rise and vent unobstructed. If a connection is needed and the cause of the escaping gas can't be repaired in a timely manner, then making the joint with a mechanical fittings should be considered.

11.0 REFERENCES

<u>G-8005</u>	General Specification for Installation of Gas Distribution Mains
<u>G-8100</u>	General Specification for Installation of Gas Distribution Services
<u>G-8104</u>	PE Pipe, Tubing, and Fittings for Gas Main and Services
<u>G-8121</u>	Qualification of Installers Performing Heat Fusion or Electrofusion of Polyethylene (PE) Plastic Pipe/Tubing for Gas Mains And Services
<u>G-8122</u>	Inspection, Handling, Storage, and Transportation of Polyethylene (PE) Plastic Pipe, Tubing, and Fittings for Gas Mains And Services
<u>G-8123</u>	Heat Fusion Joining Of Polyethylene (PE) Plastic Pipe and Fittings for Gas Mains and Services
<u>G-8149</u>	Responsibility for Maintenance and Replacement of Gas Services
<u>G-8178</u>	Shut-Off of Polyethylene Plastic Pipe/Tubing Used for Gas Mains and Services
<u>G-8199</u>	Qualification Procedure for Personnel Who Join Plastic Pipe/Tubing with Mechanical Fittings
<u>G-8204</u>	Pressure Testing Requirements for New and Replacement Gas Mains and Services



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11.0 **REFERENCES** (Continued)

- [G-8209](#) Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures
- [IP-9](#) Requirements for Written Procedures and Contingency Plans
- [IP-20](#) Installation of Mechanical Fittings for Plastic Pipe and Tubing
- [IP-40](#) Cut Outs and Tie-Ins of Existing Plastic or Plastic/Metallic Gas Mains
- DOJT Documentation and Inspection of Polyethylene (PE) Plastic Joints on Gas
[GAS6006](#) Mains and Services
- HOT Procedure for Pressure Testing and Tapping Using the Spa Saddle
[GAS6015](#) Tapping Tool
- [2015 Northeast Gas Association \(NGA\) Plastic Pipe Joining Manual](#)

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Section 16.0: Added new section, "Records". Renumbered subsequent sections

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- | | | |
|----|-----------------------|--|
| 1) | Cover Page | - Added "Effective Date", "Course ID.", "Core Groups", and "Target Audience". |
| 2) | Table of Contents | - Added Section 18.0: "Approved Valve List Summary Table" to Table of Contents; Merged "Environmental Review By" and "Safety Review By" to read "EH&S Review By" and added "Effective Date" to Footer. |
| 3) | Section 18.0 | - Created new section for "Approved Valve Summary Table". |
| 4) | Section 19.0 | - Re-sequenced from Section 18.0. |
| 5) | Main Document: Footer | - Added "Effective Date". |



TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

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AUTHOR:	APPROVED BY:	DATE APPROVED:	VOLUME: 6	PAGE 1 OF
J. Madia	Tomas Hernandez Chief Engineer Gas Distribution Engineering	9/26/17	Purchase and Test	28 PAGES



TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

1.0 SCOPE

- 1.1 This specification sets forth the minimum requirements for ball and plug valves for all sizes and pressure ratings that are furnished by suppliers for installation on mains and services in Consolidated Edison's natural gas transmission and distribution systems.
- 1.2 Unless otherwise specified, only valves listed in [Section 17.0](#) of this specification are approved for purchase.
- 1.3 All valves furnished under this specification are to be new. Reclaimed or rebuilt valves are not acceptable.
- 1.4 All coatings, lubricants and grease mentioned in this specification must be approved by Con Edison's Environmental, Health and Safety (EH&S) Department.

2.0 DEFINITIONS

- "Company" - Consolidated Edison Company of New York, Inc., or its duly authorized representative
- "Supplier" - Valve manufacturer or his authorized distributor
- "ANSI" - American National Standards Institute
- "ASME" - American Society of Mechanical Engineers
- "ASTM" - American Society of Testing Materials
- "MSS" - Manufacturers' Standardization Society of the Valve and Fitting Industry
- "CWP" - Cold Working Pressure or Maximum Working Pressure (PSIG).
- "C_v" - Capacity Factor (Flow Coefficient for Valves).
- "ALT valve" - An alternative valve that meets the requirements of API 6D.

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3.0 LEGAL REQUIREMENTS

For references to external standards cited in this specification, use the accepted revision indicated in 16 NYCRR Section 10.3. If the external standard is not listed within section 10.3, use the latest revision of the standard.

Valves purchased under this specification shall comply with the requirements in:

- 3.1 Title 49, Code of Federal Regulations, Part 192, Sections 192.145 and 192.363
- 3.2 State of New York Code, Rules and Regulations 16 NYCRR 255 "Transmission and Distribution of Gas", Sections 255.145 and 255.363.
- 3.3 New York City Fuel Gas Code, Appendix E, "Meters and Gas Service Piping."

4.0 MARKING AND IDENTIFICATION

- 4.1 All valves shall be identified with the valve type and the Company Class and Stock Number. This information shall be included on a corrosion-resistant tag permanently secured to the valve or, if space permits, included on the valve nameplate. Tags shall not be wired to the valve hand-wheel.
- 4.2 Markings shall conform to MSS Specification SP-25 "Standard Marking System for Valves, Fittings, Flanges, and Unions". The information listed below is also required:
 - A) Manufacturer/Type/Model No.
 - B) Figure No. or Part No.
 - C) Pressure Rating
 - D) Size
 - E) Serial No.
 - F) The gear operator model number (if applicable) and the number of turns required to fully operate gear operated valves shall be permanently marked on gear housing, the valve nameplate, or on a tag securely fastened to the valve.
 - G) ALT valve designations

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5.0 PACKAGING AND TRANSPORTATION**5.1 Deficiencies**

The supplier shall be liable to correct any deficiencies noted prior to installation that are due to damage or his failure to suitably protect all surfaces, including end connections.

5.2 Assembled Valve Requirements

- A) All inside valve surfaces which will be exposed to natural gas products shall be free of metal chips, weld splatter, slag, grease, dirt, and other foreign materials.
- B) Valve stem packing and bonnet gaskets shall be asbestos free and suitable for use in natural gas piping systems.
- C) Valve ends shall be sealed to prevent entrance of water, dirt, or foreign materials.
- D) Valves shall be shipped with the ball or plug in the following position(s):

<u>Valve Manufacturer</u>	<u>Position</u>
Andronaco	Fully Opened
Balon	Fully Opened
Cameron	Fully Opened
Delta	Fully Opened
Dresser	Fully Opened
Grove	Fully Opened
Kerotest	Fully Opened
Mueller	Fully Opened
Nordstrom	Fully Opened
Orbit	<u>Fully Closed</u>
Walworth	Fully opened

- E) All valves shall be fully assembled; no loose parts shall be shipped in the body cavity.
- F) Ball valves shall be shipped without any emergency seal lubricant in the seat areas.



TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

6.0 METALLIC VALVE GENERAL DESIGN REQUIREMENTS**6.1 Travel and Stops**

- A) Valves shall operate in the clockwise direction when going from the opened to close position and shall have stops in the full open and full closed position.
- B) Stops must be designed to resist being sheared off by a standard street tee wrench.

6.2 Plug Valves

- A) Lubricated plug valves shall be equipped with tapered plugs.
- B) Lubricated plug valves shall be provided with double ball check assemblies in the stem area to prevent leakage of gas to atmosphere when the lubrication fitting is removed.
- C) Lubrication fittings shall be a combination type with a button-head end allowing lubrication with either a high-pressure gun or by the stick sealant method.
- D) Lubricated plug valves shall be lubricated at the factory with an approved sealant as per Con Edison Specification [G-100,011, "Valve Lubricants for Mains and Services"](#).
- E) Valve flow coefficient values (C_v values) for all valves along with their equivalent lengths shall be made available upon request to the supplier, by the Company unless this information is available on the supplier or manufacturer's website.

6.3 Ball Valves

- A) The following port designs are acceptable:
 - ANSI Class 150- Full port or Reducing Port (Venturi Opening)
 - ANSI Class 300- Full port
- B) The approved valve seat materials are Buna-N, Nylatron GSM, Hycar, Viton and Nylon. Seats shall be resistant to cracking, abrasion, cuts, or deterioration from hydrocarbons and other foreign materials common to the gas stream. Manufacturer's offering seats

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6.0 METALLIC VALVE GENERAL DESIGN REQUIREMENTS (Continued)

other than the type listed above shall submit test reports demonstrating that the material is at least equivalent to those listed.

6.3 Ball Valves

- C) Ball valves shall be provided with double block and bleed unless otherwise specified. An accessible vent plug must be provided in the valve body to check for leakage past either seat. The vent plug shall be designed so that it cannot blow out during operation. Body vent plugs shall be installed with teflon tape prior to the manufacturer's pressure test.
- D) If a relief valve is provided as part of the valve body, the manufacturer or suppliers of valves shall remove the relief valve and install a 3000 lb. forged steel plug with ANSI tapered thread. The plug shall be seal welded. Steel plugs and button head lubrication fittings shall be installed prior to performing the pressure tests.
- E) All 6" and larger size ball valves shall be provided with an emergency lubrication system so in the event of damage to the elastomer seats, a bubble-tight shutoff can be aided by injecting a sealant, as per Con Edison Specification [G-100,011](#), through fittings in the valve seat area.
- F) Dust caps shall be provided on all lubrication fittings.

7.0 METALLIC VALVE END REQUIREMENTS**7.1 Welding Ends**

Steel-bodied valves with welding ends shall have the ends beveled for butt-welding to steel pipe as per ASME B16.25, "Butt-Welding Ends" - Figs. 1 and 2 (no backing ring), and ASME B31.8 Gas Transmission and Distribution Piping Systems, Appendix I, unless otherwise specified.

7.2 Flanged Ends

Steel-bodied valves with flanged ends shall have ends faced and drilled in accordance with ASME B16.5, "Steel Pipe Flanges and Flanged Fittings"

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7.0 METALLIC VALVE END REQUIREMENTS (Continued)

and MSS SP-44, "Steel Pipe Line Flanges". Gasket surface finish shall be either concentrically or phonographically (spirally) serrated.

7.2 Flanged Ends (Continued)

Cast iron valves with flanged ends shall have ends faced and drilled in accordance with ASME B16.1, "Cast Iron Pipe Flanges and Flanged Fittings, 25, 125, and 800 lb." for Class 125 lb. flanges.

7.3 Compression Ends

Compression ends shall have conductive gaskets to provide electrical continuity between the valve and the steel gas pipe.

Material, fabrication and marking requirements for compression ends shall be in accordance with [G-100,285 "Compression Couplings, Tees, Elbows, and Line Caps for Gas Pipe and Tubing."](#)

7.4 Screwed Ends

All valves with screwed ends shall be supplied with internal Standard Taper Pipe Threads in accordance with ASME B1.20.1, "Pipe Threads, General Purpose".

8.0 VALVES FOR THE GENERAL GAS DISTRIBUTION SYSTEM**8.1 Main and Service Curb Valves** (For buried applications)

- A) Gear operated valves shall be equipped with watertight housings filled with approved machine grease. The grease or lubricant must be approved by Con Edison's Gas EH&S Department.
- B) All metallic valves, except for "weld-end" valves shall be supplied with a copper crimp-on connector attached to the body of the valve for bonding, or cathodic protection requirements. The connector shall be large enough to accept a No.10 AWG stranded copper wire.
- C) Buried valves shall not include relief valves.



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8.0 VALVES FOR THE GENERAL GAS DISTRIBUTION SYSTEM (Continued)

8.2 Service Head, Meter and Service Regulator Valves (For above ground applications)

- A) Service head valves up to 4 inch size and meter and regulator valves up to 6 inch size shall have valve stems operable with an open end wrench or equivalent.
- B) Wrench-operated valves shall be designed to accommodate a locking device in the closed position.
- C) Wrench-operated service head and meter valves shall be of a tamper-proof design such that removal of the gland bolts cannot be compromised or accomplished with ordinary household tools.
- D) Gear-operated valves shall have steel hand-wheels capable of being replaced by a chain-wheel or having a chain operator adapter attached to it. The gearing shall be enclosed in a metal housing.
- E) Valves in this section shall **not** be coated, but approved shop primer is acceptable.

8.3 Regulator Station Valves (For Vault Applications)

- A) All ball valves shall be flanged and supplied with a hand-wheel operator.
- B) Valves 6" and larger shall be equipped with a gear operator enclosed in a watertight housing.
- C) All plug valves listed shall be wrench operated.
- D) Valves in this section shall **not** be coated, but approved shop primer is acceptable.

8.4 Compressor Station Valves

No valve having shell (body, bonnet, cover, and/or end flange) components made of cast iron, malleable iron, or ductile iron may be used in the gas pipe components of compressor stations (192.145 (e) & 255.145(c))

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9.0 ACCESSORIES**Operating Adapter**

Main and service curb valves shall be equipped with 2" square adapters for wrench operation (unless hand-wheels or levers are specified on the purchase order). The adapter will be securely fastened to the stem so that it cannot loosen, stick to the operating key, or jam against the gear housing.

**10.0 RADIOGRAPHING OF WELDS AND CASTINGS FOR ANSI CLASS 300
VALVES**

10.1 When radiographic inspection of ANSI Class 300 valves is requested by the Company, the manufacturer shall inspect in accordance with API Standard 1104, "Standard for Welding Pipe Lines and Related Facilities."

10.2 All radiographs shall be marked so that they may be readily identified with the weld. Castings shall be radiographed in accordance with MSS SP-54 "Radiographic Examination Method" and MSS SP-55 "Visual Method."

11.0 STEEL AND CAST IRON VALVE MATERIAL AND PRESSURE RATING

11.1 For steel valves furnished as ANSI 150 and 300 classes (unless otherwise specified), the maximum working pressures or CWP ratings shall be 285 and 740 psig, respectively. These valves shall be steel as per ASTM 216 grade WCB or WCC or ASTM A350LF2 according to the manufacturer.

11.2 For Cast Iron valves furnished in accordance with ASTM A126 Class B, the maximum working pressures or CWP rating shall be between 125 and 200 psig.

12.0 TESTING

12.1 The Company's Purchasing Department may canvass manufacturers and direct all potential suppliers of valves to the Gas Development Lab for the approval process covered in Section 12.4.

12.2 Each steel ball and plug valve must be hydrostatically shell and seat tested by the manufacturer to meet the minimum requirements of API 6D



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12.0 TESTING (Continued)

"Specification for Pipeline Valves", Section 11.0 prior to shipment to the Company.

- 12.3 Each cast iron valve must be tested by the manufacturer and meet the requirements set forth in MSS SP-78 "Cast Iron Plug Valves, Flanged and Threaded Ends", Tables II and III prior to shipment to the Company.
- 12.4 Certification of tests performed shall be submitted to the Company by the manufacturer when the valve is purchased.
- 12.5 The Test Report/Certificate of Compliance shall contain the Procurement Dept. Purchase Order Number, and Company Work Order number to facilitate Transmission System record keeping requirements.
- 12.6 For all ANSI 300 class valves, a copy of the individual valve's Test Report/Certificate of Compliance shall accompany each valve when shipped to Con Edison. A copy shall also be sent to the Manager of Major Projects, Gas Engineering Department, 1615 Bronxdale Avenue – Bldg 21 – 2nd Floor, Bronx, New York 10462
- 12.7 When approving a new valve for service, the Gas Development Lab may perform extended testing of valves as outlined in "Tests for Valves" based on Company Specifications and Industry Standards'. These tests do not qualify new valves per API 6D or any other industry standard and are not meant to replace the aforementioned industry testing standards. Acceptance of new valves for use in the distribution and transmission system shall include a qualification documentation review and consultation with the manufacturer and their authorized representative(s).
- 12.8 The Gas Development Lab shall test one size of a specific design valve of the same manufacturer. Acceptance or rejection shall apply to all valves of same design. Changes to the design between sizes will require additional testing. The Lab shall produce an Acceptance Test Report which describes all tests that were performed and the results of such tests.
- 12.9 The approval of any valve shall be through the Lab's Acceptance Test report. This report will document all reviews and/or appropriate extended test results. It will then recommend the valve's approval to the appropriate Section Manager. The Section Manager shall then approve the valve by signing the Lab's Acceptance Report.

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13.0 POLYETHYLENE VALVE GENERAL REQUIREMENTS**13.1 Travel and Stops**

- A) Valves shall operate in the clockwise direction when going from the opened to close position and shall have stops in the full open and full closed position.
- B) Stops must be designed to resist being sheared off by a standard street tee wrench.

13.2 Polyethylene (PE) valves shall meet the requirements of ASME B16.40, ASTM D2513 and ASTM D3261.

13.3 All PE resins used in the fabrication of ball and plug valves shall be meet the minimum requirements of ASTM Material Designation PE3408 or PE4710 for high density polyethylene materials.

13.4 All IPS and 1/2" CTS valves must be rated for operating pressures up to 100 psig, and for service temperatures ranging from minus 20° F to 140° F.

13.5 All 1" CTS and 1 1/4" CTS valves must be rated for operating pressures up to 89 psig and 72 psig, respectively and for service temperatures ranging from minus 20°F to 140°F.

13.6 All polyethylene valves 8" I.P.S and greater that will be installed in the distribution system by using either heat fusion or electrofusion shall be supplied by the manufacturer with 10" long "pup" pieces butt fused onto each end. Manufacturers shall supply letters of compliance that show their joining procedure is qualified per 49 CFR §192.283.

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14.0 COATING

- 14.1 Unless otherwise specified, all metallic valves for underground use or use in regulator manholes shall be supplied factory coated. The surface preparation and coating application shall be in accordance with the coating manufacturer's recommended procedure. All coatings must be approved by Con Edison's Corrosion Control Section. Approved coatings and minimum dry film thicknesses shall be as follows:

<u>Valve Manufacturer</u>	<u>Approved Mill Coating</u>	<u>Minimum Dry Film Thickness</u>
Delta	Tarset	20 Mils
Grove	Tarset	20 Mils
Orbit	Tarset	20 Mils
Cameron	Bitumastic No. 300-M	20 Mils
Nordstrom	Tarset	20 Mils
Walworth	Scotchkote 309	20 Mils
Southern Manufacturing	Bitumastic No. 300-M	20 Mils
Dresser	1) Al-Clad Plastisol 017 for Black Valve Bodies and compression end nuts	35 Mils
	2) Al-Clad E-Coat Black (2" Sq. Operating nut only)	0.8 Mils

- 14.2 Bare welding ends, flange ends, and areas of the valve which will not be exposed to the environment after installation need not be coated. However, these areas must be protected to prevent corrosion during storage and shipment. Flange faces and the inside of anode connectors shall not be coated.
- 14.3 Valves supplied with welding ends shall have the coating cut back 2" from each end unless valve end geometry makes this impractical. After coating, all valves shall be operated one complete cycle to ensure operability.



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14.0 COATING (Continued)

- 14.4 All valves shall be adequately packaged to prevent any damage to the coating during shipping, handling, or storage.

15.0 APPROVALS

- 15.1 Engineering drawings and component material specifications and MSDS sheets (coatings, shop primers, lubricants) must be submitted to the Gas Development Lab by manufacturers who wish to have their valves considered for approval in accordance with testing requirements of Section 12 of this specification. Specific samples shall be supplied by the manufacturer for testing when requested.
- 15.2 The Gas Development Lab will notify the Chief Gas Distribution Engineer, the Chief Gas Transmission Engineer, and the Purchasing Department of valves that have successfully passed Company reviews and/or testing requirements and are approved for inclusion on the Material Management System. A hard copy of this approval letter shall be kept with the file.
- 15.3 The manufacturer shall make no variation in the valve design, materials of construction, coatings or markings after inclusion of the valve in any of the approved lists of this specification. Proposed modifications shall be submitted to the Gas Development Lab for consideration for approval.
- 15.4 Approval of a specific valve design applies to all size valves and pressure classes made in the same design and by the same manufacturer. When applicable, the approval will be indicated in the Lab's Acceptance Test Report which is signed by the appropriate Chief Engineer in Gas Engineering.

16.0 RECORD RETENTION

Any records generated in the course of performing work in accordance with this specification shall be maintained as required by Corporate Instruction [CI-870-1](#) "Records Management". Guidance on the retention of Company Gas Operations records can also be found on the [Records Management](#) intranet site.

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17.0 REFERENCE SPECIFICATIONS

[G-100,285](#) - "Compression Couplings, Tees, Elbows, and Line Caps for Gas Pipe and Tubing"

[G-100,011](#) - "Valve Lubricants For Gas Mains and Services"

18.0 APPROVED VALVE LIST**18.1 Plug Valves: Cast Iron - Compression Ends - Wrench Operated**

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
1"	Non-Lub	Southern Manufacturing	0100-425-D-1-RS49	175	374-2145
		Dresser	0175-0127-288	175	
1 ¼"	Non-Lub	Southern Manufacturing	0125-425-D-1-RS49	175	374-2152
		Dresser	0175-0128-288	175	
1 ½"	Non-Lub	Southern Manufacturing	0150-425-D-1-RS49	175	374-2160
		Dresser	0175-0129-288	175	
2"	Non-Lub	Southern Manufacturing	0200-425-D-1-RS49	175	374-2178
		Dresser	0175-0130-288	175	

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TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

18.0 APPROVED VALVE LIST (Continued)

18.1 Plug Valves: Cast Iron -Compression Ends - Wrench Operated (Continued)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
3"	Non-Lub	Southern Manufacturing	0300, FIG 425, D, 1, RS49, BNG479 (PN 9183270) * see note	175	374-2194
4"	Non-Lub	Southern Manufacturing	0400, FIG 425, D, 1, RS49, BNG479 (PN 9243236) * see note	175	374-2202
6"	Lub	Nordstrom	24191	200	374-2210

* Valves with an asterisk should include Dresser followers, gaskets, nuts and bolts, ground lug for 8 AWG wire, surface preparation per SSPC-SP5 and coatings per section 14.1

18.2 Plug Valves: Cast Iron - Screwed - Wrench Operated (Short Pattern)

<u>Size</u>	<u>Type</u>	<u>MFR</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
3/4"	Non-Lub	Dresser	0175-0007-161	175	374-2350
	Lub	Walworth	1796T	200	
	Lub	Nordstrom	142T	200	
1"	Non-Lub	Dresser	0175-0011-161	175	374-0248
	Lub	Nordstrom	142T	200	
	Lub	Walworth	1796T	200	
1 1/4"	Non-Lub	Dresser	0175-0012-161	175	374-2434
	Lub	Nordstrom	142T	200	
	Lub	Walworth	1796T	200	
1 1/2"	Non-Lub	Dresser	0175-0013-161	175	374-2095
	Lub	Nordstrom	142T	200	
	Lub	Walworth	1796T	200	

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18.0 APPROVED VALVE LIST (Continued)**18.2 Plug Valves: Cast Iron –Screwed - Wrench Operated (Short Pattern)**
(Continued)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
2"	Non-Lub	Dresser	0175-0006-161	175	374-0321
	Lub	Nordstrom	142T	200	
	Lub	Walworth	1796T	200	
3"	Lub	Nordstrom	142T	200	374-0354
4"	Lub	Nordstrom	142T	200	374-2103

18.3 Plug Valves: Cast Iron - 125 Lb.Flanged - Wrench Operated (Short Pattern)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
3"	Lub	Nordstrom	143T	200	374-1345
		Walworth	1797F		
4"	Lub	Nordstrom	143T	200	374-2335
		Walworth	1797F		
6"	Lub	Nordstrom	143T	200	374-0413
		Walworth	1718F		
8"	Lub	Nordstrom Walworth	143T 1718F	200	374-0507



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18.0 APPROVED VALVE LIST (Continued)**18.4 Plug Valves: Cast Iron - 125 Lb.Flanged - Gear Operated (Short Pattern)**

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
6"	Lub	Nordstrom	50169	200	374-2269
	Lub	Walworth	1727F	200	
8"	Lub	Nordstrom	50169	200	374-2285
	Lub	Walworth	1727F	200	
10"	Lub	Walworth	1727F	200	Non-Stock
12"	Lub	Nordstrom	50169	200	374-2301
	Lub	Walworth	1727F	200	
16"	Lub	Nordstrom	50169	200	374-2582

18.5 Plug Valves: Cast Iron - Screwed - Wrench Operated (Regular Pattern)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
4"	Lub	Nordstrom	524	500	Non-Stock



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18.0 APPROVED VALVE LIST (Continued)

18.6 Plug Valves: Cast Iron - 125 Lb Flanged- Wrench Operated (Regular Pattern)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
4"	Lub	Nordstrom	525	500	Non-Stock
6"	Lub Lub	Nordstrom Walworth	525 1700FT	500 200	Non-Stock

18.7 Plug Valves: Cast Iron - 125 Lb Flanged - Gear Operated (Regular Pattern)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
6"	Lub Lub	Nordstrom Walworth	50169 1707F	200 200	374-2277
8"	Lub Lub	Nordstrom Walworth	50169 1707F	200 200	374-2293
10"	Lub Lub	Nordstrom Walworth	50169 1707F	200 200	374-2772
12"	Lub Lub	Nordstrom Walworth	50169 1707F	200 200	374-2319



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18.0 APPROVED VALVE LIST (Continued)

18.8 Plug Valves: Steel – Butt Welding – Wrench Operated (Short Pattern)

<u>Size</u>	<u>Type</u>	<u>WE Wall Thickness, In.</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
1"	Lub	0.179	Nordstrom	2024 1/2*	300	374-1634*
2"	Lub Lub	0.154	Nordstrom Walworth	1925 1/2 1749WE	150 150	374-2392
2"	Lub	0.218	Nordstrom	2045 1/2	300	374-2632
3"	Lub Lub	0.216	Nordstrom Walworth	1925 1/2 1749WE	150 150	374-2400
3"	Lub	0.216	Nordstrom	2045 1/2	300	Non-Stock
4"	Lub	0.237	Nordstrom	1925 1/2	150	374-2418
6"	Lub Lub	0.280	Nordstrom Walworth	4185 1/2 1967WE	150 150	374-2426 374-2426

* Valves with an asterisk are socket weld

18.9 Plug Valves: Steel - Screwed - Wrench Operated (Short Pattern)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
1"	Lub	Nordstrom	2024	300	374-1360
2"	Lub	Walworth Nordstrom	1760 2024	300 300	374-1865

18.10 Plug Valves: Steel - Butt Welding - Gear Operated

<u>Size</u>	<u>Type</u>	<u>WE Wall Thickness, In.</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
8"	Lub	0.322	Nordstrom	4187 1/2	150	374-2236
10"	Lub	0.365	Nordstrom	4187 1/2	150	374-2244
12"	Lub	0.375	Nordstrom	4187 1/2	150	374-2251



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18.0 APPROVED VALVE LIST (Continued)

18.11 Plug Valves: Steel - 150 Lb Flanged - Wrench Operated (Short Pattern)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
2"	Lub Lub	Nordstrom Walworth	1925 1749FT	150 150	374-2343
3"	Lub Lub	Nordstrom Walworth	1925 1749FT	150 150	Non-Stock
4"	Lub Lub	Nordstrom Walworth	1925 1749FT	150 150	374-2764
6"	Lub	Nordstrom	1945	150	Non-Stock

18.12 Ball Valves: Steel – 150 Lb Flanged – W/Handwheel (Full Port)

<u>Size</u>	<u>Type</u>	<u>Ball Bore</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
2"	Double Block & Bleed	2.06"	Orbit Cameron	1123MBB-RF 800101-2-216	150	379-5853
3"	Double Block & Bleed	3.13"	Orbit Cameron	1123BB 800101-2-216	150	379-5838
4"	Double Block & Bleed	4.06"	Orbit Cameron	1123MSBB 800101-2-216	150	379-5861
6"	Double Block & Bleed	6.00"	Orbit Grove Cameron Delta	1123BBGS B-5 800101-2-216 Type 55	150 150 150 150	379-5887
8"	Double Block & Bleed	8.00"	Orbit Grove Cameron Delta	1123MBB-RF B-5 800101-2-452B Type 55	150 150 150	374-2871
10"/12" 16"	Double Block & Bleed	10" 12" 15.25"	Orbit Grove Cameron Delta	1123BB B-5 800101-2-452B Type 55	150 150 150 150	Non-Stock



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18.0 APPROVED VALVE LIST (Continued)

18.12a Ball Valves: Steel -150 Lb Flanged

<u>Size</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
2"	Ball-O-Max Kerotest	2BMF285RP 72566896	150 150	379-7222
3"	Ball-O-Max Kerotest	3BMF285RP 72566904	150 150	379-7214
4"	Ball-O-Max Kerotest	4BMF285RP 72566912	150 150	379-7206

**18.13 Plug Valves: Steel - 300 Lb Flanged - Wrench Operated (Short
Pattern)**

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
1"	Lub	Nordstrom	2025	300	374-0180
2"	Lub	Nordstrom	2025	300	374-0842

18.13a Plug Valves: Steel - 300 Lb Flanged - Venturi Pattern

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
6"	Lub	Nordstrom	4249	300	374-0198



TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

18.0 APPROVED VALVE LIST (Continued)

18.14 Ball Valves: Steel - 300 Lb Flanged - W/Handwheel (Full Port)

<u>Size</u>	<u>Type</u>	<u>Ball Bore</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
2"	Double Block & Bleed	2.06"	Orbit Cameron	1223MBB-RF T-31	300	379-5846
3"	Double Block & Bleed	3.13"	Orbit Cameron	1223MBB-RF T-31	300	379-5812
4"	Double Block & Bleed	4.06"	Orbit Cameron	1223MBB-RF T-31	300	379-5879
6"	Double Block & Bleed	6.00"	Orbit Grove Cameron Delta	1223MBB-RF B-5 T-31 Type 55	300	379-5820
8"	Double Block & Bleed	8.00"	Orbit Grove Cameron Delta	1223MBB-RF B-5 T-32 Type 55	300	379-7180
10"	Double Block & Bleed	10.00"	Grove Orbit Cameron Delta	B-5 1223MBB-RF T-32 Type 55	300	379-6703
12", 16", 20"	Double Block & Bleed	12.00" 15.25" 19.25"	Grove Orbit Cameron Delta	B-5 1223MBB-RF T-32 Type 55	300	Non-Stock

18.15 Ball Valves: Steel - Butt Welding - Wrench Operated (Full Port)

<u>Size</u>	<u>Type</u>	<u>WE Wall Thickness, In.</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
2"	Double Block & Bleed	0.218 0.154	Cameron Cameron	T-31 T-31	300 150	Non-Stock Non-Stock
3"	Double Block & Bleed	0.216 0.216	Cameron Cameron	T-31 T-31	300 150	Non-Stock Non-Stock
4"	Double Block & Bleed	0.237 0.237	Cameron Cameron	T-31 T-31	300 150	379-7164 379-7164



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TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

18.0 APPROVED VALVE LIST (Continued)

18.16 Ball Valve: Steel - Butt Welding - Gear Operated (Full Port)

<u>Size</u>	<u>Type</u>	<u>WE Wall Thickness, In.</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
6"	Double Block & Bleed	0.280	Grove	B-5	300	374-2525
		0.280	Cameron	T-31	300	374-2525
		0.280	Delta	Type 55	300	374-2525
		0.280	Grove	B-5	150	374-2525
		0.280	Cameron	T-31	150	374-2525
		0.280	Delta	Type 55	150	374-2525
8"	Double Block & Bleed	0.322	Grove	B-5	300	374-2517
			Grove	B-5	150	Non-Stock
			Cameron	T-32	300	374-2517
			Cameron	T-32	150	Non-Stock
			Delta	Type 55	300	374-2517
			Delta	Type 55	150	
10"	Double Block & Bleed	0.365	Grove	B-5	300	Non-Stock
			Grove	B-5	150	Non-Stock
			Cameron	T-32	300	Non-Stock
			Cameron	T-32	150	Non-Stock
			Delta	Type 55	300	Non-Stock
			Delta	Type 55	150	
12"	Double Block & Bleed	0.375	Grove	B-5	300	374-2509
			Cameron	T-32	300	374-2509
			Delta	Type 55	300	Non-Stock
16"	Double Block & Bleed	0.375	Grove	B-5	300	374-2491
			Grove	B-5	150	Non-Stock
			Cameron	T-32	300	374-2491
			Cameron	T-32	150	Non-Stock
			Delta	Type 55	300	374-2491
			Delta	Type 55	150	Non-Stock
20"	Double Block & Bleed	0.375	Grove	B-5	300	374-2483
		0.375	Grove	B-5	150	Non-Stock
		0.500	Grove	B-5	300	379-7487
		0.375	Cameron	T-32	300	374-2483
		0.375	Cameron	T-32	150	Non-Stock
		0.500	Cameron	T-32	300	379-7487
		0.375	Delta	Type 55	300	374-2483
		0.375	Delta	Type 55	150	Non-Stock
		0.500	Delta	Type 55	300	379-7487

(Continued on next page)



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TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

18.0 APPROVED VALVE LIST (Continued)

18.16 Ball Valve: Steel - Butt Welding - Gear Operated (Full Port) (Cont'd)

<u>Size</u>	<u>Type</u>	<u>WE Wall Thickness, In.</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>ANSI Class</u>	<u>Con Edison Stock #</u>
24"	Double Block & Bleed	0.375	Grove	B-5	300	379-6695
		0.375	Grove	B-5	150	Non-Stock
		0.500	Grove	B-5	300	379-7479
		0.500	Cameron	T-32	300	379-7479
		0.500	Cameron	T-32	150	Non-Stock
		0.375	Cameron	T-32	300	379-6695
		0.375	Delta	Type 55	300	379-6695
		0.375	Delta	Type 55	150	Non-Stock
		0.500	Delta	Type 55	300	379-7479
		0.500	Delta	Type 55	150	Non-Stock
30"	Double Block & Bleed	0.375	Grove	B-5	300	Non-Stock
		0.375	Grove	B-5	150	Non-Stock
		0.500	Grove	B-5	300	379-6687
		0.500	Cameron	T-32	300	379-6687
		0.375	Cameron	T-32	150	Non-Stock
		0.375	Cameron	T-32	300	Non-Stock
		0.375	Delta	Type 55	300	Non-Stock
		0.375	Delta	Type 55	150	379-6687
		0.500	Delta	Type 55	300	
36"	Double Block & Bleed	0.562	Grove	B-5	300	379-0457 *
		0.375	Grove	B-5	150	379-7461
		0.562	Cameron	T-32	300	379-0457 *
		0.375	Cameron	T-32	150	379-7461
		0.562	Delta	Type 55	300	379-0457 *
		0.375	Delta	Type 55	150	379-7461

* Valves with an asterisk include pup pieces



TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

18.0

APPROVED VALVE LIST (Continued)

18.17 Plastic Plug Valves - Wrench Operated

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
1/2"	CTS .090 WT	Perfection	45054	100	374-2798
1"	CTS .090 WT	Perfection	45071	89	374-2731
	IPS SDR-11	Perfection	45200	100	374-2665
1 1/4"	CTS .090 WT	Perfection	45183	72	374-2749
	IPS SDR-11	Perfection	45161	100	374-2657

18.18 Plastic Ball Valves - Wrench Operated

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>
1/2"	CTS .090 WT	Andronaco Polyvalve	.589500.090	100
1"	CTS .090 WT	Andronaco Polyvalve	1-89500.090	89
	PS SDR-11	Andronaco Polyvalve	1-89500.101	100
1 1/4"	CTS .090 WT	Andronaco Polyvalve	1-89500.090	72
	IPS SDR-11	Andronaco Polyvalve	1-2589211	100



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**TITLE: VALVES FOR GAS TRANSMISSION AND
DISTRIBUTION PIPING SYSTEM**

18.0 APPROVED VALVE LIST (Continued)**18.19 Plastic Ball Valves - Wrench Operated Full Port**

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
2"	IPS SDR 11	Andronaco Polyvalve RW Lyall Polytec Valve Broen Kerotest	89111 BV0200Y-MFNO-000 SDR11 PE FP B VLV BF PEB2IHD 100 DR11 14 99052011	100	379-4229
3"	IPS SDR 11	Andronaco Polyvalve RW Lyall Polytec Valve Broen Kerotest	89111 BV0300Y-MFNO-000 SDR11 PE FP B VLV BF PEB3IHD 100 DR11 14 99053011	100	379-7412
4"	IPS SDR 11	Andronaco Polyvalve RW Lyall Polytec Valve Broen Kerotest	89111 BV0400-MFNO-000 SDR11 PE FP B VLV BF PBE4IH 100 DR11 14 99054011	100	379-7271
6"	IPS SDR 11	Andronaco Polyvalve RW Lyall Polytec Valve Broen Kerotest	89111 BV0600Y-MFNO-000 SDR11 PE FP B VLV BF PEB6IHD100 DR11 14 99056011	100	374-2921
8"	IPS SDR 11	Andronaco Polyvalve RW Lyall Polytec Broen Kerotest	89111 BV0800-MFNO-000 SDR11 PE FP B VLV BF PEB8IHD100 DR11 14 99058011	100	374-2939

(Continued on next page)



TITLE: VALVES FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM

18.0 APPROVED VALVE LIST (Continued)

18.19 Plastic Ball Valves - Wrench Operated Full Port (Continued)

<u>Size</u>	<u>Type</u>	<u>Mfr</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
12"	IPS SDR 11	Andronico Polyvalve Broen Kerotest	89111 PEB12IHD100 DR11 51 99159311	100	379-7198
16"	IPS SDR 11	Broen	PEB16IHD100 DR11 51	100	374-0263

18.20 Meter Valves (Security-Type) - Screwed Wrench Operated

<u>Size</u>	<u>Type</u>	<u>MFR</u>	<u>Figure Number</u>	<u>Max Working Pressure PSIG</u>	<u>Con Edison Stock #</u>
3/4"	Shur-Stop	Mueller Co.	805002	175	374-2616
3/4"		AY McDonald Dresser Jomar	560P 275 T-175LWN	175 175 175	374-0644
	Tamper-proof	Muller Co.	H-11118-B	100	
1"	Shur-Stop	Mueller Co.	805006	175	374-2624
1"		AY McDonald Dresser Jomar	560P 275 T-175LWN	175 175 175	374-0651
	Tamper-proof	Muller Co.	H-11118-B	100	
1 1/4"		AY McDonald Dresser Jomar	560P 275 T-175LWN	175 175 175	374-2897
	Tamper-proof	Muller Co.	H-11118-B	100	
1 1/2"		AY McDonald Jomar	560P T-175LWN	175 175	374-2905
	Tamper-proof	Muller Co.	H-11118-B	100	
2"		AY McDonald Jomar	560P T-175LWN	175 175	374-2913
	Tamper-proof	Muller Co.	H-11118-B	100	



**TITLE: VALVES FOR GAS TRANSMISSION AND
DISTRIBUTION PIPING SYSTEM**

★ 19.0 APPROVED VALVE LIST SUMMARY TABLE

All of the approved valves which appear in [Section 17.0](#) are conveniently summarized in a table which includes the *number of turns* and the *turning direction for each valve*. This table appears in the home page of the Gas Hub's Gas Specifications Website and is available by clicking the following link:

[Approved Valve List for Gas Transmission and Distribution Piping Systems](#)

★ 20.0 VALVE MANUFACTURERS

Periodically, valve manufacturers change ownership and the names listed on the nameplates change. Attached is a list of valve name equivalents for valve approval reference.

Manufacturer – New Designation

Dresser
Southern Manufacturing

Manufacturer – Old Designation

Grove
Dezurik

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REVISIONS

M. BALDWIN
B.DAS

2

REDRAWN BY CAD.
UPDATED DWG.
REVISED NOTES.
ADDED SHEET
#4 OF 4

RAJ 5/16/06

M. BALDWIN
7/27/06

3

REVISED DWG
AND NOTES.

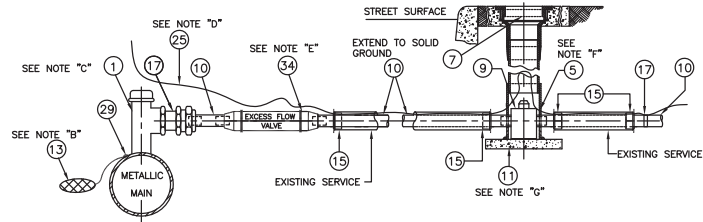
CP 6/23/06

M. BALDWIN
6/22/11

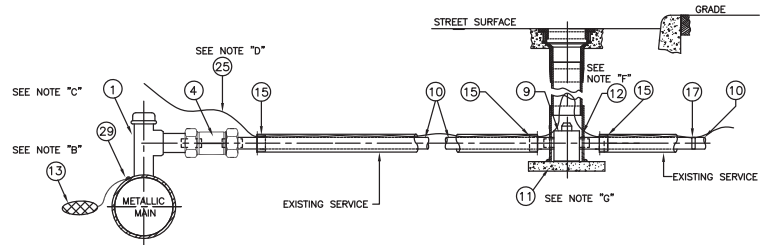
4

REVISED DRAWING
AND NOTES.

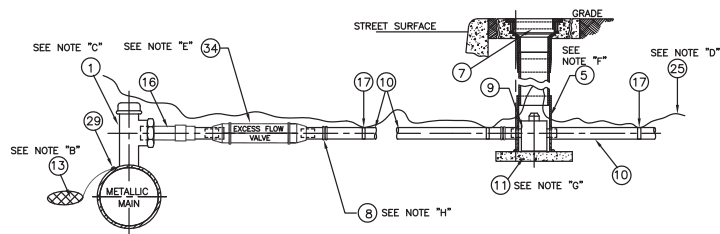
D.J. 6/22/11



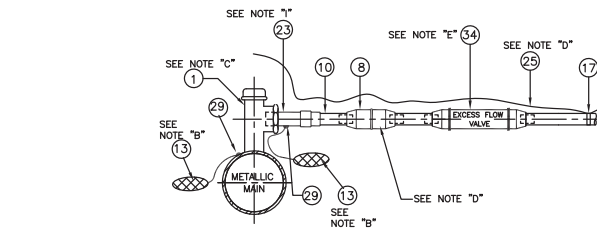
RECOMMENDED INSERTION INSTALLATION



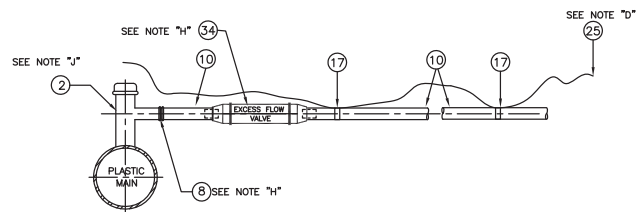
**ALTERNATE INSTALLATION OF CURB VALVE FOR
SERVICE RENEWALS BY REAMING THROUGH THE EXISTING CURB VALVE (SEE NOTE D)**



RECOMMENDED DIRECT BURIAL INSTALLATION



ALTERNATE TEE CONNECTION



TYPICAL HP DIRECT BURIAL INSTALLATION

SEE ADDITIONAL SHEETS 2 OF 4 OF THIS DRAWING # EO-16641-A INSTALLATION OF PLASTIC
(DIRECT BURIAL OR INSERTION) GAS SERVICE PIPING, AND SHEETS 3 & 4 FOR BILL OF MATERIALS.

INSTALLATION OF PLASTIC (DIRECT BURIAL OR INSERTION) GAS SERVICE PIPING

CONSOLIDATED EDISON COMPANY of N.Y., INC.
GAS ENGINEERING DEPT

DATE 2/9/84

LAST REV. 6/22/11

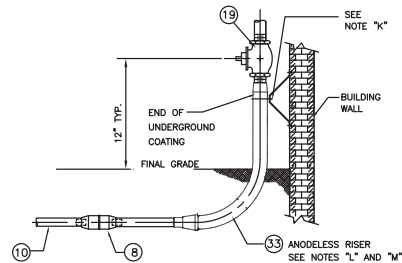
DWG.

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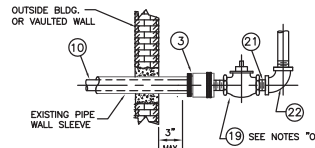
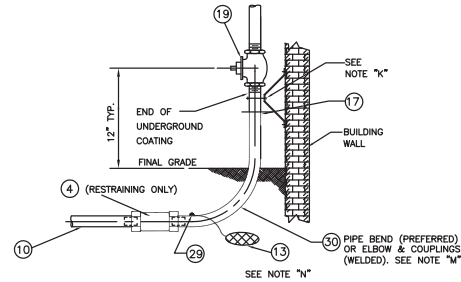
EO-16641-A
SHEET 1 OF 4

REV. 4

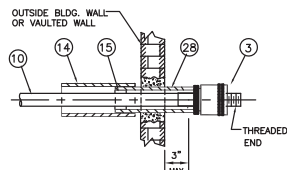
1-30 2 11000 2-4-11000-10	
REVISIONS	
M. BALDOVIN B. DAS	2
REDRAWN BY CAD UPDATED DRAWING REVISED NOTES. ADDED SHEET #4 OF 4	
RAJ.	5/16/06
M. BALDOVIN 7/27/06	3
UPDATED DRAWING REVISED NOTES.	
C.P.	6/26/06
M. BALDOVIN 6/22/11	4
UPDATED DRAWING REVISED NOTES.	
D.J.	6/22/11
CONST. STDS. VOLUME 2	



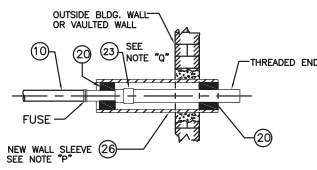
OUTSIDE CONNECTION TO CUSTOMERS PIPING



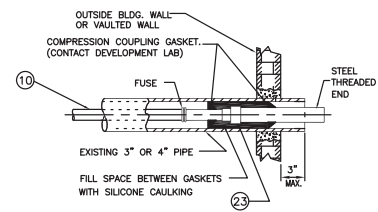
INSIDE CONNECTION TO CUSTOMERS PIPING



INDOOR SERVICE HEAD ADAPTER
WITH NEW WALL SLEEVE UP TO 2" PE SERVICE



ALTERNATE CONNECTION TO
CUSTOMERS PIPING



INSERTION OF 2" PLASTIC INTO 3" STEEL PIPE
OR 3" PLASTIC INTO 4" STEEL PIPE

NOTES:

- A - ALL CUSTOMER'S WORK SHALL CONFORM TO THE "REQUIREMENTS FOR GAS SERVICE INSTALLATIONS" BOOK AND ALL LOCAL CODE REQUIREMENTS.
- B - REFER TO G-8205 FOR MAGNESIUM ANODE INSTALLATION REQUIREMENTS ON UNPROTECTED STEEL GAS MAINS AND METALLIC FITTINGS.
- C - REFER TO G-8100 FOR INSTALLATION REQUIREMENTS OF SERVICE TEES ON PLASTIC MAINS. FOR LIVE 1½" IPS PLASTIC MAINS, SERVICE TEE SHALL ONLY BE CONNECTED VIA ELECTROFUSION OF APPROVED MECHANICAL TEE. DO NOT SIDEWALL FUSE ON A LIVE 1½" IPS PLASTIC MAIN. FOR DEAD 1½" IPS PLASTIC MAINS, SERVICE TEES MAY BE CONNECTED VIA SIDEWALL FUSION, ELECTROFUSION, OR APPROVED MECHANICAL TEE.
- D - REFER TO G-8100 FOR TRACER WIRE INSTALLATION REQUIREMENTS ON DIRECT BURIED PLASTIC SERVICES, TRENCHLESS TECHNOLOGY AND INSERTED SERVICES.
- E - REFER TO G-8100 FOR EXCESS FLOW VALVE (EFV) INSTALL REQUIREMENTS. PREFERRED METHOD OF INSTALLATION IS EFV WITH STAB ENDS INTO STAB END ADAPTER ON TEE.
- F - PLASTIC CURB VALVE BOX (ITEM 5) SHALL BE USED IN SIDEWALK AND NON-PAVED AREAS; CAST IRON CURB BOX (ITEM 13) SHALL BE USED IN THE STREET.
- G - SUPPORT THE CURB VALVE BOX (ITEM 12) WITH PRE-CAST BASE (ITEM 11) OR BRICKS (ITEM 27). ENTIRE ASSEMBLY SHOULD BE ON WELL COMPACTED SOIL.
- H - REFER TO G-8100 FOR THE INSTALLATION OF PLASTIC MOLDED FITTINGS REQUIREMENTS. PLASTIC MOLDED FITTINGS CAN NEVER BE JOINED TO PLASTIC PIPE/TUBING OR OTHER MOLDED FITTINGS BY MECHANICAL FITTINGS.
- I - REFER TO G-8100 FOR INSTALLATION REQUIREMENTS OF TRANSITION FITTINGS.
- J - REFER TO G-8100 AND EO-16645-B FOR INSTALLATION REQUIREMENTS OF SERVICE CONNECTIONS TO MAINS.
- K - RISER SUPPORT TO BE INSULATED FROM PIPE WITH NEOPRENE (OR EQUIVALENT) WRAPPED AROUND PIPE.
- L - IPS PLASTIC PIPE CONNECTIONS SHALL BE BUTT FUSED WHENEVER POSSIBLE. FOR CTS PLASTIC PIPE CONNECTIONS, USE PERMASERT COUPLINGS (ITEM 8). COUPLINGS UP TO AND INCLUDING 12" SHALL ONLY BE A RESTRAINING-TYPE.
- M - REFER TO G-8100 FOR INSTALLATION REQUIREMENTS OF GAS SERVICES THAT ENTER A BUILDING THROUGH THE FLOOR; GAS SERVICES INSERTED/INSTALLED UNDER AN ENCLOSED LIVING SPACE; GAS SERVICES INSTALLED THROUGH A SUBSURFACE VAULT OR OPEN AREAWAY; GAS SERVICES INSTALLED IN AN OPEN AREA UNDERNEATH AN OUTSIDE STAIRCASE. SEE EO-16546-B, EO-4890-B, G-8096.
- N - REFER TO G-8205 FOR MAGNESIUM ANODE INSTALLATION REQUIREMENTS ON PIPE BEND AND COUPLINGS; ANODE NOT REQUIRED FOR ANODELESS RISER INSTALLATION.
- O - REFER TO G-8100 FOR SERVICE HEAD VALVE (S/H/V) INSTALLATION REQUIREMENTS.
- P - REFER TO G-8096 FOR ANNULAR SPACE SEALING REQUIREMENTS. USE TRANSITION FITTING FOR ≥1½" IPS PLASTIC PIPE AND INSTALL LINK SEAL (ITEM 20). FOR ½" CTS - 1½" CTS/IPS PLASTIC PIPE, EXTEND PLASTIC THROUGH A THREADED STEEL WALL SLEEVE (ITEM 26) AND SEAL THE ANNULAR SPACE INSIDE THE BUILDING BY INSTALLING SERVICE HEAD VALVE ADAPTER (ITEM 3). THE OUTSIDE ANNULAR SPACE SHALL BE SEALED BY USING 3M COLD SHRINK OR "SLIPSEALS" (ITEM 20).
- Q - FOR IPS PLASTIC PIPE, USE TRANSITION FITTING (ITEM 23). FOR CTS PLASTIC PIPE, USE STAB END ADAPTER (ITEM 16) AND PVC SLEEVE (ITEM 14).
- R - ALL DIRECT BURIED PLASTIC SERVICES USING 1" OR 1½" CTS PLASTIC PIPE SHALL BE INSTALLED IN A SLEEVE (ITEM 14) AND SHALL ONLY BE USED FOR LOW PRESSURE SERVICES.
- S - "WARNING BURIED GAS LINES BELOW" TAPE (ITEM 31) MUST BE INSTALLED AT A MINIMUM OF 12" ABOVE THE TOP OF THE DIRECT BURIED NEW/REPLACEMENT SERVICE. WHEN NEW/REPLACEMENT SERVICES ARE INSERTED, THE TAPE IS TO BE INSTALLED IN ALL EXCAVATIONS, SUCH AS THE MAIN CONNECTION, THE CURB VALVE AND OTHER EXCAVATIONS.

SEE ADDITIONAL SHEETS 3 OF 4 AND 4 OF 4 FOR BILL OF MATERIAL

**INSTALLATION
OF PLASTIC (DIRECT BURIAL OR INSERTION)
GAS SERVICE PIPING**

CONSOLIDATED EDISON COMPANY OF N.Y., INC.
GAS ENGINEERING DEPT.

DATE
LAST REV. 6/22/11

DWG. NO. **EO-16641-A**
SHEET 2 OF 4

REV. **4**

1-03-015 04199-03

REVISIONS

M. BALDOVIN
B. DAS

0

REDRAWN BY CAD

RAL

5/16/06

M. BALDOVIN
7/27/06

1

CHANGED MATERIAL LIST

CP

6/26/06

M. BALDOVIN
6/22/11

2

CHANGED MATERIAL LIST

D.J.

6/22/11

8

341 - 5775 2" IPS

341 - 5767 1 1/4" IPS

341 - 5783 1" IPS

341 - 3952 1 1/4" CTS

341 - 3960 1" CTS

341 - 3945 1/2" CTS

8

337 - 9229 1 1/4" CTS

337 - 9237 1" CTS

337 - 9245 1/2" CTS

7

003 - 4215 COVER, PLASTIC PLATE

020 - 1145 LOCK, CURB VALVE BOX

003 - 9172 BOX, CURB VALVE, PLASTIC

003 - 7762 BOX, CURB VALVE, PLASTIC (UP TO 1 1/2" VALVE)

003 - 8729 BOX, CURB VALVE, PLASTIC (2", 3", 4" VALVE)

002 - 2673 CURB VALVE BOX, CONCRETE COVER (S/W)

4

337 - 7876 4" BOLTED

337 - 8700 3" BOLTED

337 - 8932 2" x 1 1/4" REDUCER

337 - 8924 2" x 1 1/4" REDUCER

337 - 8916 2" x 1" REDUCER

337 - 8106 2" CONDUCTIVE

337 - 8908 1 1/2" x 1 1/2" REDUCER

337 - 8890 1 1/2" x 1" REDUCER

337 - 8858 1 1/2" CONDUCTIVE

337 - 8882 1 1/4" x 1" REDUCER

337 - 8874 1 1/4" x 3/4" REDUCER

337 - 8098 1 1/4" CONDUCTIVE

337 - 8866 1" x 3/4" REDUCER

337 - 8841 1" CONDUCTIVE

337 - 8833 3/4" CONDUCTIVE

3

341 - 0958 2" FPT x 1 1/4" CTS x 1 1/2" MPT

341 - 4786 2" FPT x 1" IPS x 1" MPT

341 - 0941 1 1/2" FPT x 1 1/4" CTS x 1 1/2" MPT

341 - 2467 1 1/2" FPT x 1 1/4" CTS x 1 1/2" MPT

337 - 6480 1 1/2" FPT x 1" CTS x 1 1/2" MPT

337 - 7330 1 1/4" FPT x 1" CTS x 1 1/2" MPT

341 - 2186 1 1/4" FPT x 1" CTS x 1 1/4" MPT

337 - 6035 1 1/4" FPT x 1/2" CTS x 1 1/4" MPT

337 - 5631 1" FPT x 1/2" CTS x 1" MPT

337 - 1648 3/4" FPT x 1/2" CTS x 1" MPT

341 - 1022 3/4" FPT x 1/2" CTS x 3/4" MPT

341 - 2764 1 1/2" THD. INLET x 1 1/4" CTS. PLAST. OUTLET INNER-TITE

341 - 2756 1 1/2" THD. INLET x 1" CTS. PLAST. OUTLET INNER-TITE

2

341 - 5643 2" IPS x 1" IPS CENTRAL PLASTICS - HDPE

341 - 5635 2" IPS x 1/2" CTS CENTRAL PLASTICS - HDPE

341 - 5627 1 1/4" IPS x 1" IPS CENTRAL PLASTICS - HDPE

341 - 5619 1 1/4" IPS x 1/2" CTS CENTRAL PLASTICS - HDPE

SIDEWALL FUSION PLASTIC BODY-TAPPING TEE

341 - 3788 12" MAIN x 2" IPS OUTLET

341 - 3879 12" MAIN x 1 1/4" CTS OUTLET

341 - 4760 12" MAIN x 1/2" CTS OUTLET

341 - 4125 10" MAIN x 2" IPS OUTLET

341 - 4166 10" MAIN x 1 1/4" IPS OUTLET

341 - 2798 8" MAIN x 2" IPS OUTLET

341 - 3867 8" MAIN x 1 1/4" CTS OUTLET

341 - 2780 8" MAIN x 1" IPS OUTLET

341 - 4604 8" MAIN x 1/2" CTS OUTLET

341 - 1121 6" MAIN x 2" IPS OUTLET

341 - 3895 6" MAIN x 1 1/4" CTS OUTLET

341 - 2145 6" MAIN x 1" IPS OUTLET

341 - 4612 6" MAIN x 1/2" CTS OUTLET

341 - 2202 4" MAIN x 2" IPS OUTLET

341 - 3903 4" MAIN x 1 1/4" CTS OUTLET

341 - 1139 4" MAIN x 1" IPS OUTLET

341 - 4596 4" MAIN x 1/2" CTS OUTLET

341 - 2194 3" MAIN x 2" IPS OUTLET

341 - 3911 3" MAIN x 1 1/4" CTS OUTLET

341 - 1147 3" MAIN x 1" IPS OUTLET

341 - 1154 2" MAIN x 1" IPS OUTLET

341 - 3291 2" MAIN x 1/2" CTS OUTLET

341 - 1162 1 1/2" MAIN x 1" IPS OUTLET

341 - 3283 1 1/2" MAIN x 1/2" CTS OUTLET

1

341 - 4794 2" x 2" IPS

341 - 4505 2" x 1 1/4" CTS

341 - 4521 2" x 1" CTS

341 - 4588 1 1/2" x 1 1/4" CTS

341 - 4513 1 1/2" x 1" CTS

341 - 4463 1 1/2" x 1" CTS

341 - 4471 1 1/4" x 1" CTS

TEE METALIC BODY

337 - 5763 2" WELD INLET x 2" INSUL.COMP. OUTLET

337 - 6811 2" THD. INLET x 2" PLAIN OUTLET

337 - 5789 2" THD. INLET x 2" INSUL.COMP. OUTLET

337 - 6449 1 1/2" WELD. INLET x 1 1/4" WELD OUTLET

337 - 6852 1 1/4" THD. INLET x 1 1/4" PLAIN OUTLET

337 - 6910 1" THD. INLET x 1" COMP OUTLET

337 - 5656 1" THD. INLET x 1" INSUL.COMP. OUTLET

337 - 6431 1" WELD INLET x 3/4" INSUL.COMP. OUTLET

337 - 7686 3/4" WELD INLET x 1" COMP OUTLET
SELF TAPPING FOR MP & HP USE ONLY

ITEM NO.

CLASS & STOCK NO.

DESCRIPTION

DWG. NO. SPEC. NO.

BILL OF MATERIAL

NOTE:

SEE SHEETS NO 1 OF 4 AND 2 OF 4 OF THIS DRAWING # EO-16641 INSTALLATION OF PLASTIC (DIRECT BURIAL OR INSERTION) TO INDOOR / OUTDOOR METER, GAS SERVICE PIPING.

CONST. STDS.
VOLUME 2

CONTINUED ON SHEET 4 OF 4

18

686 - 0134

ROCK SHIELD, PLASTIC MESH

17

596 - 2436

TAPE, ELECTRICAL P.V.C.

16

341 - 4075 2" IPS x 1 1/4" CTS

341 - 0925 1 1/2" IPS x 1 1/4" CTS

341 - 3341 1 1/4" IPS x 1 1/4" CTS

341 - 2178 1 1/2" IPS x 1" CTS

337 - 6027 1 1/4" IPS x 1/2" CTS

337 - 5839 1" IPS x 1/2" CTS

341 - 1014 3/4" IPS x 1/2" CTS

ADAPTER W/STIFFENER, STAB END

G-100,291

15

341 - 2269 2" IPS

341 - 2251 1 1/2" IPS

341 - 2244 1 1/4" IPS

341 - 2236 1" IPS

341 - 2228 3/4" IPS

BUSHING END PROTECTOR

14

341 - 0974 3" OD WITH 2" SLOT

341 - 0966 3" OD WITH 1 1/2" SLOT

341 - 0860 2" OD WITH 1" SLOT

341 - 0792 1 1/2" OD WITH 3/4" SLOT

SLEEVE, PROTECTIVE, PVC:

13

079 - 0048 32 LBS

079 - 0030 17 LBS

079 - 0014 3 LBS

ANODE MAGNESIUM:

G-8102

12

003 - 9172 WHITE PLASTIC WITH YELLOW COVER

003 - 9602 CAST IRON C/V BOX EXTENSION

003 - 3423 BOX, CURB VALVE, CI 24"

003 - 3365 BOX, CURB VALVE, CI 36"

BOX, CURB VALVE:

EO-4045-C

11

002 - 5114

BASE, CURB VALVE

EO-9241-D

10

328 - 0641 12" IPS (40' LENGTHS)

328 - 0849 12" IPS (20' LENGTHS)

328 - 0518 8" IPS (40' LENGTHS)

328 - 0559 8" IPS (20' LENGTHS)

328 - 0401 6" IPS (40' LENGTHS)

328 - 0567 6" IPS (20' LENGTHS)

328 - 0393 4" IPS (40' LENGTHS)

328 - 0575 4" IPS (20' LENGTHS)

328 - 0690 4" IPS (500' COIL)

328 - 0385 3" IPS (40' LENGTHS)

328 - 0583 3" IPS (20' LENGTHS)

328 - 0708 3" IPS (500' COIL)

328 - 0591 2" IPS (20' LENGTHS)

328 - 0377 2" IPS (500' COIL)

328 - 0369 1 1/2" IPS (500' COIL)

328 - 0351 1" IPS (500' COIL)

360 - 0954 1 1/4" CTS (500' COIL)

360 - 0988 1" CTS (500' COIL)

360 - 0947 1/2" CTS (500' COIL)

PIPE AND TUBING, PLASTIC

G-8104

9

379 - 7198 12" IPS FULL PORT

379 - 2939 8" IPS FULL PORT

379 - 2921 6" IPS FULL PORT

379 - 7271 4" IPS FULL PORT

379 - 7412 3" IPS FULL PORT

379 - 4229 2" IPS

374 - 2657 1 1/2" IPS W/PERMASERT TYPE ENDS

374 - 2749 1 1/4" CTS W/PERMASERT TYPE ENDS

374 - 2665 1" IPS W/PERMASERT TYPE ENDS

374 - 2731 1" CTS W/PERMASERT TYPE ENDS

374 - 2798 1/2" CTS W/PERMASERT TYPE ENDS

VALVE, PLASTIC

G-100,298

8

341 - 4976 8" IPS CENTRAL PLASTICS

341 - 4182 6" IPS CENTRAL PLASTICS

341 - 4190 4" IPS CENTRAL PLASTICS

341 - 4208 3" IPS CENTRAL PLASTICS

341 - 4216 2" IPS CENTRAL PLASTICS

341 - 4174 1 1/4" IPS CENTRAL PLASTICS

341 - 4224 1" IPS CENTRAL PLASTICS

341 - 5429 12" IPS FRIATEC

341 - 5411 8" IPS FRIATEC

341 - 5395 6" IPS FRIATEC

341 - 5379 4" IPS FRIATEC

341 - 5403 3" IPS FRIATEC

341 - 5387 2" IPS FRIATEC

341 - 5916 1 1/4" IPS FRIATEC

341 - 5908 1" IPS FRIATEC

341 - 5866 1/2" CTS FRIATEC

COUPLING - ELECTROFUSION

8

341 - 4836 1 1/4" CTS

341 - 4877 1" CTS

341 - 4869 1/2" CTS

COUPLING, PERMASERT

G-8104

ITEM NO.

CLASS & STOCK NO.

DESCRIPTION

DWG. NO. SPEC. NO.

INSTALLATION OF PLASTIC (DIRECT BURIAL OR INSERTION) GAS SERVICE PIPING
BILL OF MATERIAL

CONSOLIDATED EDISON COMPANY OF N.Y., INC.
GAS ENGINEERING DEPT

DATE

5/16/06

DWG. NO.

EO-16641-A

REV.

2

LAST REV.

6/22/11

SHEET 3 OF 4

1-301 EDS 0-4-1999-03	
REVISIONS	
M. BALDWIN B. DAS	0
REDRAWN BY CAD	
RAJ.	5/16/06
M. BALDWIN 7/27/06	1
UPDATED MATERIAL LIST	
C.P.	6/26/06
M. BALDWIN 6/22/11	2
UPDATED MATERIAL LIST	
D.J.	6/22/11
CONST. STDS. VOLUME 2	

31	024 -- 6660	TAPE, "WARNING GAS LINES BELOW"	G-8100
30		BEND, PIPE, RISER:	
	003 -- 0700	2" IPS	
	003 -- 1047	3" IPS	
29	058 -- 3534	THERMIT WELD: FOR STEEL.	G-100,279
28		SLEEVE,WALL,SCH.40,STEEL.THREAD ONE END	
27	000 -- 0372	BRICK, NO.1 COMMON RED:	
26		SLEEVE,WALL,SCH.40,STEEL OR P.V.C. PIPE.	G-8096
25	563 -- 0199	WIRE, PLASTIC COATED COPPER,RED,NO.14	
	563 -- 1361	WIRE, PLASTIC COATED COPPER,RED,NO.10	
24		REDUCER,PLASTIC:	
	341 -- 1220	2" IPS x 1 1/4" IPS	
	341 -- 1170	2" IPS x 1 1/4" CTS	
	341 -- 2749	1" IPS x 1 1/4" CTS	
	341 -- 2079	1" IPS x 1" CTS	
	341 -- 1196	1" IPS x 1/2" CTS	G-8104
23		FITTING, TRANSITION, PLASTIC TO STEEL, THREADED END	
	341 -- 4414	4" IPS x 4" IPS	
	341 -- 4356	3" IPS x 3" IPS	
	341 -- 4349	2" IPS x 2" IPS	
	341 -- 4331	1 1/2" IPS x 1 1/4" IPS	
	341 -- 4323	1" IPS x 1" IPS	
		FITTING, TRANSITION, PLASTIC TO STEEL, BEVELED END	
	341 -- 3820	12" IPS x 12" IPS	
	341 -- 1113	10" IPS x 10" IPS	
	341 -- 2822	8" IPS x 8" IPS	
22		ELBOW, THREADED END	
	332 -- 1080	3"	
	332 -- 1049	2"	
	332 -- 1023	1 1/2"	
	332 -- 1007	1 1/4"	
	332 -- 0983	1"	
	332 -- 1429	3/4"	
		NIPPLE,STEEL,SHOULDER,SCH.80	
	330 -- 1694	4" x 4" LONG	
	330 -- 1629	3" x 4" LONG	
21		SEAL, LINK	
	341 -- 0776	12" x 16" (12 LINKS)	
	341 -- 1030	10" x 16" (10 LINKS)	
	341 -- 1006	8" x 12" (12 LINKS)	
	341 -- 1006	6" x 10" (10 LINKS)	
	341 -- 0750	4" x 6" (6 LINKS)	
20		3M COLD SHRINK	
	341 -- 5676	1" x 3/4" (WILL ALSO SEAL 1" x 1/2")	
	341 -- 5684	1 1/2" x 1 1/2" (WILL ALSO SEAL 1 1/2" x 1 1/4")	
	341 -- 5692	2" x 1 1/2" (WILL ALSO SEAL 2" x 1 1/4")	
	341 -- 5700	3" x 2" (WILL ALSO SEAL 3" x 1 1/2" ,BUT NOT 1 1/4")	
		VALVE, PLUG, SERVICE HEAD	
19	374 -- 2319	12" FLANGED END	
	374 -- 2772	10" FLANGED END	
	374 -- 2293	8" FLANGED END	
	374 -- 2277	6" FLANGED END	
	374 -- 2335	4" FLANGED END	
	374 -- 2103	4" THREADED END	
	374 -- 1345	3" FLANGED END	
	374 -- 0354	3" THREADED END	
	374 -- 0321	2" THREADED END	
	374 -- 2095	1 1/2" THREADED END	
18	374 -- 2434	1 1/2" THREADED END	
	374 -- 0248	1" THREADED END	
	374 -- 2350	3/4" THREADED END	

BILL OF MATERIAL
CONTINUED FROM SHEET 3 OF 4

35		SIDEWALL FUSION TAPPING TEE w/EFV & PERMASERT END	
	341 -- 5452	12" MAIN x 1/2" CTS OUTLET	
	341 -- 5460	8" MAIN x 1/2" CTS OUTLET	
	341 -- 5478	6" MAIN x 1/2" CTS OUTLET	
	341 -- 5486	4" MAIN x 1/2" CTS OUTLET	
	341 -- 5494	2" MAIN x 1/2" CTS OUTLET	
34		EXCESSFLOW VALVES	
	341 -- 5528	1" IPS x 1/2" CTS x 1" IPS (STAB ENDS)	
	337 -- 9492	3/4" IPS x 1/2" CTS x 3/4" IPS (STAB ENDS)	
	341 -- 4893	1/2" CTS WITH PERMESRT ENDS	
33		BEND, ANODELESS RISER	
	341 -- 5601	4" IPS x 4" IPS FLANGED	
	341 -- 5585	4" IPS x 4" IPS THREADED	
	341 -- 5593	3" IPS x 3" IPS FLANGED	
	341 -- 5577	3" IPS x 3" IPS THREADED	
	341 -- 5304	2" IPS x 2" IPS	
	341 -- 5023	1" IPS x 1" IPS	
	341 -- 3747	1 1/2" CTS x 1 1/2" IPS	
	341 -- 3739	1" CTS x 1" IPS	
	341 -- 3721	1/2" CTS x 1" IPS	
32		ELBOW, PLASTIC, 90 DEGREES, " MET-FIT "	
	341 -- 3994	1 1/2" CTS	
	341 -- 3986	1" CTS	
	341 -- 3978	1/2" CTS	
		ELBOW, PLASTIC, 90 DEGREES, " PERMASERT "	
	341 -- 4810	1 1/2" CTS	
	341 -- 4802	1" CTS	
	341 -- 4828	1/2" CTS	
		ELBOW, PLASTIC, 90 DEGREES	
	341 -- 3796	12" IPS	
29		ELBOW, PLASTIC, 45 DEGREES	
	341 -- 3804	12" IPS	
	341 -- 2806	8" IPS	
	341 -- 2160	6" IPS	
	341 -- 2111	4" IPS	
	341 -- 2103	3" IPS	
		ITEM NO. CLASS & STOCK NO. DESCRIPTION DWG. NO. SPEC. NO.	

BILL OF MATERIAL

NOTES :

SEE SHEETS NO1 OF 4 AND 2 OF 4 OF THIS DRAWING
EO-16641 INSTALLATION OF PLASTIC (DIRECT BURIAL
OR INSERTION) GAS SERVICE PIPING.

INSTALLATION OF PLASTIC (DIRECT BURIAL OR
INSERTION) GAS SERVICE PIPING
BILL OF MATERIAL

CONSOLIDATED EDISON COMPANY OF N.Y., INC.
GAS ENGINEERING DEPT

DATE	5/16/06	DWG. NO.	EO-16641-A	REV.	2
LAST REV.	6/22/11	NO.	SHEET 4 OF 4		



CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
4 IRVING PLACE
NEW YORK, NY 10003

**DISTRIBUTION ENGINEERING
DISTRIBUTION EQUIPMENT**

**SPECIFICATION EO-8085
REVISION 9
NOVEMBER 2013**

**EFFECTIVE DATE
NOVEMBER 30, 2013**

**GENERAL SPECIFICATION FOR BACKFILL
AND BEDDING MATERIAL
FOR EXCAVATIONS**

FILE: PURCHASE AND TEST STANDARDS, MANUAL NO. 6, SECTION 16

TARGET AUDIENCE	REGIONAL CONSTRUCTION
NESC REFERENCE	NONE

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3.0	DEFINITION	3
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5.0	MATERIAL	3
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5.2	Recycled Backfill	3
5.3	Fill Material	4
6.0	COMPACTION.....	4

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-8085	9	11/15/2013	11/15/2013	2007-2013 Consolidated Edison Co. of New York, Inc.	2/6
Filing Information		Purchase and Test		Manual No. 6, Section 16	

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Distribution Engineering Intranet Site [Distribution Engineering](#) or <http://distribution>, for the current version prior to use.

1.0 **PURPOSE**

This specification applies to backfill and bedding material for use around conduits, manholes, vaults, underground residential distribution (URD) installations, and coated steel pipes for 69KV, 138KV and 345KV electric cable circuits, and all gas mains and all gas mains and services.

2.0 **APPLICATION**

All Customer Service Areas and Gas Operations.

3.0 **DEFINITIONS**

- 3.1 The term "Con Edison" as used in this Specification refers to the Consolidated Edison Company of New York, Inc.
- 3.2 The term "Con Edison Engineer" as used in this Specification refers to the project engineer.
- 3.3 The term "Con Edison Construction Representative" as used in this Specification refers to the Construction Manager, Contract Construction Manager or his authorized representative.

4.0 **GENERAL APPROVALS**

The Con Edison Engineer or Con Edison Construction Representative shall have the right to examine all fill ordered in accordance with this Specification prior to its placement and reject any order which does not comply with this Specification. The Contractor shall be responsible for the trucking cost of any loads, which are rejected.

5.0 **MATERIAL**

- 5.1 **Backfill** - Material to be used for backfill shall conform to the following types. Type 3/8 - This material shall be clean fill material conforming to the sieve analysis shown in Table 1. It shall have a pH value greater than 5.5 and shall be free of cinders, ashes, vegetable matter, rubbish or any foreign matter. Type I - This material shall be clean fill material conforming to the sieve analysis shown in Table 2. It shall have a pH value greater than 5.5 and shall be free of cinders, ashes, vegetable matter, rubbish or any foreign matter. Type II - This material shall be clean sand conforming to the sieve analysis shown in Table 3. It shall have a pH value greater than 5.5 and shall be free of cinders, ashes, vegetable matter rubbish or any foreign matter.
- 5.2 **Recycled Backfill** - Backfill material composed of excavated material recycled at a New York State Department of Environmental Conservation

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
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Filing Information		Purchase and Test		Manual No. 6, Section 16	

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certified recycling facility is permitted. The recycled backfill shall conform to the requirements of paragraph 5.1.

- 5.3 Fill Materials** – Fill materials containing or comprised of “Stone Dust”, or “Pond Fill” (crystalline silica) shall not be used as backfill material.

6.0 COMPACTION

The compaction criteria specified in EO-1181 shall be followed for all installations listed in Section 1.0.

Mohsen Shaaker (Signature on File)
 Mohsen Shaaker
 Manager
 Tools and Structures
 Distribution Engineering Department

ATTACHMENT: Table 1, 2, & 3

L. Kandic

<u>REVISION No. 9</u>	<u>FILE:</u>
1) Revised cover page (pg. 1) to: add “Specification for” 2) Revised cover page (pg. 1) to reflect Purchase and Test Standard Manuals 3) Revised Table of Contents (pg. 2) to reflect added Section 6.0 Compaction 4) Revised pg. 4 to add Section 6.0 Compaction	Purchase and Test, Manual No. 6, Sect. 16 - Pipe Type Cable Field Manual # 22, Sec. 10

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-8085	9	11/15/2013	11/15/2013	2007-2013 Consolidated Edison Co. of New York, Inc.	4/6
Filing Information		Purchase and Test		Manual No. 6, Section 16	
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ATTACHMENT

TABLE 1

Sieve Size	Percent Passing
3/8"	100
#4	95-100
#8	80-100
#16	50-85
#30	25-60
#50	10-30
#200	0-0

TABLE 2

Sieve Size	Percent Passing
1"	100
3/4"	95-100
#4	60-85
#8	45-70
#30	15-30
#50	5-20
#200	0-3

TABLE 3

Sieve Size	Percent Passing
2"	100-85
3/4"	
#4	
#8	45-70
#30	
#50	
#200	0-15



**CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
4 IRVING PLACE
NEW YORK, NY 10003**

**DISTRIBUTION ENGINEERING
TOOLS AND STRUCTURES**

**SPECIFICATION EO-1181
REVISION 6
May 2010**

**EFFECTIVE DATE
June 1, 2010**

**GENERAL SPECIFICATION FOR BACKFILLING
OF TRENCH AND SMALL OPENINGS**

FILE: CONSTRUCTION STANDARDS MANUAL NO. 3, SECTION 37

TARGET AUDIENCE	REGIONAL CONSTRUCTION
NESC REFERENCE	NONE

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2.0	<u>APPLICATION</u>	3
3.0	<u>DEFINITIONS</u>	3
4.0	<u>REQUIREMENTS</u>	4
4.1	<u>Compaction</u>	4
4.2	<u>Density Testing</u>	5
4.3	<u>Procedure For Electric Duct Backfill</u>	5
4.4	<u>Procedure For 138kv Cable Pipe Installation</u>	6
4.5	<u>Procedure For Backfilling Gas Trenches & Small Openings</u>	6
4.6	<u>Backfilling Concrete Coated & Steel Jacketed Steam Main Trenches</u>	7
5.0	<u>PRECAUTIONS</u>	7

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	2/7
Filing Information		Construction Standards		Manual No. 3, Section 37	
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1.0 **PURPOSE**

This specification details the procedures to be followed in backfilling all Con Edison street openings for electric, gas and steam facilities.

2.0 **APPLICATION**

This specification applies to all Con Edison Customer Service Areas.

3.0 **REFERENCE SPECIFICATION AND DEFINITIONS**

- 3.1** The term "Engineer" used in this specification refers to the Distribution Tools & Structures Engineer or his authorized representative.
- 3.2** The term Construction Representative shall mean the Construction Manager, Contract Construction Manager, or his authorized representative.
- 3.3** The terms "Type 3/8", "Type I" and "Type II" shall be as defined in [EO-8085](#).
- 3.4** The term "small opening" shall refer to street openings which are 6' x 5' or smaller.
- 3.5** The term "suitable backfill" shall refer to in-place material excavated from the trench or opening which satisfies the following requirements:
- 3.5.1** The excavated material shall be free of all broken asphalt pavement, broken concrete, brick, all organic material, and all debris.
- 3.5.2** The excavated material shall be substantially sandy soil gritty and granular in texture and have a small amount of rocks compared to the total volume of soil. It shall have no rocks greater than 2 inches in size.
- 3.5.3** The excavated material shall be substantially free of clay like or clayey soil. Clayey soil shall be determined as soil that is powder like in texture when dry and capable of being molded when wet.

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	3/7
Filing Information		Construction Standards		Manual No. 3, Section 37	

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- 3.5.4** Frozen backfill material shall either be removed or broken into small particles before being compacted. Excessively wet material shall be mixed with dry material to reduce moisture content before backfilling.
- 3.5.5** Fill materials, known as "Stone Dust", or "Pond Fill", containing crystalline silica shall not be used as backfill material.
- 3.5.6** If there are any questions as to suitability of the excavated material, the Engineer shall be consulted.
- 3.6** The term "mechanical compaction" shall mean the use of equipment, either impact or plate vibratory, which is designed specifically for soil compaction. The term "hand tamping" shall mean compaction of backfill by means of a plate tamper, which will impart sufficient force to compact the backfill material.
- 3.7** The term "wetted backfill" shall mean backfill material containing sufficient moisture so that when molded by hand it will form a firm shape. If the specimen crumbles it lacks sufficient moisture. If water is squeezed from the specimen it contains too much moisture.

4.0 REQUIREMENTS

4.1 Compaction

- 4.1.1** The term "compacted", for both "mechanical compaction" and "hand tamping", shall mean a minimum level of compaction of 95% of the maximum dry density of the backfill material used as determined by a Standard Proctor Test (ASTM D-698). In lieu of a Standard Proctor Test a "one point" test shall be done by taking a sample of the soil and compacting it using a Standard Proctor mold procedure and determining the maximum in field density that can be obtained and 95% of this value should be used as a comparison to the actual compaction achieved.
- 4.1.2** In lieu of the above, when using "suitable backfill", compaction will be considered adequate if density readings of the compacted fill equal 95% of the readings of the in-place material (i.e. density readings must be taken at the time of excavation to use as reference for compaction). For this type of "before and after" comparison, devices such as the nuclear density tester may be used.

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	4/7
Filing Information		Construction Standards		Manual No. 3, Section 37	
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4.2 Density Testing

- 4.2.1** The sand-cone test, ASTM D1556 or nuclear density tester may be used for all in place density tests. Other methods may be used upon approval of the Engineer.
- 4.2.2** The Construction Representative or Engineer may order as many in-place density tests as he deems necessary to insure proper compaction. If an in-place density test indicates insufficient compaction, the Contractor shall re-compact the area in question until the backfill is compacted to the requirements set forth in paragraph 4.1.1. The Contractor may elect to take additional tests 5 feet on both sides of the test which failed, and average the values of the three readings. If the average value of the three tests meets the compaction requirements, the area in question will be considered sufficiently compacted and no additional compaction will be required. If the average value does not meet the compaction requirements, the Contractor will be required to pay for the two additional in-place density tests and to re-compact the area, which has been determined to be insufficiently compacted. Test after recompaction.

4.3 Procedure For Electric Duct Backfill

- 4.3.1** The following backfill procedure shall be used for concrete duct, asbestos cement, and plastic and fibre conduit.
- 4.3.2** Where the ducts are in a rock area, a minimum 4" bed of Type 3/8" backfill shall be placed. It shall be wetted and mechanically compacted to form a firm base for the support of the ducts. Suitable backfill shall be free of stones larger than 2 inches.
- 4.3.3** For concrete conduit, asbestos cement conduit, plastic and fibre conduit encased in concrete, the trench shall be filled with suitable backfill as defined in paragraph 3.5 or Type II material (EO-8085) in 12 inch wetted lifts. Each lift shall be mechanically compacted.
- 4.3.4** For direct buried asbestos cement, plastic and fibre conduit, the trench shall be filled with Type 3/8 material to a level of 12 inches above the ducts. It shall be compacted by hand in a no more than 12 inch wetted lifts. The remaining trench shall be backfilled with suitable backfill or Type II material ([EO-8085](#)) in 12 inch wetted lifts mechanically compacted.

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4.4 Procedure For 138kv Cable Pipe Installation

4.4.1 All installation of 138KV and 345KV cable pipe type feeders shall comply with the requirements set forth in [CE-TS-3352](#).

4.4.2 The requirement for the use of excavated material as "suitable backfill" shall follow the requirements of paragraph 3.5.

4.5 Procedure For Backfilling Gas Trenches & Small Openings

4.5.1 Coated Steel & Plastic Gas Pipe Trenches

- a. A smooth surface shall be excavated in the bottom of the trench and the pipes laid to grade. Where the trench is in a rock area, a minimum of 4 inches of Type 3/8 material shall be placed, wetted and mechanically compacted to form a firm base for the gas pipes.
- b. The trench shall be backfilled with Type 3/8 material to a height of 12 inches above the pipe in a maximum of 12 inch wetted lifts which shall be hand compacted.
- c. The remaining trench shall be backfilled with Type 3/8, Type I, Type II or suitable existing backfill in a maximum of 12 inch wetted lifts, which shall be mechanically compacted.
- d. The density of the compacted backfill shall be tested and accepted or rejected in accordance with paragraph 4.2.2.

4.5.2 Cast Iron, Plastic & Steel Gas Pipe In Small Openings

- a. Backfill material shall be Type 3/8, or suitable existing backfill, which has been segregated to remove all rocks, which may damage the pipe coating.
- b. Openings shall be backfilled to a height of 12 inches above the pipe in a maximum of 12 inch wetted lifts, which shall be hand, compacted. The remainder of the openings shall be backfilled in 12 inch wetted lifts with Type I or Type II or "suitable backfilled" as per paragraph 7 which shall be mechanically compacted.
- c. The density of the compacted backfill shall be tested and

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accepted or rejected in accordance with paragraph 4.2.2.

4.6 Backfilling Concrete Coated & Steel Jacketed Steam Main Trenches

- 4.6.1** A smooth surface shall be established in the bottom of the trench and the pipes leveled and laid on a firm base. Where the trench is in a rock area, a minimum of 4 inches of Type I material shall be placed, wetted and mechanically compacted to form a firm base.
- 4.6.2** The trench shall be backfilled with Type I, or Type II or suitable backfill material in 12 inch wetted lifts, which shall be mechanically compacted.
- 4.6.3** The backfill shall be tested and accepted or rejected in accordance with paragraph 4.2.2.

5.0 PRECAUTIONS

If a work site is found to contain existing fill material that contains or comprised of “Stone Dust” or “pond Fill”, the contractor shall cover the material with a 3” layer of sand. If this material is found to be stockpiled at a work site, it shall be covered with a tarpaulin or removed from the work site.

Joseph R. Martin (Signature on File)
Joseph R. Martin
Manager
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Marco Meza

<u>REVISION No. 5</u>	<u>FILE:</u>
Revised section 4.4 (added installation spec.). Due to be reviewed 05/2015	Construction Standards Manual 3 Section 237 - Subway

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**DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 12 16 – ASPHALT PAVING**

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PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This specification defines the requirements for furnishing and placement of asphalt concrete pavement including base course, binder course and wearing course.
- B. The Contractor shall provide all supervision, labor, materials, tools and equipment required to construct asphalt concrete pavement as indicated herein and on the Contract Drawings.

1.02 REFERENCES

- A. Where reference is made to codes or standards, or to technical or trade specifications (such as ASTM or ANSI), or to the Engineer's standards, the latest edition and latest addenda shall be used. In event of conflict between the reference documents, the most conservative and stringent requirements shall apply. However, any such conflicts shall be brought to the attention of the Engineer for resolution.
- B. The following ASTM publications are referenced in this Section and shall apply:
 - 1. D 4 Bitumen
 - 2. D 8 Roads and Pavements, Materials for
 - 3. D 140 Sampling Bituminous Materials
 - 4. D 242 Bituminous Paving Mixtures, Mineral Filler
 - 5. D 290 Bituminous Mixing Plant Inspection
 - 6. D 692 Bituminous Paving Mixtures, Coarse Aggregate
 - 7. D 946 Asphalt Cement for Use in Pavement Construct
 - 8. D 979 Sampling Bituminous Paving Mixtures
 - 9. D 995 Mixing Plants for Hot-Mixed, Hot-Laid Bitumen
 - 10. D 1073 Bituminous Paving Mixtures, Fine Aggregate
 - 11. D 1097 Bitumen Content of Paving Mixtures by Centri
 - 12. D 1663 Asphalt Paving Mixtures, Hot-Mixed, Hot-Laid
 - 13. D 2041 Maximum Specific Gravity of Bituminous Paving Mixtures

1.03 DEFINITIONS

- A. ROADWAY AND MISCELLANEOUS SURFACE SUBBASE: Gravel materials placed and compacted on prepared subgrade.
- B. COARSE AGGREGATE: Limestone, gravel, slag, or other suitable material, predominately retained on No. 8 sieve.
- C. FINE AGGREGATE: Mineral aggregate passing a No. 8 sieve.
- D. HOT-MIX ASPHALT BASE COURSE: Foundation course of mineral aggregate bound with asphaltic cement, placed on subbase.
- E. HOT-MIX ASPHALT INTERMEDIATE COURSE: A leveling course (binder course) of mineral aggregate bound together with asphaltic cement between a base and surface course.
- F. HOT-MIX ASPHALT SURFACE COURSE: The top (wearing) course of an asphalt pavement.

- G. JOB-MIX FORMULA: Formulation of aggregates and asphalt to comply with the specifications.
- H. MINERAL FILLER: Mineral aggregate, 70% passing No. 200 sieve.
- I. PLASTICITY INDEX (PI): A measure of cohesion and swell characteristics of soil.
- J. SULPHATE SOUNDNESS TEST: Test to determine resistance of aggregates to deterioration by freezing and thawing.
- K. TACK COAT: A light coat of liquid asphalt to existing asphalt or Portland cement concrete surface.
- L. GUTTER: Asphalt material shaped to transport runoff.

1.04 QUALITY ASSURANCE

- A. Qualifications of Asphalt Concrete Producer: Use only materials furnished by a bulk asphalt concrete producer.
- B. Regulatory Requirements: Comply with applicable requirements of New York State Department of Transportation.
- C. Qualifications of Testing Agency: See Section 01400.

1.05 PAVING QUALITY REQUIREMENTS

- A. General:
 - 1. Test in-place asphalt concrete courses for density, thickness, and surface smoothness.
 - 2. Provide final surfaces to grades and cross-sections.
 - 3. Take 4-inch diameter pavement specimens for each course, locations directed by Engineer/Architect.
 - 4. Repair test holes as specified for patching defective work.
- B. Density of Top Course:
 - 1. Compare in-place density against specimen of same asphalt mixture, when subjected to 50 blows of standard Marshall hammer on each side of specimen.
 - 2. Minimum acceptable density, 97% of lab specimen.
- C. Surface Smoothness:
 - 1. Test surface of each course using a 10 ft. straight-edge applied parallel to and at right angles to centerline of paved areas.
 - 2. Check surfaced areas at intervals directed by the Engineer/Architect.
 - 3. Surface will not be acceptable if it exceeds:
 - a. Base Course: 3/8 in. in 10 ft.
 - b. Surface Course: 1/4 in. in 10 ft.
 - c. Crowned Surfaces:
 - (a) Test with crown template, centered and at right angles to the crown.
 - (b) Surface will not be acceptable if it varies more than 1/4 in. from the template.

1.06 SUBMITTALS

- A. Samples: Provide samples for laboratory testing and job-mix design.
- B. Certificates:
 - 1. Provide certificate, in lieu of lab test report.
 - 2. Certify that materials comply with specification.
 - 3. Signed by asphalt concrete producer and Contractor.

1.07 JOB CONDITIONS

- A. Weather Limitations:
 - 1. Apply tack coats when the ambient temperature is 50° F and has not been below 35° F for 12 hours prior to application.
 - 2. Do not apply when the base surface is wet.
 - 3. Construct surface course only when temperature is above 40° F, when the base is dry, and when weather is not rainy.
 - 4. Place base coarse when temperature is not below 35° F and rising.
 - 5. Run-of-bank gravel, crushed gravel, or crushed stone may be placed under any weather conditions acceptable to the Engineer/Architect.
- B. Grade Control: Maintain the required lines, grades, and widths, including crown and cross-slope, for each course.
- C. Subbase Surface: The Contractor shall prime coat the subbase surface if it has been damaged by weather or use.
- D. Traffic Control:
 - 1. Maintain vehicular and pedestrian traffic during paving operations.
 - 2. Provide flagmen, barricades, warning signs, and warning lights for movement of traffic and safety.

PART 2 - PRODUCTS

2.01 BASE COURSE GRANULAR

- A. Granular base course shall consist of Type 2 under sub-section 304-2.02, Material Requirements, of Section 304 - Subbase Course, as outlined in NYSDOT standards.

2.02 BASE COURSE BITUMINOUS CONCRETE

- A. Bituminous concrete base course shall consist of base course, Type 1, conforming to Table 401-1, Section 400, Bituminous Pavements, as outlined in NYSDOT standards.

2.03 BITUMINOUS CONCRETE BINDER AND TOP COURSES

- A. Bituminous concrete binder and top courses shall consist of binder, Type 3 and top course, Type 7 respectively, conforming to Table 401-1, Section 400, Bituminous Pavements as outlined in NYSDOT standards.

2.04 PRIME AND SEAL COATINGS

- A. Prime and/or tack coat where required shall consist of an asphalt emulsion meeting requirements of sub-section 407-2, Materials, of Section 407, Tack Coat, as outlined in NYSDOT standards.
- B. Seal coat where required shall be Jennite AE as manufactured by Maintenance Inc., Wooster, Ohio or equal.

2.05 TRAFFIC AND PARKING MARKING MATERIALS

- A. Traffic lane marking paint:
 - 1. With chlorinated rubber base (state highways).
 - 2. With Methylene chloride and toluene chloride base (all other highways)
- B. Factory mixed, quick-drying and non-bleeding.
 - 1. FS TTP-115E, Type III.
 - 2. FS TTP-115F, Type I.
- C. Color:
 - 1. Driving lane dividers - white.
 - 2. No parking zone markings - yellow.
 - 3. Parking dividers - white.
 - 4. Walking lanes - white or yellow.

PART 3 - EXECUTION

3.01 METHOD OF INSTALLATION

- A. Subgrade Preparation
 - 1. The subgrade (cut or fill) shall be properly compacted to at least a Relative Density of 85% or an equivalent acceptable to the Engineer.
 - 2. The outside edge of the pavement section shall extend at a minimum 12 inches beyond the edge of the bituminous pavement (binder and wearing course), except where concrete curbs are installed.
- B. Thickness Requirements
 - 1. Unless otherwise indicated on the Contract Drawings, the minimum thickness and tolerances of pavement materials shall be in accordance with the following:

Material	Nominal Thickness (Inches)	Tolerance (Inches)
Granular Base Course	6	+/- 1/4
Binder Course	3	+/- 1/4
Top Course	1-1/2	+/- 1/4

2. The thickness indicated for each course of pavement is a nominal thickness. The pavement shall be so constructed that the final compacted thickness is as near to the nominal thickness as is practical. However, the sum total thickness of all the bituminous treated courses combined shall not vary from the total of the nominal thickness by more than 3/8 of an inch.

3.02 PREPARING THE MIXTURE

- A. Comply with ASTM D995 for material storage, control, and mixing, and for plant equipment and operation.
- B. Stockpiles:
 1. Keep each component of the aggregates in separate stockpiles.
- C. Heating:
 1. Heat the asphalt cement to a viscosity which can uniformly distribute the mixture.
 2. Use lowest possible heat to suit viscosity of the asphalt.
 3. Do not exceed 350° F (176.6° C).
- D. Aggregate:
 1. Heat aggregates to reduce moisture content to 1.5%.
 2. Deliver dry aggregate to mixer from 250° F to 325° F to suit penetration grade and viscosity of asphalt cement, air temperature, and workability.
 3. Accurately measure aggregates and asphalt cement to comply with job-mix formula.
- E. Mix aggregate and asphalt cement to achieve 90-95% coating for base and 85-90% coating for surface in accordance with ASTM D2489
- F. Transporting:
 1. Transport mixtures from plant in tight, clean trucks.
 2. Coat compartments with lime-water mixture to prevent sticking.
 3. Drain compartment of excess solution before loading.
 4. Provide covers to protect from weather and heat loss.
 5. For cold weather or long hauls, provide insulation around entire truck bed.

3.03 PLACEMENT

- A. General
 1. Each bituminous material shall be laid with finishing machines having an edging attachment to aid in securing a satisfactory joint between adjacent lanes.
 2. All materials shall be spread immediately upon delivery after the temperature in the delivery vehicle has been checked and approved.
 3. All asphaltic materials shall be placed only on clean and dry surfaces containing no frost. Unless specifically authorized in writing by the Engineer no materials shall be placed when the shade temperature is below 50°F.
 4. Where there is a substantial time span as determined by the Engineer or the Engineer's Field Representative between placing of overlying bituminous materials, the in-place bituminous

layer shall be swept clean and coated with a primer at a rate not exceeding 0.2 gallons per square yard but sufficient to totally coat the underlying layer.

B. Compaction

1. After placing, and while still hot and workable, the material shall initially be rolled with a 10-12 ton three wheel roller or an 8-10 ton tandem roller. Final finishing shall be accomplished using a tandem roller weighing at least ten tons.
2. In areas inaccessible to standard rollers, the required compression shall be secured with mechanical tampers or vibrating rollers approved by the Engineer.

C. Tack Coat:

1. Dilute with water and apply to contact surfaces of existing asphalt concrete or Portland cement concrete.
2. Apply 0.10 to 0.15 gal. per sq. yd.
3. Brush surfaces of curbs, gutters, manholes, and other structures projecting into or abutting pavement.
4. Dry to a "tacky" consistency before paving.
5. Tack coat all end transitions to existing pavement, when traffic is driven on lower paved surface, for all pavement overlays or as ordered by the Owner.

3.04 FRAME ADJUSTMENTS

- A. Set frames to final grade as part of this work. Include existing and new frames furnished under other work.
- B. Surround set frames with a ring of compacted asphalt up to 1 inch below top of frame, slope to grade, and compact by hand prior to paving.
- C. If permanent covers are not in place, install temporary covers until rolling is complete.

3.05 MARKING ASPHALT CONCRETE PAVEMENT

A. Cleaning:

1. Sweep surface with power broom supplemented by hand brooms to remove loose material and dirt.

B. Apply paint with mechanical equipment:

1. Provide uniform straight edges.
2. Not less than 2 separate coats in accordance with manufacturer's recommended rates.

3.06 PAVEMENT MARKINGS

A. Surface Preparation

1. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

2. Thoroughly clean all surfaces to be marked before application of paint. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
3. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement with scrapers, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.
4. Where oil or grease are present on old pavements to be marked, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application.
5. Pavement markings shall follow as closely as practicable after the surface shall been cleaned and dried, but do not begin any markings until the Owner has inspected the surface and gives permission to proceed.

B. Application

1. Parking stall lines shall be 18'-0" long by 0'-4" wide unless otherwise noted.
2. Apply uniformly painted pavement marking of required color(s), length, and width with true, sharp edges and ends on properly cured, prepared, and dried surfaces.
3. The length and width of lines shall conform within a tolerance of plus or minus 3 inches and plus or minus 1/8 inch, respectively.
4. Apply the paint at a wet film thickness of 0.015-inches.
5. Temperature of the surface to be painted and the atmosphere shall be above 50°F and less than 95°F.
6. Apply paint in one coat.

C. Protection

1. Conduct operations in such a manner that necessary traffic can move without hindrance.
2. Protect the newly painted markings so that the tires of passing vehicles will not pick up paint.
3. Place warning signs at the beginning of the wet line, and at points well in advance of the marking equipment for alerting approaching traffic from both directions.
4. Place small flags or other similarly effective small objects near freshly applied markings at frequent intervals to reduce crossing by traffic.
5. Replace damaged portions of markings at no additional cost to the Owner.

D. Detail Pavement Marking

1. Use Detail Pavement Markings on curbs, at crosswalks, at parking bays and at such other locations as shown.
2. Show the International Handicapped Symbol at indicated parking spaces. Color shall be as required by ADA. Apply paint for the symbol using suitable template that will provide marking with true, sharp edges and ends.

E. Final Clean-up

1. Remove all debris, rubbish and excess material.

END OF SECTION

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SECTION 32 31 13 – CHAIN LINK FENCES AND GATES

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PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all work necessary to layout, assemble and install chain-link fencing, posts and gates indicated herein and outlined in the Contract Documents.
- B. The work of this Section of the Specifications shall include all labor, materials, tools, equipment, appliance or services necessary to complete the work as shown on the Drawings, as specified herein, or as required by the job conditions.

1.02 REFERENCES

- A. All work under this section shall conform to the requirements of the “New York State Building Code” and the regulations of governmental authorities having jurisdiction.
- B. All work performed and material supplied under this Section shall be in accordance with the latest addenda thereto of the applicable codes, standards, specifications, regulations, and procedures.
- C. ASTM A116 Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.
- D. ASTM A121 Zinc-Coated (Galvanized) Steel Barbed Wire.
- E. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- F. ASTM A392 Zinc-Coated Steel Chain-Link Fence Fabric.
- G. ASTM C94 Ready-mixed Concrete.
- H. ASTM F567 Installation of Chain-Link Fence.
- I. ASTM F573 Residential Zinc-Coated Steel Chain Link Fence Fabric.
- J. ASTM F669 Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence.
- K. ASTM F1083 Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
- L. ASTM F1234 - Protective Coatings on Steel Framework for Fences.
- M. Chain Link Fence Manufacturers Institute (CLFMI) - Product Manual.

1.03 SUBMITTALS

- A. The Contractor shall furnish product data for all proposed material and equipment that will be furnished to complete the work. Submittal type, quantities and distribution shall be in accordance with the General Requirements section of the Contract Documents and this Section.
- B. Submit submittals for all proposed equipment that will be furnished to complete the work in accordance with the General Requirements section of the Contract Documents and this Section.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer, with minimum 3 years’ experience, who has completed Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Construction Site Quality: Contractor shall maintain, on site, sufficient office, field engineering, and field supervision staff to assure that all materials and layout correspond with the requirements of the Contract Documents and approved drawings.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered to the site, ready for use, in the manufacturer's original and unopened containers or packaging. Packaging to contain material description and manufacturer information.
- B. All delivered materials, products or equipment shall be stored under cover in a dry, weather-tight, and adequately ventilated location. All materials shall be elevated off of the ground.

PART 2 - PRODUCTS

2.01 GENERAL DESCRIPTION

- A. Fence Height: 6 feet.
- B. Security Wire or Ribbon on Top: No
- C. Privacy Slats: No
- D. Gate Type: Double lockable type gate assembly.
- E. Gate Size: 30 inches (each).

2.02 MATERIALS

- A. Framing (Steel): ASTM F1083 Schedule 40 galvanized steel pipe, welded construction, minimum yield strength of 25 ksi; coating conforming to ASTM F1234 Type A on pipe exterior and interior.
- B. Fabric Wire (Steel): ASTM A116 galvanized wire.
- C. Concrete: 3000 psi compressive strength.
- D. Materials and Components: Conform to CLFMI Product Manual.
- E. Fabric Size: CLFMI service.
- F. Intermediate Posts: Type I round.
- G. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round.

2.03 COMPONENTS

- A. Line Posts: 2.38-inch diameter.
- B. Corner and Terminal Posts: 3.5-inch diameter.
- C. Gate Posts: 2.5-inch diameter.
- D. Top and Brace Rail: 1.66-inch diameter, plain end, sleeve coupled.
- E. Gate Frame: 1.66-inch diameter for fittings and truss rod fabrication.
- F. Fabric: 2-inch diamond mesh interwoven wire, 9 gage thick, top salvage bottom selvage.
- G. Tension Wire: 6 gage thick Galvanized steel, single strand.
- H. Tie Wire: Min. 11GA Galvanized steel wire at posts and rails.

2.04 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

- C. Gate Hardware: Fork latch with gravity drop; a minimum of two 180-degree gate hinges per leaf and hardware for padlock.

2.05 FINISHES

- A. Components and Fabric: Galvanized to ASTM A123.
- B. Hardware: Galvanized to ASTM A153.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide all excavation and concrete fill required to support all gate, corner, and run posts. Depth of excavation shall exceed that of the established frostline, (>36 inches).
- B. Install framework, fabric, accessories and gates in accordance with ASTM F567 or applicable manufacturer's instructions.
- C. Place fabric on inside of posts and rails.
- D. Set posts plumb, in concrete footings with top of footing flush with finish grade. Slope top of concrete for water runoff.
- E. Line Post, Corner, Gate and Terminal Post Footing Depths Below Finish Grade: Sufficient to maintain fencing for the duration of the Work.
- F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- G. Provide top rail through line post tops and splice with 6-inch-long rail sleeves.
- H. Install brace rails on corner gate leaves.
- I. Do not stretch fabric until concrete foundation can adequately receive the load of the fence.
- J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- K. Position bottom of fabric at finished grade.
- L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- N. Install bottom tension wire or strap stretched taut between terminal posts.
- O. Do not attach the hinged side of gate from building wall; provide gate posts.
- P. Install gate with fabric and barbed wire overhang to match fence. Install three hinges per leaf with associated other hardware.
- Q. Erection Tolerances
 - 1. Maximum Variation from Plumb: 1/4 inch.
 - 2. Maximum Offset from True Position: 1 inch.
 - 3. Components shall not infringe adjacent property lines.

END OF SECTION

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PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The work under this section shall be subject to the requirements of the “General Conditions” governing all contract and “Special Conditions” for site work.

1.02 SCOPE OF WORK

- A. The work includes all labor, materials, equipment and appurtenances for the complete execution of all work of this section as shown on the drawing, these specifications and conditions at the site, and shall include but not be limited to the following:
 - 1. Testing off-site sources of soil, mulch, and amendment materials for approved use in turf and planting bed soil mix. Verification testing of on-site sub-soils as required.
 - 2. Furnishing material from approved off-site sources(s) for lawn and planting soil mixes and furnishing other soil amendment materials.
 - 3. Amending, preparing, mixing plantings soils for turf, woodland restoration, and planting bed areas throughout the life of the contract.
 - 4. Preparing sub-grade at turf, woodland restoration and planting bed areas.
 - 5. Preparation shall include amending and mixing planting soil with controlled fill material soil to the depths indicated for transition zones of each planting area.
 - 6. Placing, spreading, and fine grading pre-mixed planting soil materials indicated for plant and sod areas.
 - 7. Protecting all plant mix installations with Construction Limit Fencing, or other means approved by the Engineer, as required until substantial completion.

1.03 DESCRIPTION

- A. Related work specified elsewhere:
 - 1. Seeding: Section 32 92 19

1.04 SUBMITTALS

- A. Product Data: Submit to the Engineer technical descriptive data for each manufactured or packaged product of this Section. Include manufacturer’s product testing and analysis and installation instructions for manufactured or processed items and materials.
- B. Certificates: Submit certified analysis for each soil treatment, amendment, and fertilizer material specified and/or approved for use by the Engineer. Include guaranteed analysis and weight for packaged materials.
- C. Test Reports: Submit to the Engineer written reports of each sample tested. Soil tests must be unique and individual to each sample taken and are not to be resubmitted or reused. Samples and analyses must be submitted within 14 calendar days of sampling. Each report shall include the following as a minimum and such other information required specific to material tested:
 - 1. Date issued.
 - 2. Project title and names of Contractor and material supplier.
 - 3. Testing laboratory name, address and telephone number, and name(s), as applicable of each field and laboratory inspector.

4. Date, place, and time of sampling or test with record of temperature and weather conditions.
5. Location of material source.
6. Type(s) of test.
7. Results of tests including identification of deviations from acceptable ranges. Identify any toxic substances(s) harmful to plant growth or life.
- D. Statement(s) of Qualifications: Submit within 15 days of notice to proceed to confirm qualifications as specified in Article 1.05 herein.
- E. Schedule and Protection Plan: Submit a detailed plan for scheduling and sequencing of work and for protection of completed work including coordination with contractors requiring access through the site. Indicate with schedules and plans the utilization of temporary mulch pads and Construction Limit Fencing for protection against over compaction and damage to areas outside the limits of disturbance.
- F. Settlement methodology: Submit a plan with a schedule describing the proposed method intended for settling installed work.
- G. Quality Control Submittals:
 1. Worker's Qualifications Data: Names and addresses of five similar projects that each person has worked on during the past 2 years.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 1. Installation and Maintenance: Foreman on the job shall be experienced in landscape installation and maintenance. Perform work with personnel very familiar with planting soil preparation and lawn and planting installations under the supervision of a foreman experienced with landscape work.
 2. Agricultural Chemist: Experienced person or persons employed by public or private soils testing laboratory, qualified and capable of performing tests, making soil recommendations and issuing reports as specified. Testing Laboratory and Agricultural Chemist shall be approved by the Engineer.
- B. References:
 1. Association of Official Agricultural Chemists.
 2. American Society for Testing and Materials (ASTM) using test criteria as specified or required by other references.
- C. Inspections and Testing:
 1. Soil, leaf mold, mulch, and other material testing required in this Section shall be furnished and paid for by the Contractor. Contractor shall provide labor to the Engineer for performing any tests unless otherwise provided.
 2. Owner's Representative, and/or Engineer reserve the right to take and analyze at any time such additional samples of materials as deemed necessary for verification of conformance to specification requirements. Contractor shall furnish samples for this purpose upon request and shall perform testing as requested.

1.06 REGULATORY REQUIREMENTS

- A. Comply with all rules, regulations, laws, and ordinances of local, state, and federal authorities having jurisdiction. Provide labor, materials, equipment, and services necessary to make Work comply with such requirements without additional cost to Owner.
- B. Procure and pay for permits and licenses required for work of this section.

1.07 PROJECT/SITE CONDITIONS

A. Acquaintance with Existing Site Conditions

- 1. Through study of all Contract Documents, and by careful examination of the site, become informed as the nature of surface and subsurface soil conditions, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work.
- 2. Investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions, and other limitations affecting transportation ingress and egress of this work site. Conform to all governmental regulations with regard to the transportation of materials to, from, and at the job site, and secure in advance such permits as may be necessary.
- 3. Should the Contractor, in the course of work, find any discrepancies between Contract Drawings and physical conditions or any omissions or errors in Drawings, or in layout as furnished by the Owner, it will be contractor's duty to inform the Engineer immediately in writing for clarification. Work done after such discovery unless authorized by the Engineer, shall be done at the Contractor's risk.

B. Environmental Requirements:

- 1. Perform both off-site mixing and on-site soil work only during suitable weather conditions. Do not disc, rototill, or work soil when frozen, excessively wet, or in otherwise unsatisfactory condition.
- 2. Soil mixes shall not be handled, hauled or placed during rain or wet weather or when near or above field capacity.

C. Sequencing and Scheduling: Adjust, relate together, and otherwise coordinate work of this Section with work of Project and all other sections of Project Specifications.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials to the location where soils are to be mixed, in unopened bags or containers, each bearing the name, guarantee, and trademark of the producer, material composition, and manufacturer has certified analysis, and the weight of the material. Retain packaging for the Engineer.
- B. Soil, mulch, or amendment materials stored on-site temporarily in stockpiles prior to placement shall be protected from intrusion of contaminants and erosion. Engineer shall approve all temporary storage means and methods.
- C. After mixing, soil materials shall be covered with a tarpaulin until time of actual use.

PART 2 - PRODUCTS

2.01 PLANT MIX MATERIALS

A. General:

1. All plant mix materials shall fulfill the requirements for new plant mixes as specified.
2. Samples of individual components of plant mixes in addition to blended plant mixes including mulch materials shall be submitted by the contractor for testing and analysis to the approved testing laboratory. Include verification testing of on-site sub-soils. Comply with specific material requirements specified.
 - a. No base component material for plant mix shall be used until certified test reports by an agricultural chemist have been received and approved by the Engineer.
 - b. As necessary, make any and all soil mix amendments and resubmit test reports indicating amendments until approved.
3. Owner's Representative and/or Engineer may request additional testing by Contractor for confirmation of mix quality and/or soil mix amendment at any time until completion. See Article 1.05, herein for additional requirements.

B. Base Component Material

1. At a minimum material must meet requirements contained in specifications for Soil Mix 'A' and 'B'. Base component materials, for Topsoil Mix 'A' and 'B' only, shall not be site salvaged and must be an off-site borrow material.
2. Test Base Component Materials, both individual components and mixed materials, for compliance with material specifications. These test criteria and results, when approved shall establish the standard to which all subsequent Base Component Material tests must conform.
3. Prior to mixing Base Component Material with leaf mold, have (1) composite sample tested from each 100 c.y. of material (see each mix type for rate of testing requirement) intended for use in soil mixes of lawn and planting work.
 - a. Base Component Material shall meet specified requirements. The only allowable amendments to the Base Component Material will be for adjustment of nutrient levels and then only by means established by these specifications, or as per the Engineer.
 - b. Perform the following agricultural soil tests and submit comprehensive test reports. Soil tests must be unique and individual to each sample taken and are not to be resubmitted, duplicated, or reused. Samples and analyses must be submitted within 14 calendar days of sampling. Failure to include any of the criteria stated below will be sufficient cause for rejection of the test reports.
 - (1) Particle size analysis/distribution as defined below as well as with a hydrometer method.
 - (2) Fertility analysis-Soil pH and soluble salts.
 - (3) Available Nutrient analysis-Total nitrates (Nh3), phosphorus as P2O5, potassium as K2O, calcium, sodium, magnesium, ammonium, iron, and manganese.
 - (4) Cation exchange capacity.
 - (5) Organic matter content (% oven-dry weight of soil).

- (6) Heavy metal analysis-Selenium, chromium, cadmium, lead, nickel, cobalt, mercury, molybdenum, zinc, aluminum, boron, copper.
- (7) Material drainage rate.
- (8) Carbon/nitrogen ratio.
- (9) Calcium/magnesium ratio.

4. Material Requirements: Material shall substantially conform to the following:

a. Physical Analysis (Soil Texture):

Sieve Size	% Passing	% Retained	Dimension Class
1" 1	00.0	0.0	Gravel
1/4"	99.8	1.2	Fine Gravel
#10	96.2	2.8	Very Coarse Sand
#20	82.6	11.4	Coarse Sand
#40	41.1	42.5	Coarse Sand
#60	15.5	23.2	Medium Sand
#80	9.1	8.8	Fine Sand
#100	6.7	3.2	Very Fine Sand
#200	3.7	5.6	Very Fine Sand
Pan		1.3	Silt/Clay

b. Chemical Analysis:

- (1) Organic matter content (% oven-dry weight of soil): Total content shall be 1.6-2.5%
- (2) Soil reaction (pH): 4.7-6.0
- (3) Soluble salt content (Conductivity): 4 mmhos/cm.

b. Hydrometer Testing

- (1) Gravel-3.1
- (2) Sand-86.5
- (3) Silt-6.0
- (4) Clay-4.4

- c. Material Drainage at a rate of 60% to 70% of the total volume of water within 3 minutes. Soil should be saturated prior to conducting tests.

C. Leaf Mold (Fully Composted)

- 1. Leaf Mold: Shredded leaf litter, composted for a minimum of one year (12 months) and tested to confirm the following characteristics:
 - a. The leaf mold must be free of all inorganic debris such as plastic fragments, glass and metal fragments.
 - b. The leaf mold must be free of any and all stones larger than 1/2", large branches, and large roots over 1/2" in length. 100% of leaf mold must pass a 1/2" screen.
 - c. Chemical Analysis:

- (1) Organic matter content (% oven-dry weight of soil): Total content shall be within a range of 45-70% (% oven-dried weight of leaf mold).
 - (2) Soil reaction (pH) measured as a 1:5 dilute in the range from 6.5-7.5.
 - (3) The carbon/nitrogen ratio should fall between 12:1 and 25:1.
 - (4) The calcium/magnesium ratio should fall between 2:1 and 6:1.
 - (5) The soluble salt content (conductivity) must be less than 150 mmhos/cm for a 1:5 leaf mold to water ratio.
 - (6) A fertility analysis (nitrate, phosphate, potassium, calcium, and magnesium levels) must be provided for each batch of leaf mold.
- d. Material Drainage: at a rate of 55% to 70% of the total volume of water within 3 minutes. Soil should be saturated prior to conducting test.
 - e. The leaf mold shall be tested for nutrient content as specified below. Trace nutrient content shall fall within the range of the following indicated amounts:

Element	Acetate Extract	HCL Extract
Iron	0.5-5.0 ppm	greater than or equal to 5 ppm
Manganese	0.5-8.0 ppm	less than or equal to 15.4 ppm
Molybdenum	0.5-1.0 ppm	greater than or equal to 1.0 ppm
Zinc	0.1-1.0 ppm	greater than or equal to 4.4 ppm
Aluminum	0.1-2.0 ppm	greater than or equal to 2.0 ppm
Boron	0.1-1.0 ppm	greater than or equal to 1.7 ppm
Copper	0.1-1.0 ppm	greater than or equal to 1.0 ppm

- f. The leaf mold shall be tested for toxic substance content as specified below. Heavy metal content not to exceed (less than) the following indicated amounts:

Element	Acetate Extract	HCL Extract
Lead	less than or equal to 0.1 ppm	less than or equal to 25 ppm
Selenium	less than or equal to 0.1 ppm	less than or equal to 10 ppm
Mercury	None	None
Chromium	less than or equal to 0.1 ppm	less than or equal to 1 ppm
Cadmium	less than or equal to 0.5 ppm	less than or equal to 0.2 ppm
Nickel	less than or equal to 0.5 ppm	less than or equal to 2 ppm
Cobalt	less than or equal to 0.5 ppm	less than or equal to 2 ppm

None = none detected = below detection limits of 0.01 ppm

- g. Rate of testing for Leaf Mold: Have one (1) composite sample tested for each new source of supply, each variable pile within each source of supply, and/or for each 50 c.y. of material or as directed by the Engineer.

D. Mulch Materials

1. Organic mulch: Double hammered hardwood bark and/or leaf mold mixture for ground cover, annual, perennial beds and tree and shrub saucers and/or beds from the following sources:
 - a. "Peanut Hulls & Milled Leaf" mulch by Brookside Nurseries Inc. 228 Brookside Road, Darien, CT 06820, (203) 655-3978.

- b. “Southland Soil Conditioner” mulch as provided by Southern Importers Inc. P.O. Box 8579, Greensboro, NC 27419, (919) 292-4521.
 - c. Or approved equal, as approved by Engineer.
2. Mulch materials shall have been composted for a minimum of 6 months and tested to confirm the following characteristics:
- a. The mulch materials must be free of all inorganic debris such as plastic fragments, glass, and metal fragments.
 - b. The mulch material must be free of stones larger than ¼”, branches, and large roots over ½” in length.
 - c. Wood chips over ½” in length or diameter should be removed by screening.
 - d. Chemical Analysis:
 - (1) Organic matter content (% oven-dry weight of mulch): Total content shall be 60-90%.
 - (2) Soil reaction (pH) measured as a 1:5 dilute in the range from: 4.5-6.0 at time of supply. Amend pH with dolomitic limestone to bring mulch pH to 6.0-7.0 at time of installation.
 - (3) The carbon/nitrogen ratio should fall between 2:1 and 6:1.
 - (4) The calcium/magnesium ratio should fall between 2:1 and 6:1.
 - e. Heavy metal content not to exceed (less than) the following indicated amounts:

Element	Acetate Extract	HCL Extract
Iron	0.5 ppm	3.1 ppm
Manganese	0.5 ppm	15.4 ppm
Molybdenum	0.4 ppm	0.8 ppm
Zinc	0.2 ppm	4.4 ppm
Aluminum	0.2 ppm	1.2 ppm
Boron	1.1 ppm	1.7 ppm
Copper	None	0.01 ppm
Lead	0.1 ppm	0.4 ppm
Selenium	None	0.4 ppm
Mercury	None	None
Chromium	None	None
Cadmium	None	0.02 ppm
Nickel	None	0.04 ppm
Cobalt	None	0.05 ppm

None = none detected = below detection limits of 0.01 ppm.

3. Test mulch material
- a. Rate of Testing for Mulch Material: Have one (1) composite sample tested for each new source of supply, each variable pile within each source of supply, and/or for each 35 c.y. of material or as directed by the Engineer.
 - b. In mock-up installation with Soil Mix ‘B’ (8 parts Soil Mix ‘B’ to 2 parts proposed Mulch Material) to ensure compliance with material specifications including organic

matter, pH, and heavy metal content. Use parameters for Soil Mix 'B' as standard for testing. Have one (1) composite sample tested for each new source of supply, each variable pile within each source of supply, and each 50 c.y. of material or as directed by the Engineer.

2.02 SOIL AMENDMENT MATERIAL

- A. Ground Limestone: Ground Limestone as a soil amendment material will only be used pending results of analysis.
 - 1. Provide a dolomitic limestone with a minimum of 88% of calcium and magnesium carbonates.
 - 2. Ground limestone material shall have a total of 100% passing the 1-mesh sieve, minimum of 90% passing the 20-mesh sieve, and a minimum of 60% passing the 100-mesh sieve.
- B. Common Fertilizers
 - 1. Fertilizers (For amending Soil Mixes): Provide to extent approved by Engineer as a result of soil test recommendations for each plant condition.
 - a. "Dry Roots 2 Formula" For Planting and Turf (3-3-3) as manufactured by Roots Inc. 3120 Weatherford Road, Independence, MO 64055.
 - b. Multi Purpose Fertilizer for Trees, Plants and Turf (10-10-10) as manufactured by Lebanon Lawn & Garden, 1600 East Cumberland Street, Lebanon, PA 17402.
 - c. Or approved equal, as approved by Engineer.
- C. Compost Material
 - 1. Biosolid material (For amending Soil Mixes): Provide to extent approved by Engineer, as a result of agricultural soil testing for available nutrients required for each plant condition.
 - a. "Nutri-Brew" as distributed by Commodities Specialties, P.O. Box 610, Baldwinsville, NY 13027, Phone (315)638-1113.
 - b. "Orgrow" as provided by the Professional Services Group Inc. 300 Anthony Street Schenectady, NY 12308, Phone (518)382-5025.
 - c. "EarthMate" as provided by the Philadelphia Water Department Biosolids Management Unit, 4th floor, ARAMARK Tower, 1101 Market Street, Philadelphia, Pennsylvania 19107-2994, Phone (215)685-6248, Fax (215)685-6207.
 - d. "Allgro" as produced by Synagro Technologies, 1800 Bering Drive, Suite 1000, Houston, TX 77057, Phone (800) 370-0035.
 - e. Or approved equal, as approved by Engineer.
- D. Herbicides: For possible use, if there is seed germination on-site after sub-grade placement prior to planting mix installation or after subsequent plant mixes installation. Under no circumstance are materials to be applied without specific instruction from the Engineer.
 - 1. Herbicides shall be approved before use for type and rate of application by the owner and by local and state agencies with jurisdiction.
 - 2. Emergent shall be "Roundup," as manufactured by Monsanto Agricultural Products Company, C3NJ, St. Louis, MO 63166, or an approved equal as approved by Engineer.

2.03 PLANTING SOIL MIXES

- A. Adequate quantities of mixed planting soil materials shall be provided to attain, after compaction and natural settlement all design finish grades. Verify quantities for placement to suit conditions.
- B. Uniformly mix ingredients as specified for each Mix Type (Base Component Material, leaf mold, and other ingredients deemed to be necessary as a result of testing) by wind rowing/tilling on an approved hard surface area. Organic matter shall be maintained moist, not wet during mixing.
 - 1. Mixing of Amendments: Add leaf mold in proportions as specified and as confirmed by testing. Other amendments shall not be added unless approved to extent and quantity by Engineer and additional tests have been conducted to verify type and quantity of amendment is acceptable.
- C. Testing of Plant Mixes:
 - 1. Perform initial tests to confirm compliance with base material and mix specifications. These test results, when approved, will establish the standard to which all other tests results must conform.
 - 2. Follow-up Testing: Have one (1) composite sample tested prior to delivery and upon arrival to the job site for each 100 c.y. of material (see each mix type for rate of testing requirement) or as required by the Engineer intended for use in each type of turf area and plant mix to include the following:
 - a. Particle size analysis: Use sieve sizes as specified for Base Component Material.
 - b. Composition Analysis: Use the hydrometer method and classify the soil.
 - c. Nutrient Analysis:
 - (1) Have available nutrient levels (nitrate nitrogen, water soluble nitrogen, phosphorous as P205, potassium as K20, magnesium, calcium, ammonium, iron, and manganese) tested, and request testing laboratory recommendations for additional fertilizer requirements at both lawn and all plant areas if nutrient levels are below average.
 - (2) Available nutrient deficiencies in soil mixes for plant beds shall be corrected with amendment materials prior to installation, and shall be monitored throughout up until and including the landscape planting installation period. Deficiencies confirmed by testing shall also be corrected during the maintenance period specified.
 - (3) Available nutrient deficiencies in soils of lawn areas shall be corrected with amendment materials both prior to time of lawn installation and during maintenance period as specified.
 - d. Test organic matter, pH, cation exchange capacity, carbon/nitrogen ratio, calcium/magnesium ratio and material drainage rate.
- D. Soil Mix Types: Provide the following planting soil mix types at the locations indicated. Percentages of components, unless otherwise noted will be established upon completion of individual test results for components of the various mixes. The controlling factor will be the percent (0/c) organic matter as specified for each mix. Note that percent (%) by volume of components will be in large part, determined by the leaf mold and amendment materials. Specifically the bulk density reading of the leaf mold will directly impact the organic matter readings which have been specified for each mix.

1. Topsoil Mixture for Turf Restoration: Soil Mix 'A'
 - a. Organic Matter: 6-8%.
 - b. Base Component Materials: 60-70% by volume (Exact percent to be identified through testing as previously specified).
 - c. Leaf mold: 30-40% by volume (Exact percent to be identified through testing as previously specified).
 - d. Soil pH to be 6.5-7.0.
 - e. Available nutrients (Nitrates/ Phosphate/ Potassium) to be Nitrates: 30-100 ppm, Phosphate: 5-25 ppm, Potassium: 15-40 ppm.
 - f. Soluble salts no higher than 50.0 mmhos/cm min.
 - g. Other amendments as indicated by test results and as directed by Engineer.
 2. Topsoil Mixture for Planting Beds: Soil Mix 'B'
 - a. Organic Matter: 12-15%.
 - b. Base Component Materials: 30-50% (Exact percent to be identified through testing as previously specified).
 - c. Leaf mold: 50-70% (Exact percent to be identified through testing as previously specified).
 - d. Soil pH to be 6.5-7.0.
 - e. Available nutrients (Nitrate/ Phosphate/ Potassium) to be Nitrates: 30-100 ppm, Phosphate: 5-25 ppm, Potassium: 15-40 ppm.
 - f. Soluble Salts no higher than 50.0 mmhos/cm min.
 - g. Other amendments as required by test results and as directed by Engineer.
- E. Stockpiling
1. General: Stockpiling on-site, off-site and at source should be restricted to no more than the needs of what can be used in a 24 hour period. Under no circumstances shall on-site or off-site stored material exceed 50 c.y. Stockpiles should be no more than six feet in height to prevent anaerobic conditions within the pile(s). Stockpiles shall be sheltered from weather to prevent excessive water absorption and blowing by winds as approved by Engineer.

PART 3 - EXECUTION

3.01 VERIFICATIONS

- A. Prior to construction and soil placement operations at planting and turf areas, ascertain the location of all existing and proposed electric, cable, conduits, under-drainage systems and utility lines. Take proper precautions so as not to disturb or damage sub-surface elements. Contractor failing to take these precautions shall be responsible for making requisite repairs to damaged utilities at Contractor's own expense.
- B. Verify that required underground utilities are available in proper location, and ready for use. Coordinate with others.

- C. Verify that all work requiring access through or adjacent to areas where plant mixes are to be placed has been completed and no further access (other than Landscape installation) will be required. In the event that access will be required, this must be coordinated with the Engineer.

3.02 PREPARATION OF SUB-GRADE

- A. Prior to dumping and spreading soils, the Contractor shall furnish and install grade stakes on a 25-foot grid in open areas and sufficiently spaced in other areas to ensure correct line and grade of sub-grade and finished grade.
- B. All amendments shall be thoroughly incorporated into the mixture to assure uniform distribution. Delay mixing of compost and/or fertilizers if planting will not follow within 48 hours.
- C. Additional amendments shall be mixed into the soil as confirmed by the testing reports and as approved by the Engineer for each plant type and condition of installation.

3.03 PLACING PLANTING SOIL

- A. Remove all large clods, lumps, brush, roots, stumps, litter, and other foreign material and stones one-half inch (1/2") in diameter or larger. Legally dispose of removed material off site.
- B. Do not place a muddy or wet soil mix.
- C. Existing Soil Conditions: Prior to placing soil, scarify or otherwise loosen 3-inches of the surface of the sub-grade to ensure proper blending of the sub-grade to new soil materials.
- D. Place and spread planting soil mix of the type specified over approved sub-grade to a depth sufficiently greater than the depth required for lawn and planting areas so that after natural settlement, misting, and/or light rolling, as previously approved by the Engineer, the completed work will conform to the lines, grades, and elevations shown or otherwise indicated.

1. Turf Restoration: Soil Mix 'A' (See Section 2.03-D-1 for Soil Mix 'A')

- a. Required Soil Mix 'A' depth shall be as indicated on drawings with a minimum of six inches (6").
- b. Place fills lightly in layers of three-inch (3") lifts and settle to eliminate air pockets and minimize settlement. Lightly scarify previously placed surfaces prior to placing subsequent lifts. Fills shall not be so compacted as to restrict the flow of air or water through the soil as previously specified.
- c. Roll the whole surface of lawn bed with a hand roller weighing approximately one hundred (100 lb) per foot (12") of roller width. During the rolling, fill all depressions caused by settlement with additional planting soil, then re-grade, and add 1" leaf mold to surface as shown on drawings. Lightly roll and rake until the surface presents a smooth, even, and uniform finish that is at required grade.
- d. Allow plant mix in turf areas to remain undisturbed until fully settled in accordance with settlement methodology submitted as approved by Engineer. After any additional settlement has occurred, restore areas to finished grade prior to seeding.
- e. Protect plant mix against construction activity with Construction Limit Fencing and from the eroding effects of wind and rain with filter fabric as approved for the protection plan.

2. Planting Beds: Soil Mix 'B' (See Section 2.03-D-2 for Soil Mix 'B')

- a. Required Soil Mix 'B' depths shall be as indicated on drawings with a total planting depth to be a minimum of twenty four inches (24") as measured in place in a settled position.
 - b. Place fills lightly in layers of maximum of twelve-inch (12") lifts and very carefully settle soils to eliminate air pockets and to minimize future settling. Lightly scarify previously placed surfaces prior to placing subsequent lifts. The Engineer shall, as previously, approve proposed method of settlement. Method may include, but is not limited to, natural settlement over an approved period of time or light hand tamping and light water misting of each layer.
 - c. After natural settlement has occurred, add soil to maintain finished grades. If for any reason, soil is left exposed for a long duration prior to planting, add soil, and regrade as required. Fills shall not be so compacted as to in any way restrict the flow of water or air through the soil.
 - d. Protect plant mix against construction activity with Construction Limit Fencing and from the eroding effects of wind and rain with filter fabric as approved for the protection plan.
- E. Grading Tolerances: Turf, planting, and planting bed areas shall be fine graded within plus or minus (0.10) feet of grades indicated on drawings. Maintain all "flat" areas and slopes to allow free flow of surface drainage without ponding.

END OF SECTION

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DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 92 19 – SEEDING

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PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This specification defines the requirements for furnishing and installing tuff and grass seed as indicated on the Contract Documents.
- B. The work of this Section of the Specifications shall include all labor, materials, tools, equipment, appliance or services necessary to complete the work as shown on the Drawings, as specified herein, or as required by the job conditions.

1.02 SUBMITTALS

- A. Product Data; Hydro Mulch: Manufacturer's specifications and application rate.
- B. Product Data; Erosion Control Blanket: Manufacturer's specifications.
- C. Sample: One pound of seed in vendor's unopened package with label and seed analysis.

1.03 QUALITY ASSURANCE

- A. For Turf Areas provide prepackaged seed readily available to the public with quality and purity equal to product of O.M. Scotts and Son, Marysville, OH. On-the-job or made-to-order mixes will not be accepted.
- B. For Woodland Restoration Area provide custom seed product of Ernst Conservation Seeds, Meadville, PA. On-the-job or other made-to-order mixes will not be accepted.

1.04 DELIVERY STORAGE AND HANDLING

- A. Deliver fertilizer in manufacturer's standard size bags or cartons showing weight, analysis, and the name of the manufacturer. Store as approved by Owner's Representative.
- B. Store all seed at the site in a cool dry place as approved by the Owner's Representative. Replace any seed damaged during storage.
- C. Deliver erosion control blanket in manufacturer's standard packing material, showing the name of the manufacturer. Store as approved by the Owner's Representative.

1.05 SCHEDULING

- A. Time For Seeding: Sow grass seed between April 1st and May 15th or between August 15th and October 1st, except as otherwise approved in writing by the Director.

PART 2 - PRODUCTS

2.01 FERTILIZER

- A. Fertilizer: Mixed commercial fertilizers shall contain total nitrogen, available phosphoric acid and soluble potash in the ratio of 10-6-4 (50% N/UF). 50% of total nitrogen shall be derived from ureaform furnishing a minimum of 3.5% water insoluble nitrogen (3.5% WIN). The balance of the nitrogen shall be present as methylene urea, water soluble urea, nitrate and ammoniacal compounds.
- B. Other fertilizers meeting DOT Specification Section 713-03 Fertilizer can be used.

2.02 SEED

- A. Furnish fresh, clean, new-crop seed mixed in the proportions specified for species and variety, and conforming to Federal and State Standards.
- B. Acceptable material in a seed mixture other than pure live seed consists of nonviable seed, chaff, hulls, live seed of crop plants and inert matter. The percentage of weed seed shall not exceed 0.1 percent by weight.
- C. All seed will be rejected if the label or test analysis indicates any of the following contaminants: Timothy, Orchard Grass, Sheep Fescue, Meadow Fescue, Canada Blue Grass, and Bent Grass.
- D. Provide the following seed mixture:
 1. A = Min. Percentage of Germination
 2. B = Min. Purity Percentage
 3. C = Percentage Pure Live Seed in Mixture

SEED MIX 'A'

Name	Variety	A	B	C
Creeping Red Fescue (Festuca rubra trichophylla)	Ensylva	95	97	40
Kentucky Bluegrass *	Baron, Flyking, Glade, or an approved equal.	75	95	15
Perennial Ryegrass ** (Lolium perenne)	Manhattan II, Pennfine, Yorktown II, or an approved equal.	90	95	40
Annual Ryegrass (Loium multiflorum)	Commercial	98	97	5

*Approximately equal proportions of 2 or more improved Bluegrass varieties as listed in the Cornell Recommendations for Turfgrass.

**One or more of the improved Ryegrass varieties as listed in the Cornell Recommendations for Turfgrass.

SEED MIX 'B' WOODLAND RESTORATION

Name	Variety	A	B	C
Annual Ryegrass (Loium multiflorum)	Commercial	98	97	5
Northern Red Oak (Quercus Rabra)	Ernst Conservation Seeds	---	---	25

Name	Variety	A	B	C
White Oak (Quercus Alba)	Ernst Conservation Seeds	---	---	25
Red Maple (Acerrabrum)	Ernst Conservation Seeds	---	---	25
Dogwood (Cornus florida)	Commercial	---	---	10
Arrow Wood (Viburnum Dentatum)	Commercial	---	---	10

2.03 MULCH

- A. Dry Application, Straw: Stalks of oats, wheat, rye or other approved crops which are free of noxious weeds. Weight shall be based on a 15 percent moisture content.
- B. Hydro Application: Colored wood cellulose fiber product specifically designed for use as a hydro-mechanical applied mulch. Acceptable Product: Conwed Hydro Mulch, Conwed Fibers, 231 4th Street SW, Hickory, NC.

2.04 EROSION CONTROL BLANKET

- A. Erosion Control Blanket: North American Green (Product - SC150), 14644 Highway 41 North, Evansville, IN 47711.
 1. Stakes: North American Green (6" wire staples).
 2. FOR USE AT ANY SECURE FACILITY.
 3. Stakes: North American Green (6" Bio-Stake).

PART 3 - EXECUTION

3.01 PREPARATION

- A. Seed Bed: Scarify soil to a depth of 3 inches in compacted areas. Smooth out unsightly variations, bumps, ridges, and depressions which will hold water. Remove stones, litter, or other objectionable material.
 1. Obtain written approval of seed bed from the Owner's Representative before commencing seeding operations.

3.02 FERTILIZING

- A. Apply 10-6-4 fertilizer evenly at the rate of 40 pounds per 1000 sq ft or 2 pounds of nitrogen per 1000 sq ft.

3.03 SEEDING

- A. Assume all risks when seed is sowed before approval of seed analysis.

B. Do not seed when the wind velocity exceeds 5 miles per hour.

C. Application Rate:

1. Seed Mix “A”: 5 pounds per 1,000 sq. ft.

2. Seed Mix “B”: 24 pounds per acre

D. Dry Application: Sow seed evenly by hand or seed spreader on dry or moderately dry soil.

3.04 MULCHING

A. Dry Application: Within one day after seeding, cover the seeded areas with a uniform blanket of straw mulch at the rate of 100 pounds per 1000 sq ft of seeded area.

B. Hydro Application: Apply approved mulch in accordance with the manufacturer’s written instructions and recommended rates of application.

3.05 EROSION CONTROL BLANKET

A. Erosion Control Blanket: Within one day after seeding, cover sloped areas with a uniform blanket of erosion control blanket. Apply approved blanket in accordance with the manufacturer’s written instructions. Do not apply straw mulch in area that erosion control blanket will be covering.

B. Stakes: Install approved stakes in accordance with the manufacturer’s written instructions.

3.06 ESTABLISHMENT

A. Maintain the grass at heights between 2-1/2 inches and 3-1/2 inches and include a minimum of 2 mowings.

B. Water and protect all seeded areas until final acceptance of the turf.

3.07 FINAL ACCEPTANCE

A. Final acceptance of turf areas will be granted when a uniform stand of acceptable grass is obtained, with a minimum of 95 percent coverage. Portions of the turf areas may be accepted at various times at the discretion of the Owner’s Representative.

B. Unacceptable turf areas, dry application: Reseed as specified and fertilized at one-half the specified rate.

C. Once accepted, the Owner will assume all maintenance responsibilities.

END OF SECTION