SECTION 02070
SELECTIVE REMOVALS & DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of Work

Removal and demolition of selected items from selected areas of the building as indicated on the Drawings; items to be removed include, but are not limited to, the following:

1. Removal of existing face brick masonry (parapets and stairs) as shown in drawings.
2. Temporarily remove coping stone, precast stone bench, and safety railing. Store the railing and coping stone for reinstallation in kind.

B. Recycling and disposal of non-hazardous waste shall be performed in accordance with Section S01524 – Construction Waste Management.

1.03 SUBMITTALS

A. Shop Drawings

For that part of the Work that is not considered minor alterations or ordinary repairs, submit shop drawings and associated calculations. Demolition drawings and sequencing shall be signed and sealed by a Professional Engineer licensed in the State of New York and Design Drawings of such shall be filed with the Building Department.

B. Schedule

Submit a schedule indicating proposed methods and sequence of operations for selective removals and demolition Work, prior to commencement of operations. The sequence of operations shall be planned, in detail, to ensure uninterrupted progress of school sessions.

C. Provide details and procedures for dust and noise control.

D. Signed receipt for salvaged items delivered to the Department of Education.

1. Contractor Qualifications

   a. Provide proof of Contractor and Professional Engineer qualifications specified under "Quality Assurance".

   b. Provide proof of Refrigerant Recovery Technician qualifications

1.04 RESPONSIBILITY, PROTECTION, DAMAGES, RESTRICTIONS

A. Condition of Space

The Authority assumes no responsibility for actual condition of the space in which removals and demolition Work is performed.

B. Protections

Provide temporary barricades and other forms of protection required to protect Authority and Department of Education property, personnel, students and general public from injury due to selective removals and demolition work.

1. Provide protective measures as required to provide free and safe passage of students, Authority personnel, Department of Education personnel, and the general public.

2. Protect from damage existing finish work that is to remain in place and which becomes exposed during operations.

3. Protect floors with building paper or other suitable covering.

C. Damages

Promptly repair any and all damages to all property and finishes caused by the removals and demolition work; to the Authority's satisfaction and at no extra cost to the Authority.

D. Explosives

The use of explosives is prohibited.

E. No Power-driven Tools for removals and demolition.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Company specializing in performing the Work of this Section shall have a minimum of 3 years experience and shall have worked on 3 projects of similar size.

2. Preparation of details of demolition of items not constituting minor alterations or ordinary repairs shall be under the direct supervision of and bear the seal of a Licensed Professional Engineer of the State of New York experienced in the design of such work, who shall also be responsible for construction supervision of such.

3. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

B. Regulatory Requirements

1. Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations and guidelines of all governmental authorities having jurisdiction, including, but not limited to, safety, health, and anti-pollution regulations. Where more stringent requirements than those contained in the Building Code or other applicable regulations are given in this Section, the requirements of this Section shall govern.

2. Conform to the requirements of "Safety and Health Standards, Subpart P - Excavations, Trenching and Shoring" - OSHA.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to commencement of the selective removals and demolition Work, inspect the areas in which the Work will be performed. Determine and list the existing conditions of area, surfaces and equipment. After the Work in each respective area is completed, determine if adjacent surfaces or equipment have been damaged as a result of the Work; if so, the damage shall be corrected immediately at the Contractor's expense.

B. Create a safety zone around the demolition area as per Section BC 3306.2.1 of the 2014 NYC Building Code. Fences/barriers shall be erected to prevent persons other than workers from entering.

3.02 REMOVALS AND DEMOLITION WORK

A. The Contractor shall engage the services of a third party Registered Professional Engineer (not a direct employee) to prepare the details and sequencing of the demolition, complying with all items included in Section BC 3306.5, for that part of the Work that does not constitute a minor alteration or ordinary repair (Refer to Section §28-105.4.2 of the NYC Administrative Code for the items that do not constitute minor alterations or ordinary repairs i.e. items that affect structural, fire or health safety). The Contractor's Engineer shall file Form PW-1 with the Building Department, thereby becoming the Engineer of Record for such demolition work. These submittal documents must be kept at the site as per Section BC 3306.5.2.

B. Perform selective demolition Work in a systematic manner and use such methods as are required to complete the Work indicated, and in accordance with the Specifications and governing City, State, and Federal regulations.

C. When walls, partitions, floors, and ceilings (or portions thereof) are indicated to be removed; unless indicated otherwise:

1. Remove all items attached to the surfaces of the construction to be removed.

2. Remove all plumbing piping, fixtures, accessories and rough-in occurring on or in the construction to be removed; cap piping and/or re-route lines as indicated or required.

3. Cap piping and ductwork as indicated or required by the Engineer.

4. Remove all electrical wiring, to include, but not limited to, lighting, communications, alarms and all related appurtenances, conduits, devices, fixtures, and other electrical items and accessories occurring on or in the construction to be removed; disconnect power and remove wiring and conduit back to source.

D. Carefully remove items, equipment and materials to be retained by the Department of Education and deliver

them to locations indicated in the Article titled "Ownership of Materials".

3.03 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish and other materials resulting from the removals and demolitions from the building immediately; transport and legally dispose of materials off-site. Disposal method shall be in accordance with City, State, and Federal regulations. Items to be retained by the Department of Education shall be delivered to locations indicated in the Article titled "Ownership of Materials".

B. Burning of removed materials is not permitted on the job site.

3.04 CLEAN-UP AND REPAIR

A. Upon completion of removals and demolition Work, remove tools, equipment and all remaining demolished materials from the site.

B. Repair all damaged areas caused by the removals and demolition Work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

C. All areas in which Work was performed under this Section shall be left "broom-clean."

3.05 OWNERSHIP OF MATERIALS

A. All equipment, materials, and items removed shall remain the property of SUNY College Purchase, if desired; equipment, material and items not desired to be re-used or retained shall be removed from the site by the Contractor. The Engineer's Representative will designate which equipment, materials and items will be retained.

END OF SECTION

* * *

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Shop Drawings: for work not Considered minor alterations or Ordinary Repairs	_____	_____
Schedule: 1. Schedule of proposed Methods 2. Sequence of operations:	_____	_____
Details & procedures for dust & noise control:	_____	_____
Receipt for salvaged items:	_____	_____
Qualifications:	_____	_____

1. Contractor
2. Professional Engineer
3. Refrigerant Recovery Technician.

* * *

SECTION 03610
GROUTING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish material, equipment, labor, services required to provide non-shrink grout. Work includes, but is not limited to grouting under steel base plates.

1.02 RELATED SECTIONS

A. Unit Masonry ..... Section 04200

1.03 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

A. American Society of Testing and Materials (ASTM) Standards, latest editions.

ASTM C109 Test Method for Compressive Strength of Hydraulic Cement Mortars.

ASTM C191 Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle

ASTM C1090 Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout

ASTM C1107 Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).

B. Army Corp of Engineers

CRD C-621 Specification for Non-Shrink Grout.

1.04 SUBMITTALS

A. Product Data

Submit manufacturer's information on the non-shrink grout, including mixing and installation instructions for each type of application.

B. Quality Control Submittals

1. Qualifications

Provide proof of Manufacturer and Installer qualifications specified under "Quality Assurance".

1.05 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Company specializing in the production of grout shall have a minimum of five years experience.

2. Installer: Company specializing in performing the work of this section shall have three years minimum experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in manufacturer's sealed and undamaged packaging. Each package shall contain clear and legible labels that meet requirements of local, state and federal regulations identifying manufacturer's name, product name, quantity of material, and batch number.

B. Protect material from the elements and from other damage at site.

C. Replace and pay for material and work damaged to the satisfaction of Engineer.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not apply grout at temperatures below 40°F or higher than 90°F. Follow manufacturer's recommendations for placement temperatures, which is typically at an optimum range of 50°F to 80°F. Provide hot and cold weather procedures at other temperatures as per ACI 305R and ACI 306R respectively.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Grout

1. Sika Corp., Lyndhurst, NJ 07071

2. Euclid Chemical Company, Cleveland, OH 44110

3. Five Star Products, Inc., Fairfield, CT 06824

4. HiltiInc., Tulsa, OK 74146

5. Mapei, Deerfield Beach, FL 33442

6. Kaufman Products Inc. Baltimore, MD 21226

2.02 MATERIALS

A. Grout

1. Grout shall be non-shrink, non-metallic, cement based material meeting ASTM 1107 and CRD C-621 with the following characteristics:

   a. Minimum compressive strength of 6000 psi @ 28 days when testing in accordance with ASTM C109 or CRD C-621.

   b. Slight positive expansion when tested in accordance with CRD C-621 or ASTM C1090.

2. Products:

   a. SikaGrout 212 by Sika Corp.

   b. Dry Pack Grout and NS Grout by Euclid Chemical Company

   c. "Five Star Grout" by U.S. Grout Corp.

   d. Multipurpose Grout by Hilti, Inc.

   e. Precision Grout by Hilti, Inc.

   f. Planigrout 712 by Mapei

   g. SureGrout and Suregrout 106 by Kaufman Products Inc.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to Engineer any condition that prevents the performance of this Work.

B. Repair surfaces to receive grout as approved by the Engineer of Record to ensure that the maximum allowed thickness of material is not exceeded.

3.02 SURFACE PREPARATION

A. Concrete surface shall be free of all loose material.

B. All metal components shall be clean and free of corrosion.

C. Surfaces and metal components shall be free of oil, grease, loose paint, corrosive deposits, dust, laitance and other contaminants.

D. Sleeves and holes shall be clean of water, dust and debris.

3.03 APPLICATION

A. Perform all grouting in accordance with the recommendations of ACI, CSI, and the grout manufacturer's published specifications for site preparation, product mixing, and placing. For grouting in weather below 50°F, contact manufacturer for cold weather instructions.

B. Arrange with the manufacturer of the grout for the services of a qualified field representative to instruct the work crews in the mixing of components, preparation of surfaces, technique of installation, and inspection procedures.

C. Place grout at a no more than “flowable” consistency as required by the application, carefully using the manufacturer’s recommended water content for Dry Pack, Plastic or Flowable consistencies.

D. Locations

1. Provide grout 1" thick minimum, 2” thick maximum, unless otherwise specified, under column base plates and beam bearing plates. Work grout under plates to provide full and even bearing. Grouting is to be done prior to placement of any concrete on the structure.

2. Provide grout for grouting fence posts into sleeves. Grout is to be placed at a “plastic” consistency and crowned at the post to shed water away from the post onto the adjoining concrete surface.

3. Provide grout for grouting bars in concrete and for "Dry Packing". Follow manufacturer's procedure for mixing and installation.

4. Provide grout under equipment bases.

5. Provide for grouting in pipes entering precast units.

6. Provide grout wherever else it is indicated on Drawings or Specifications.

D. Follow manufacturer's instructions for curing.

3.04 PROTECTION AND CLEANING

A. Clean all adjacent area of excess material and clean all floors and walls of powder and droppings.

3.05 FIELD QUALITY CONTROL

A. Engineer’s Testing Laboratory will inspect the grouting procedure and take cube specimens to test compressive strength.

B. Engineer will inspect and reject any that are of inadequate strength or contains cracks or other defects. These areas shall be fixed at contractor's expense.

C. Engage the services of the material manufacturer's representative to instruct in the proper mixing and usage of the material to ensure the grout is placed at the correct consistency and manner.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:	_____	_____
1. Grout		
Qualifications	_____	_____
1. Manufacturer 2. Installer		

* * *

SECTION 03733
CONCRETE REPAIR WORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide labor, materials, equipment, and services to provide for the structural repair of concrete members with manufactured structural repair concrete/mortar as shown on Drawings and as specified herein. Work includes removing spalled concrete and cleaning and coating of exposed steel reinforcement.

1.02 RELATED SECTIONS

A. Epoxy Injection Repair Work.....Section 03736

1.03 REFERENCE STANDARDS

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

A. ASTM International (ASTM)

B. Steel Structures Painting Council (SSPC)

1. "Hand Tool Cleaning - SP2"

2. "Power Tool Cleaning - SP3"

C. International Concrete Restoration Institute (ICRI)

1.04 SUBMITTALS

A. Product Data

Provide manufacturer's information on the anti-corrosion coating and structural repair concrete/mortar, including application instructions and specifications.

B. Quality Control Submittals

1. Certificates

a. Furnish manufacturer's certification that materials meet or exceed Specification requirements.

b. Manufacturer’s training certificate: Furnish letter from manufacturer stating personnel performing work have been instructed on the proper usage of the material.

2. Repair Procedure: Furnish written description of repair procedures and operations sequencing based on manufacturer's requirements prior to commencing the Work.

3. Manufacturer's Field Reports: Submit field report from manufacturer of repair mortar indicating areas of surface preparation and mortar placement inspected.

4. Qualifications

Provide proof of Installer and Manufacturer qualifications specified under “Quality Assurance”.

5. Mock-up: Provide mock-ups as indicated under Quality Assurance.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Installer: Company specializing in the Work of this Section shall have a minimum of three years experience and at least two projects with similar quantity of materials. Contractor shall be trained by the repair mortar manufacturer and shall have a certificate of training on file from the manufacturer.

2. Manufacturer: Company specializing in the manufacture of concrete repair mortars to be used in this Contract shall have a minimum of ten years experience.

B. Manufacturer's Representative

All work of this Section shall be performed under the overall supervision of the repair material manufacturer's representative. The representative shall attend pre-construction meetings to instruct the contractor on the proper usage of the material and to make regular visits during the course of construction to ensure that surface preparation and method of installation is acceptable.

C. Job Mock-ups

Prior to performing the work of this Section, prepare a sample panel of not less than 12 sq. ft. of concrete repair work, including a separate mock-up of the surface preparation. For formed repairs, provide mock-up of pour to ensure that material will be properly vibrated and finish will be without voids. Do not proceed further with the work until the Authority's representative has approved the sample panel. Sample shall be a portion of the area to be restored and may be kept if approved.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Materials specified shall be delivered to the site in sealed, properly labeled containers. Containers shall indicate manufacturer's name, trade name of product, lot number, shelf life of product, and mix ratio (if applicable).

B. Keep containers tightly closed when not in use. Comply with manufacturer's printed instructions for storing and protecting materials.

C. Do not store liquid material in hot sun. Keep material from freezing.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not apply if the temperature is below 50°F or above 85°F unless the material manufacturer is consulted for recommendations.

B. Do not use frozen materials or materials coated with ice or frost.

C. Do not apply when there is expectation of rain within 24 hours.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Sika Corp, Lyndhurst, NJ 07071

B. Strongwall Industries, Ridgewood, NJ 07451

C. Mapei Corp, Deerfiled Beach, FL 33442

D. Kaufman Products Inc. Baltimore MD 21226

2.02 MATERIALS

A. Structural Repair Concrete - Non-formed/overhead Application

1. Shall have non-shrink characteristics and be of high compressive and bond strength. Material shall be non-sag, capable of being troweled in place for vertical and overhead applications without the need of formwork and conform to the following properties:

a. Compressive strength of 5000 psi in 28 days when tested in accordance with ASTM C109.

b. Bond strength of 1700 psi in 28 days when tested in accordance with ASTM C882 (modified). Results of tests showing failure of base material is acceptable alternative.

c. Flexural strength of 1100 psi in 28 days when tested in accordance with ASTM C78 or ASTM C293 or 1400 psi when tested in accordance with ASTM C348.

d. Maximum linear length change shall be 0.080% when tested in accordance with ASTM C157 (dry cure).

e. Modulus of elasticity shall be between 3.0 and 3.5 x 10^6 when tested in accordance with ASTM C469.

2. Repair concrete/mortar shall be:

a. Sikatop 123 Plus as manufactured by Sika.

b. SWI-88 as manufactured by Strongwall Industries.

c. Planitop 23 by Mapei.

d. Patchwell VO or Duracrete II VOFT by Kaufman Products Inc.

B. Structural Repair Concrete/Mortar - Horizontal Application

1. Shall have non-shrink characteristics and be of high compressive and bond strength. Material shall be capable of being poured or troweled in place for horizontal applications and for formed applications of sufficient dimensions to allow for proper placement of material and conform to the following properties:

a. Compressive strength of 5000 psi in 28 days when tested in accordance with ASTM C109.

b. Slant/shear bond strength of 1700 psi in 28 days when tested in accordance with ASTM C882 modified). Results of tests showing failure of base material is acceptable alternative.

c. Flexural strength of 1100 psi in 28 days when tested in accordance with ASTM C78 or ASTM C293 or 1400 psi when tested in accordance with ASTM C348.

d. Maximum linear length change shall be maximum of 0.08% at 28 days when tested in accordance with ASTM C157.

e. Modulus of elasticity shall be between 3.0 and 3.5 x 10^6 when tested in accordance with ASTM C469.

2. Repair concrete/mortar shall be:

a. Sikatop 122 Plus as manufactured by Sika.

b. SWI-81 as manufactured by Strongwall Industries.

c. Mapecem 202 by Mapei – only 1450 for C882.

d. Duracrete II, Duracrete II FT, Patchwell or Patchwell Deep by Kaufman Products Inc.

C. Structural Repair Concrete/Mortar - Formed Application

1. Shall have non-shrink characteristics and be of high compressive and bond strength. Material shall be flowable, capable of being poured in formed repairs of small dimensions without forming voids and conform to the following properties:

a. Compressive strength of 5000 psi in 28 days when tested in accordance with ASTM C109.

b. Bond strength of 1700 psi in 28 days when tested in accordance with ASTM C882 modified). Results of tests showing failure of base material is acceptable alternative.

c. Flexural strength of 1100 psi in 28 days when tested in accordance with ASTM C78 or ASTM C293 or 1400 psi when tested in accordance with ASTM C348.

d. Maximum linear length change shall be maximum of 0.08% at 28 days when tested in accordance with ASTM C157.

e. Modulus of elasticity shall be between 3.0 and 3.5 x 10^6 when tested in accordance with ASTM C469.

2. Repair concrete/mortar shall be:

a. Sikatop 111 Plus as manufactured by Sika.

b. SWI-81 as manufactured by Strongwall Industries.

c. Planitop 15 SCC by Mapei.

D. Anti-corrosion Coating

1. Corrosion-inhibiting, epoxy/acrylic resin, protective coating for steel reinforcing bars that will not form a vapor barrier or bond break with the repair mortar with the following properties:

a. Bond strength of 1500 psi in 2 hours when tested in accordance with ASTM C882.

b. Flexural strength of 1100 psi in 28 days when tested in accordance with ASTM C78 or ASTM C293 or 1250 psi when tested in accordance with ASTM C348.

c. Tensile strength of 600 psi in 28 days when tested in accordance with ASTM C496

2. Anti-corrosion coating shall be:

a. Armatec 110 as manufactured by Sika.

b. Planibond 3C by Mapei

c. Surepoxy HM by Kaufman Products Inc.

E. Miscellaneous Materials

1. Water: Potable water, ASTM C94

2. J hooks: 1/4" diameter threaded rod, Type 316 stainless steel

2. Epoxy paste adhesive: ASTM C882

4. Coarse aggregate: Clean, washed crushed stone, 3/8" maximum size, conforming to ASTM C33.

2.03 PRE-INSTALLATION MEETING

A. At least 15 days prior to the start of the concrete repair work construction schedule, the Contractor shall conduct a meeting to review the proposed repair and to discuss the required methods and procedures to achieve the required quality. The meeting shall include, at a minimum, the repair mortar installer, repair mortar manufacturer, Architect/Engineer of Record, Special Inspector and the Authority’s Construction Manager and CID Inspector. The Contractor shall send a conference agenda to all attendees prior to the scheduled date of the conference. The Contractor shall schedule a test placement to verify proper bond and hardened properties.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Authority any conditions that prevent the performance of this Work.

B. The Contractor shall determine the most suitable material indicated in Part 2 of this Specification to be used for each application to achieve the most structural sound repair with appropriate finish, unless specifically indicated on the Drawings. As an example, the Contractor may decide to form an application on a vertical surface in lieu of using the overhead repair mortar. The contractor shall include in the repair work procedure what materials will be used where and how the repair will be achieved for both the structural integrity of the patch and the correct finish.

3.02 PREPARATION AND PROTECTION

A. Protection

Protect adjacent surfaces not to be restored. Protect sills, ledges, and projections from material droppings.

B. Surface Preparation

3

1. Remove spalled and weak concrete and remove all loose and foreign material. Chip substrate by bush hammering or other mechanical means acceptable to the repair concrete/mortar manufacturer to obtain a minimum aggregate-fractured surface profile of 1/8+" conforming to an ICRI CSP 7 or greater surface preparation. Minimum depth of repair shall be 1/2", with the perimeter of the repair having a minimum of 1/8" in depth. Feather edging is not permitted.

2. If steel reinforcing is exposed, chip out behind the reinforcing steel. Chip a minimum of 1/2" behind the bar and 3" past the point where the bar is exposed. Concrete behind bars shall be removed enough to allow for the entire circumference of the bar to be cleaned. Remove concrete to the point past where sound material begins.

3. Exposed steel reinforcement and steel beams shall be free of all rust, scale, oil, paint, grease, loose mill scale, and all other foreign matter that will prevent bonding with the repair concrete. Use power chipping or power-driven brushes and clean to an SSPC-SP2 or SP3 surface preparation.

4. Where additional reinforcement is not shown to be anchored in and for patches greater than $1^1/_2$" in depth and overhead patches, install stainless steel threaded J hooks set in epoxy paste adhesive. Anchor is to be 3/4" clear minimum from finished face of repair. Hooks are to be embedded a minimum of 3" into concrete, installed diagonally to plane of concrete surface. Holes are to drilled 1/8" larger than rod diameter and shall be cleaned thoroughly. Space hooks at 16" o.c.

3.03 ANTI-CORROSION COATING APPLICATION

A. Mix anti-corrosion coating in accordance with manufacturer's instructions. Apply to dry reinforcing steel using a stiff bristle brush. Brush in well to ensure continuous coverage. Apply in two coats of approximately 10 mils each or as per manufacturer's latest recommendations.

B. Protect coated steel from weather and allow to dry a minimum of 30-45 minutes between coats or repair concrete/mortar application. However, apply repair material within 20 hours after last coating. If a 20-hour period elapses, reapply bonding agent and allow to dry as above.

3.04 REPAIR CONCRETE/MORTAR APPLICATION

A. Mix structural repair concrete in accordance with manufacturer's instruction. Follow time limits set by manufacturer to prevent hardening of material prior to placement. For material requiring extension with aggregate due to depth of repair, provide 3/8" aggregate of proportions specified by the repair mortar manufacturer.

B. Prior to application of material, thoroughly saturate surface with water. Remove any standing water prior to patching.

C. Apply a scrub coat of the repair material of proportions determined by manufacturer (indicate in written repair procedure). While still damp, apply repair concrete/mortar.

D. Apply material behind and around rebars first to completely fill void.

E. Overhead/Vertical Repairs - Apply repair concrete/mortar, non-formed/overhead application, on vertical and overhead members with a trowel or other such device, all in accordance with the manufacturer's recommendations. Apply in lifts of up to 2" or as determined by material manufacturer at a consistency that the material will not slump. Follow manufacturer's instructions for scoring, curing, priming, and approximate time between layers. Do not leave voids. Trowel exposed surface smooth and to same shape and finish as the adjacent existing surface.

F. Horizontal Repairs - Pour or trowel repair concrete/mortar, horizontal application, into hole until it is to the same level and at the same pitch as the surrounding slab. For deep repairs, extend mortar with clean aggregate by the amount recommended by the manufacturer. Provide finish as follows:

1. Surfaces to receive bonded applied cementitious applications such as full-set terrazzo and vitreous ceramic tile: Darby and float surface and follow with a rough broom finish.

2. Surfaces to receive floor coverings such as resilient flooring, thin-set terrazzo and vitreous ceramic tile, carpeting, wood floors, or surfaces which are intended as walking surfaces such as exposed or painted (cement finish), unless specified otherwise: Steel trowel surface to a smooth plane finish, free of score marks, grooves, depressions and ripples with a tolerance no greater than $\pm$1/8" in ten feet.

3. Surfaces intended to receive roofing, waterproofing membranes: Darby and float surface. Leave surface free from depressions, bulges, rough spots, and other defects.

4. Ramps, Exterior Concrete Steps: Level surface with wood float and follow with a broom finish perpendicular to direction of traffic.

G. Formed Repairs

1. Apply repair concrete, horizontal application, on vertical members where formwork can be utilized to confine the concrete and the width of repair permits its proper installation.

2. Apply flowable repair mortar for repairs to be formed, especially for thin repairs.

3. Place so as not to leave voids. Vibrate forms with pencil vibrator to remove~~d~~ air bubbles. Remove formwork as soon as possible and trowel exposed surface smooth and to same shape and finish as the adjacent existing surface.

3.05 CURING

A. As soon as surface of patch has hardened, cure patch a minimum of 48 hours by applying water-based acrylic curing compounds conforming to ASTM C309 or C1315, misting, wet burlap, etc. For patches to be covered with other material, only use curing compounds acceptable to the finish material manufacturer, unless the compound is removed prior to placing the finish material in a manner acceptable to the finish manufacturer.

B. Follow manufacturer's latest recommendations for any other recommendations. The curing provision of A above shall not be waved unless manufacturer does not permit it.

3.06 PROTECTION AND CLEANING

A. Clean all adjacent areas of excess material and clean all floors and walls of powder and droppings. Remove misplaced materials from surfaces immediately.

B. Protect material from freezing and from rainfall prior to final set.

3.07 FIELD QUALITY CONTROL

A. Special Inspector

1. The Authority will assign, under the requirements of Section BC 1705.3 of the 2022 NYC Building Code, a Special Inspector who will supervise the inspection

of concrete construction, including proper mixing/water of the repair concrete/mortar, size of members, and installation and preparation of reinforcement. The Special Inspector is responsible any required filing with the Building Department, as well as maintaining a logbook of the concrete work.

2. The Special Inspector will check that all required tests are made and the results submitted. The Special Inspector will also report to the Building Department Superintendent any deviation from the requirements of the Code, as indicated by records of inspection and reports of tests.

3. Notification

   a. Notify the Authority in writing at least forty-eight hours in advance of each concrete placement. The Authority will notify the Testing Laboratory immediately to order out the necessary concrete technicians to cover the work.

   b. Once the concrete technicians are ordered out and a cancellation follows, the Contractor will be charged Four Hundred Fifty Dollars for each technician so ordered to appear, unless a cancellation order is issued to the Laboratory by 3 PM the day before the concrete placement.

   c. During the placement of the concrete, notify the Authority immediately of any delay at the concrete plant or at the job site. Where the Authority decides to provide a technician at the plant, do not mix concrete or add admixtures unless the Technician is present. Do not add admixtures to be added at the site unless the Technician is present.

B. The Authority will inspect surfaces and reject any that contain cracks or other defects. The repair will be tested for soundness and structural integrity. Any defective areas shall be fixed at Contractor's expense. Notify the Authority’s representative in advance of the concrete repairs. The Authority’s representative will review the mixing, surface preparation and proper application of all materials.

C. Engage the services of the material manufacturer's representative to inspect the surface preparation, instruct in the proper usage of the material and to inspect the work throughout the project. Pay for all required fees.

D. The Authority's testing laboratory will perform bond tests in accordance with ASTM C158, "Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)" at a rate of 2 per session. The Contractor is to repair all test areas. Areas not meeting the requirements will have further tests performed. Remove all non-conforming areas.

END OF SECTION

Notes to Specifier (Delete from Specification)

1. Adjust section to suit project. Review project with repair mortar manufacturers.

2. If large areas a being patched, a mesh may be required for temperature and shrinkage and should be specified.

3. Depending on the application, verify the surface preparation profile is sufficient. Repair areas subject to heavy traffic may require a ±1/4" surface profile conforming to an ICRI CSP 9 surface preparation.

4. Installation of structural repair concrete/mortar is subject to Special Inspection, unless the work meets the Exceptions of Section BC 1705.3. During filing of the project, an exemption from TR3 requirements is to be made as the repair concrete falls into the category of Section BC 1905.4, Proportioning without field experience or trial mixtures, since the quantity of concrete is less than 50 CY. As the amount of material is less than 50 CY, testing of the concrete is not required as per BC 1905.6.2.3 and thus a TR2 is not required. Upon approval of the repair mortar to be approved, Designer is to file a letter indicating approval of the material as per Section BC 1905.4 based on the manufacturers published data.

GR:gr

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:		
1. Anti-corrosion coating 2. Repair concrete/mortar		
Certificates:		
1. Material certification 2. Training certificate		
Procedure:		
1. Detailed written repair procedure		
Reports:		
1. Manufacturer's written field reports.		
Qualifications		
1. Installer 2. Manufacturer		
Mock-Up:		
1. Surface Preparation 2. Repair		

* * *

SECTION 03736
EPOXY INJECTION REPAIR WORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide labor, materials, equipment and services for the structural repair work on concrete by epoxy adhesive injection shown on Drawings and as specified herein.

1.02 RELATED SECTIONS

A. Concrete Repair Work. . . . . .Section 03733

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)

C881 Specification for Epoxy-Resin Base Bonding Systems for Concrete

C882 Test Method for Bond-Strength of Epoxy-Resin Systems Used with Concrete

D570 Test Method for Water Absorption of Plastics

D638 Test Method for Tensile Properties of Plastics

D695 Test Method for Compressive Properties of Rigid Plastics

D732 Standard Test Method for Shear Strength of Plastics by Punch Tool

D790 Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

1.04 SUBMITTALS

A. Product Data

Provide manufacturer's information on the epoxy adhesives, including application instructions.

B. Quality Control Submittals

1. Certificates

a. Furnish manufacturer's certification that materials meet or exceed Specification requirements.

b. Manufacturer’s training certificate: Furnish letter from manufacturer stating personnel performing work have been instructed on the proper usage of the material.

2. Repair Procedure: Furnish written description of repair procedures and operations sequencing based on manufacturer's requirements prior to commencing the Work.

3. Manufacturer's Field Reports: Submit field report from manufacturer of repair mortar indicating areas of surface preparation and mortar placement inspected.

4. Contractor Qualifications: Provide proof of qualifications specified under Quality Assurance.

5. Mock-up: Provide mock-ups as indicated under Quality Assurance.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Company regularly engaged in the manufacturing of the products specified in this section.

2. Installer: Company qualified to perform the work specified with a minimum of 3 years experience and a minimum of 4 projects of equivalent size and has been trained by the product manufacturer.

B. Mock-up

Prior to performing the work of this Section, prepare at one location to be repaired a sample panel of not less

than 6 linear feet of injection work and surface repair (grinding and finishing).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original factory packaging bearing identification of product, manufacturer, batch number, and expiration date as applicable. Provide Material Safety Data Sheets for each product.

A. Store products in a location protected from freezing, damage, construction activity, precipitation and direct sunlight in strict accordance with the manufacturer's recommendations.

C. Handle all products with appropriate precautions and care as stated on the Material Safety Data Sheet.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Condition products to approximately 60˚F to 70˚F (16˚ to 21˚C) for use in accordance with the manufacturer's recommendations.

B. Do not apply if the temperature is below 50°F or above 85°F unless the material manufacturer is consulted for recommendations.

C. Do not use products under conditions of precipitation or freezing weather. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Epoxy Adhesive

1. Unitex Concrete Construction Chemicals, 3101 Gardner Kansas City, MO 64120

2. Sika Corporation, Lyndhurst, NJ

3. Kaufman Products Inc. Baltimore MD 21226

2.02 MATERIAL

A. Epoxy Resin for Epoxy Injection

1. Shall be a moisture-tolerant, epoxy resin adhesive material capable of restoring the structural integrity of concrete conforming to ASTM C881 and AASHTO M-235 specifications. Material shall be low viscosity, capable of being poured by gravity, or injected by pressure injection, and meeting the following criteria:

   a. Tensile Strength: **7,200** psi per ASTM D638.

   b. Elongation: 1-3 percent per ASTM D638.

   c. Compressive Strength **@ 73°F**, Minimum (per ASTM D695):
      1) 16 Hrs: **3,**500 psi
      2) **1** Day: **4,**500 psi
      3) 3 Days: 9,500 psi
      4) 7 Days: 10,000 psi
      5) 14 Days: 10,500 psi
      6) 28 Days: 10,600 psi

   d. Compressive Modulus of Elasticity (28 Days): 390,000 psi per ASTM D695.

   e. Flexural Strength (14 Days): **5,**300 psi minimum, per ASTM D790.

   f. Bond Strength, 14 Days Wet Cure (Hardened Concrete to Hardened Concrete): 2,200 psi per ASTM C882.

   g. Water Absorption (24 Hour Immersion): **1.5%** per ASTM D570.

   h. Viscosity: Approximately **280** cps

2. Material:

a. Sikadur 52 by Sika Corporation.

b. Pro-Poxy **50** by Unitex **(Dayton Superior):**

c. SurePoxy HMSLV by Kaufman Products Inc.

B. Epoxy Adhesive for Sealing Cracks and Injection Ports

1. Shall be a moisture-tolerant, high-modulus, high-strength, structural epoxy paste/adhesive material capable of sealing cracks and porting devices conforming to ASTM C881 and AASHTO M-235 specifications. Material shall meet the following criteria:

a. Shore D: 90.

b. Pot Life: **25-**35 minutes at 77°F (25°C).

c. Bond Strength, 2 Day Cure: **2,200** psi (15.4 MPa) per ASTM C882.

d. Water Absorption: 0.63% per ASTM D570.

e. Linear Coefficient of Shrinkage: **0.002** percent.

f. Compressive Strength **@ 73°F: 11,000 @ 7 days** per ASTM D695.

g. Compressive Modulus: **.375x10^{6}** psi per ASTM D695.

h. Elongation at Break: **0.9%** percent per ASTM D638.

i. Shear Strength: **3,200** psi per ASTM D732.

j. Flexural Strength: **5,400** psi minimum, per ASTM D790.

2. Material:

a. Sikadur 31, Hi-Mod Gel by Sika Corporation.

b. Pro-Poxy 300 Fast by Unitex **(Dayton Superior)**

c. SurePoxy HM **Gel** by Kaufman Products Inc.

B. Injection ports for manual application.

C. Injection Ports for Automated Application: Supplied by manufacturer of pressure injection equipment.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Authority any condition that prevents the performance of this Work.

3.02 PROTECTION

A. Inspect all areas involved in work to establish extent of work, access, and need for protection of surrounding construction.

B. Protect adjacent work from contamination due to mixing, handling, and application of epoxy resin adhesive products.

C. Protect all surroundings from epoxy resin adhesive and paste repair compounds including, but not limited to, windows, roofs, walkways, drives, and landscaping.

3.03 SURFACE PREPARATION

A. The cracks and adjacent substrate must be clean and sound. The area may be dry or damp, but free of standing water and frost.

B. Remove dust, laitance, grease, waxes, curing compound, impregnations, foreign particles, coatings, efflorescence, and disintegrated materials by mechanical means, i.e. - high pressure water blasting, as recommended by the manufacturer and A/E of Record.

3.04 EPOXY ADHESIVE APPLICATION

A. Mix each epoxy resin adhesive in accordance with manufacturer's instruction. Premix each component and combine in manufacturer's proportions by volume into a clean, dry mixing pail. Mix thoroughly for 3 minutes min. with a jiffy paddle on a low-speed (400-600 rpm) drill.

Mix only that quantity of material that can be used within its pot life (20-30 minutes at 73°F).

B. Set porting devices as required by the manufacturer. Place ports at a distance of 1 foot apart (approximate thickness of the material).

C. Apply the mixed epoxy resin paste adhesive over the cracks and around each porting device to provide an adequate seal to prevent the escape of the pressure injected epoxy adhesive. Install paste adhesive in a manner to prevent large raised areas that will affect the look of the terra-cotta. Do not inject epoxy adhesive until the paste has cured.

D. Pressure injection may be by manual or automated means. Begin the pressure injection at the lowest port and continue until there is the presence of adhesive at the next port, thus indicating travel. Then move to the next port and so on, continuing the procedure until all pressure injectable cracks have been filled. Have manufacturer's representative on site during application.

E. If penetration of any crack is impossible, consult the Engineer before discontinuing the procedure. If modification of the proposed procedure is required to fill the cracks, submit said modification in writing to the Engineer for acceptance prior to proceeding.

F. Adhere to all limitations and cautions for the epoxy resin adhesive in the manufacturers current printed literature.

3.05 CLEANING, FINISHING, AND PROTECTION

A. Maintain substrate at temperature recommended by manufacturer (50°F minimum) in order to ensure epoxy hardens. Protect material from freezing and from rainfall prior to final set.

B. After the epoxy adhesive has cured, the adhesive for sealing the cracks and the porting devices shall be removed. Grind all material flush with adjacent surfaces and sand smooth.

C. Clean all adjacent areas of excess material; powder, resin, and droppings.

D. Paint the entire beam to match the existing color.

3.06 FIELD QUALITY CONTROL

A. The Authority will inspect surfaces and reject any that have not been satisfactorily repaired. The repair will be tested for soundness and structural integrity. Any defective areas shall be fixed at Contractor's expense.

END OF SECTION

GR:gr

Notes to Specifier (Delete from Specification)

1. Use this Section for the structural repair of concrete. The designer should include coating of exposed concrete for aesthetics as the grinding of the crack to remove excess epoxy and ports to get it smooth will yield a surface not matching adjoining surfaces.

2. Section can be modified, along with materials, for cracks in slabs being repaired by gravity feed rather than injection.

* * *

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:	_____	_____
1. Catalog sheets, specs., Installation instruction For each item specified.		
Certificates:	_____	_____
1. Material certification 2. Training certificate		
Procedure:	_____	_____
1. Detailed written repair procedure		
Reports:	_____	_____
1. Manufacturer's written field reports.		
Qualifications	_____	_____
1. Installer 2. Manufacturer		
Mock Up:	_____	_____
1. Complete repair		

* * *

SECTION 04200
UNIT MASONRY

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section includes, but is not limited to, the following:

Provide brick masonry, cavity wall insulation, and other masonry Work as specified herein, as shown on the Drawings, and as needed for a complete and proper installation.

B. Related Work includes, but is not limited to, Division 7 Section "Fluid-Applied Membrane Air Barrier, Vapor Retarding", for air barrier system at masonry cavity walls.

1.02 WORK FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Veneer anchors

1.03 WORK INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

Not Used

1.04 SUSTAINABILITY REQUIREMENTS

NOT USED

1.05 DESIGN REQUIREMENTS

A. No air-entraining admixtures or material containing such shall be permitted in the mortar. Also, no anti-freeze compounds, calcium chloride, or other compounds, unless expressly permitted otherwise, shall be permitted in the mortar.

B. Mortar types to be used at the following locations, unless otherwise stated:

1. Face brick, concrete masonry units - Type N unless otherwise noted.

1.06 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

A. American Society of Testing and Materials (ASTM) standards, latest editions.

A951 Standard Specification for Steel Wire for Joint Reinforcement.

C33 Standard Specification for Concrete Aggregates.

C43 Standard Definitions of Terms Relating to Structural Clay Products.

C67 Standard Methods of Sampling and Testing Brick and Structural Clay Tile.

C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50 MM Cube Specimens).

C126 Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.

C129 Standard Specification for Non-Load-Bearing Concrete Masonry Units.

C140 Standard Methods of Sampling and Testing Concrete Masonry Units.

C144 Standard Specifications for Aggregate for Masonry Mortar.

C150 Standard Specification for Portland Cement.

C207 Standard Specification for Hydrated Lime for Masonry Purposes.

C216 Standard Specification for Facing Brick (Solid Masonry Units made from Clay or Shale).

C270 Standard Specification for Mortar for Unit Masonry.

C404 Standard Specifications for Aggregates for Masonry Grout.

C476 Standard Specification for Grout for Reinforced and Nonreinforced Masonry.

C578 Standard Specification for Preformed, Cellular Polystyrene Thermal Insulation.

C595 Standard Specifications for Blended Hydraulic Cements.

C652 Standard Specification for Hollow Brick

C979 Standard Specification for Pigments for Integrally Colored Concrete.

C1019 Method of Sampling and Testing Grout

C1405 Standard Specification for single-fired Glazed Brick

B. Industry Standards.

1. "Standard for Concrete Masonry Units" - UL 618- Underwriters Laboratory.

2. American Welding Society – AWS D1.4 – Structural Welding Code – Reinforcing Steel

1.07 SUBMITTALS

A. Submittals for Specified Items

1. For items that are specified herein by manufacturer's name and model number, submit a Product Schedule indicating the item description, manufacturer name, model number and any other identifying nomenclature. The Schedule will be accepted by the EOR for record purposes only. Product Data and Samples are not required for such specified items except for selection of color or

similar purpose. When submitting items that are not specified herein by manufacturer's name and model number, provide complete Product Data and Samples for each item for review and approval.

B. Product Data

Submit Product Data to show compliance with specified requirements.

1. Submit complete data for masonry units. Laboratory test reports for brick shall be no more than two years old. Submit a list indicating the maximum dry weight of each type and size of CMU to be used in the project.

2. Submit complete data for reinforcement and ties, of each type.

3. Portland Cement: Brand and manufacturer's name.

4. Lime: Brand and manufacturer's name.

5. Mortar Pigments: Brand and manufacturer's name.

6. Packaged Products: Manufacturer's specifications and application instructions.

7. Sand: Location of pit, name of owner, and previous test data.

8. Masonry reinforcement, anchors

9. Insulation

10. Insulation adhesive

11. Masonry cleaner, including specific masonry manufacturer’s recommended cleaning procedure for the product selected.

C. Samples

1. Submit as many face brick of each color to show the entire color range and in quantities sufficient to determine percentages. Submit samples of face

brick of special sizes and shapes, including factory fabricated corners and lip brick.

D. Shop Drawings

1. Submit drawings for brick of special shapes.

2. Submit plans indicating locations of control joints in interior partitions.

E. Quality Control Submittals

1. Schedule of Uses: By mortar type.

2. Certificates

a. Submit the lightweight CMU producer's and GCB manufacturer's certificate stating that the minimum equivalent thickness and mix design are in conformance with UL 618 for the indicated fire rating.

b. Submit lightweight CMU producer’s certificate stating aggregate used is 100% lightweight, expanded shale, clay, or slate (rotary kiln) aggregate, in accordance with ASTM C331. To provide the required recycled content, it is acceptable to provide up to 20% lightweight recycled aggregate that will maintain the same fire resistance equivalent thickness of 100% expanded shale, clay, or slate without a decrease in block strength.

c. Furnish notarized Building Department affidavit from masonry manufacturer (Form 10H) stating materials delivered to project comply with the Specification requirements.

d. Furnish notarized Building Department affidavit from masonry supplier (Form 10J) stating materials delivered to project comply with the Specification requirements.

e. Provide certification that insulation used in Project was not produced with, nor contains, any of the U.S. EPA regulated CFC compounds that are listed in the Montreal Protocol.

F. Mockups

In accordance with Article titled Quality Assurance.

1.08 QUALITY ASSURANCE

A. Qualifications

1. Company specializing in the Work of this Section shall have a minimum of 3 years experience and at least three projects with similar quantity of materials.

2. Masonry foreman shall have the following minimum experience:

   a. Five years of practical experience as determined by Authority's Representative via a letter from the Contractor listing the projects and experience of the foreman.

   b. Certificate of journeyman brick layer or PCC.

   c. The construction of five masonry related projects of the same type of construction (e.g. brick, stone, terra cotta, etc.) where the individual served as a field foreman. List project in qualification submittal.

   d. Must be able to read and communicate in English and be able to read construction drawings and specifications.

3. **3**. Adhesive Anchor Installer: Installer for adhesive anchors installed in a horizontal or upwardly inclined position supporting sustained tension loads shall be certified per ACI Appendix D9.2.2 as per Section BC 1912 of the 2014 NYC Building Code.

B. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYC Building Code and

all applicable regulations of governmental authorities having jurisdiction, including safety, health, noise, and anti-pollution regulations. Where more severe requirements than those contained in the Building Code are given in this Section, the requirements of this Section shall govern.

2. UL 618: Fire rating of CMU and assemblies shall conform to the requirements UL 618.

3. NYC Board of Standards and Appeals (BSA) approvals, or

4. NYC Materials and Equipment Acceptance (MEA) approvals.

C. Controlled Inspection and Certification

Reinforced and unreinforced masonry shall conform to the material acceptance, certification and inspection requirements of Article 7, Chapter 1 - Subchapter 1 and Tables 10-1 and 10-2 of the Building Code (Title 27).

D. Mockups

1. General

a. Construct sample panels to conform with appearance and workmanship as indicated in the Drawings and Specifications.

b. Use approved sample panels for a standard of comparison for the Project. All Work shall conform in workmanship and appearance to that of the approved samples.

c. If not approved, remove panel and install new panel (or panels) repeating the process until panel is approved.

d. Do not proceed with Work until panels are approved in writing by the Project Architect. Do not build Sample Panel "B" until Sample Panel "A" has been approved.

e. Approved Panel "B" may remain in place as part of the Project.

2. Erect sample panels where directed, for approval by the Project Architect.

   a. Face Brick: Provide sample Panel "A", 4'x 4' panel illustrating mortar, bonding, jointing, course heights, and ties to back-up units. Lay up Panel "A" from brick furnished for this purpose. Provide a second sample Panel "B", incorporated into the building, from brick delivered for the job, Sample Panel "B" shall be 4'x8' minimum.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in undamaged condition per ASTM guidelines. Store in an enclosed location or off the ground with waterproof covering as needed to protect all materials from moisture, contaminants, corrosion, deleterious temperature changes, and other harmful conditions.

B. Packaged Products

1. Deliver materials to the site in manufacturer's original, sealed containers. Do not deliver materials which have exceeded shelf life limitation set forth by the manufacturer. Material containers shall bear the manufacturer's label indicating manufacturer's name, trade name of product, lot number, shelf life of product, and mix ratio (if applicable). This includes individual bags of pre-bagged mortar mixes.

2. Comply with manufacturer's printed instructions for storing and protecting materials.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Construction Requirements

Salt or other chemicals for lowering the freezing temperature of the mortar shall not be used.

Masonry units, mortar, and grout shall be preconditioned and masonry protected for the following cold weather conditions:

1. Air temperature 40°F to 32°F:

   a. Heat mixing water or sand to minimum of 70°F and to maximum of 160°F.

2. Air temperature 32°F to 25°F:

   a. Heat mixing water and sand to minimum of 70°F and to maximum of 160°F.

   b. Provide heat source to maintain a minimum air temperature 32°F on each side of masonry construction.

3. Air temperature 25°F to 20°F:

   a. Heat mixing water and sand to minimum of 70°F and to maximum of 160°F.

   b. Provide heat source to maintain a minimum air temperature of 32° on each side of masonry construction.

   c. Provide wind breaks for wind in excess of 15 miles per hour.

4. Air temperature 20°F and Below:

   a. Heat mixing water and sand to a minimum of 70°F and to maximum of 160°F.

   b. Provide enclosures and heat source to maintain a minimum air temperature of 32°F on each side of masonry construction during construction.

   c. Keep temperature of masonry units a minimum of 30°F when laid.

B. Protection Requirements

1. Mean Daily Air Temperature of 40°F to 32°F:

   a. Protect masonry from rain or snow for 24 hours.

2. Mean Daily Air Temperature of 32˚F and Below:

   a. An air temperature of at least 32˚F shall be maintained on each side of masonry for a period of at least 48 hours if Type M or S mortar is used and at least 72 hours if Type N or O mortar is used.

C. Wetting of Clay Masonry Units

For units with initial rates of absorption that require their wetting before laying, follow the following cold weather requirements:

1. If surface temperatures are above 32°F, use water heated to about 70°F.

2. If surface temperatures are below 32°F, use water heated to about 120°F.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Reinforcement and Ties

1. Hohmann & Barnard, Inc., Hauppage, N.Y.

2. Dur-O-Wall, Arlington Heights, IL.

C. Insulation

1. Dow Chemical Co., Midland, Michigan.

2. UC Industries Inc., Parsippany, NJ

D. Insulation Adhesive

Adhesives, mastics, compatible with air barrier systems and other contacted materials:

1. Henry Company

2. W. R. Grace & Co.

3. Rubber Polymer Corporation

E. Mortar Coloring

1. "SGS" Mortar Colors, Solomon Grind-Chem Services, Inc.

2. "True Tone Mortar Colors", Davis Colors, Rockwood Industries, Inc.

3. "Flamingo Colors ", Lehigh Corporation.

L. Mortar Additives

1. ACM Chemistries, Norcross, GA 30010

2. Master Builders, Inc., Cleveland, OH 44122

3. Sika Corp., Lyndhurst, NJ 07071

M. Mortar Dropping Collection Net

1. Advanced Building Products Inc., Springvale, Maine.

2. Mortar Net USA, Ltd., Gary, Indiana

N. Mortar Weeps

1. Mortar Net USA, Ltd., Gary, Indiana

2.02 FACE BRICK DISTRIBUTORS

A. Consolidated Brick and Building Supplies, Inc., N.Y., N.Y.

B. Tri-State Brick & Building Materials, Inc. N.Y., N.Y.

C. Belden Brick Sales & Service, Inc., N.Y., N.Y.

D. Glen-Gery Corp. Somerville, N. J.

2.03 MATERIALS

A. Base Materials

1. Portland Cement

a. Type I ASTM C150

b. Type II (for manholes) ASTM C150

2. Slag cement (only use for Manufacture of concrete block) ASTM C989, Grade 100 or 120.

3. Sand for Mortar Mix ASTM C144
Sand shall be washed natural sand with 100% passing the No. 8 sieve.
Mix shall not contain chlorides.

4. Aggregate for CMU - 100% light-weight aggregate, expanded clay shale or slate (rotary kiln process). To meet recycled content, lightweight recycled aggregate of up to 20% of total material that will maintain the same fire resistance equivalent thickness of 100% expanded shale, clay, or slate without a decrease in block strength may be used. ASTM C331

5. Aggregate for Masonry Grout ASTM C404

6. Hydrated Lime ASTM C207 Type "S"

7. Water - Clean, potable New York City water free of injurious materials.

8. Mortar Coloring: Provide pure mineral pigments, natural and synthetic iron oxides, and chromium oxides compounded for use in mortar mixes. Material shall conform to ASTM C979. Coloring shall not contain alkalyde salts or chlorides. No liquid colorants shall be permitted.

9. Mortar additive for use in setting of exterior brick coping caps, granite steps, and other such elements with horizontal surfaces exposed to weather. Use additive for such elements within 10 vertical feet of grade or walking areas.

   a. Additive shall be non-toxic, non-flammable, and non-hazardous during storage, mixing, application, and when cured.

b. Finished mortar shall be resistant to urine, dilute acid, dilute alkali, sugar, brine, and calcium chlorides and other salts used in de-icing salts.

10. Premixed sand and lime for mortar mixes is not permitted. The use of batched material by Spec-Mix and factory-packaged cement-lime-pigment by major mortar manufacturers is permitted. Each individual bag of material shall have the manufacturer's label identifying the mortar type.

B. Brick

1. Utility Modular Face Brick: Clay or shale, ASTM C216 (solid), grade SW, type FBX, or ASTM C652 (cored), grade SW, type HBX of size 3-5/8" x 3-5/8" x 11-5/8" (nominal dimensions 4"x4"x12"). Colors and textures as selected by the Project Architect. Special sizes and shapes as shown on the Drawings or specified herein. Brick shall be manufactured to special sizes and shapes, not cut in the field. Glazed units are not permitted. Brick shall be tested for efflorescence in accordance with ASTM Test Methods C67 and the rating shall be ”Not Effloresced”.

a. Lipped brick, such as are used above relieving angles and lintels, shall be manufactured with the lip portion having dimensions not less than 5/8" high and 3/4" deep. Provide brick with larger lip dimensions when recommended by brick manufacturer. When recommended by the manufacturer, lipped brick may be cut to the required dimensions from solid brick in the factory, provided that cuts are carefully made to a 90 degree interior angle and do not extend past this angle.

C. Joint Reinforcement and Ties

1. Material

a. Reinforcement and Ties for Exterior Walls: Formed from stainless steel, 18-8, type 304.

1) Sheet steel: (No. 2B Finish), cold-rolled, annealed, ASTM A240.

2) Wire steel: ASTM A951.

b. Reinforcement and Ties for Interior Walls: ASTM A951, hot-dip galvanized (after fabrication), ASTM A153.

c. Provide factory-fabricated corners and tees at corners and intersecting walls for continuous type reinforcing, such as truss type, except as indicated otherwise.

d. Width of truss and mesh reinforcement to place edge of reinforcement 1” from each face of masonry.

2. Manufactured Units. Units are listed by Hohmann & Barnard model number in order to establish a standard for comparison. Deliver all units with manufacturer’s printed installation instructions.

a. Exterior Walls - Brick with Concrete Backup:

Provide #315-BT Flexible Dovetail Brick Tie, dovetail end to be 16 gage minimum, 1" wide. Provide Byna-Tie 3/16" in diameter, of length to provide 2" embedment in brick. Anchor slot shall be #305 Series Dovetail Anchor Slots. Provide multi-grooved rigid PVC Seismiclips, #187-A, for seismic interlock system. Provide 3/16" diameter Type 304 stainless steel continuous joint reinforcement wire.

b. Exterior Walls - Brick with Concrete Masonry Unit (CMU) Backup:

1) #180 S.I.S. Dub'l Loop Lok Truss Seismiclip Interlock System consisting of the following components:

a) #180 Type 304 stainless steel Dub'l Loop Lok truss type horizontal joint reinforcement with welded loops. Truss 9 gauge. Loops 3/16" diameter.

b) 3/16" diameter Type 304 stainless steel Byna-Ties. Provide Box type or Bent-Box type as required for coursing. Provide sizes required for 2" embedment in brick.

c) Impact resistant, multi-grooved rigid PVC Seismiclips, #187-A.

d) 3/16" diameter Type 304 stainless steel continuous wire.

e) At walls with cavity insulation provide Loop-Lok Washers to mechanically lock rigid insulation in place.

2) #355L Column Anchor, 1/4" thick by 1-1/4" wide, twisted, with a slotted opening for lock stud. Provide a straight positive lock stud, 3/8" diam., threaded, with nut and washers for anchoring masonry to steel column when masonry is parallel to column flange. Length as required for conditions.

3) #353L Column Anchor, 1/4" thick by 1-1/4" wide, twisted, with a slotted opening for lock bolt. Provide a bent positive lock stud, 3/8" diam., threaded, with nut and washers, for anchoring masonry to steel column when masonry is perpendicular to column flange. Length as required for conditions.

4) Juncture of exterior back-up wall with interior block partition: #MWT, 1/2" square by 16 gage, of proper width for wall thickness

5) Concrete block to steel spandrel: #360 Gripstay Channel with # 365 Gripstay Anchor, 12 gage. Weld channel to steel spandrel. Length as required for conditions.

c. Exterior Brick Walls/Parapet Walls (Multi-wythe): LOX-ALL #120 truss, 9-gage, of proper width for wall thickness.

d. Expansion and Control joints: "Slip-set stabilizer.

i. Exterior Brick with Steel Back-up: #362 Gripstay Channel, 12 gage welded to steel, with #315-BT Flexible Dovetail Brick Tie, dovetail end to be 16 gage minimum, 1" wide. Provide Byna-Tie 3/16" in diameter, of length to provide 2" embedment in brick. Provide multi-grooved rigid PVC Seismiclips, #187-A, for seismic interlock system. Provide 3/16" diameter Type 304 stainless steel continuous joint reinforcement wire.

I. Miscellaneous Accessories

1. Weeps: High Density polyester, polypropylene, or polyethylene woven mesh, 90% open, full height of adjacent brick x full width of joint. Recessed 1/4" from face of brick, and extending to back of brick. Color to be selected by Architect from manufacturer's standard colors.

a. "Weep Vent" by Mortar Net

2. Mortar Collection/Deflection Device: High density polyethylene, polyester, or polypropylene open woven mesh of width to fill entire cavity after installation of the insulation. Provide double layer of material to ensure cavity is filled. Mesh shall be installed to create an up and down effect.

a. "Mortar Break" or "Mortar Break II" by Advanced Building Products Inc.

b. "Mortar Net" by Mortar Net, Inc.

K. Insulation

1. Extruded polystyrene, rigid, ASTM C578 Type X with R-value (aged) of 5.0/inch at 75°F mean temperature when tested in accordance with ASTM C518.

a. Minimum compressive strength: 15 psi in vertical direction when tested in accordance with ASTM D1621.

b. Maximum water absorption: 0.1% by volume when tested in accordance with ASTM C272.

c. Surface Burning Characteristics in accordance with UL tests): Flame Spread - 5, Smoke Developed - 165.

2. Product shall not be produced with or contain any of the U.S. EPA regulated CFC compounds which are listed in the Montreal Protocol.

3. Provide Styrofoam Brand Cavity-mate by Dow Chemical.

Panel size: 16" x 96". Thickness: as shown on the Drawings. Provide each panel of full thickness indicated.

4. Adhesive: Type recommended by insulation manufacturer and air barrier manufacturer. Compatible with insulation and substrate.

L. Masonry Cleaner

Masonry cleaner capable of cleaning masonry without degrading the masonry material or mortar. Cleaner must be approved by the masonry manufacturer.

M. Electrodes for Welding
Electrodes for welding stainless steel to carbon steel: E309-16.

2.04 MIXES

A. Mortar (basic)

Shall conform to ASTM C270 and BIA M1-88. Provide Type I Portland cement (Type II Portland Cement when used for manholes). Masonry cement shall not be used as a substitute. Preconstruction testing with the proportions carefully monitored is to be used to establish the upper end of the strength range, which should generally be near the minimum strength of the next higher strength mortar.

1. Type M: 1 part gray cement, 1/4 part lime, $3\frac{3}{4}$ parts dry sand. Minimum compressive strength shall be 2500 psi at 28 days.

2. Type S: 1 part gray cement, 1/2 part lime, $4\frac{1}{2}$ parts dry sand. Minimum compressive strength shall be 1800 psi at 28 days.

3. Type N: 1 part gray cement, 1 part lime, 6 parts dry sand. Minimum compressive strength shall be 750 psi at 28 days.

4. Type N "White": 1 part white cement, 1 part lime, 6 parts dry white sand. Minimum compressive strength shall be 750 psi at 28 days.

B. Colored Mortar

Proportion mortar coloring with other mortar mix ingredients to obtain desired color, as approved by the Project Architect. Provide white cement instead of gray cement where required to meet the desired color. Do not exceed 1 part pigment to 10 parts cement, by weight. If consistent color cannot be obtained, provide as a minimum premixed Portland cement and coloring from major cement manufacturer.

C. Grout for Masonry

1. Mixes

a. Fine Grout: 1 part Portland Cement, 0-1/10 part Hydrated Lime, $2\frac{1}{4}$-3 times the sum of volumes of cementitious materials of fine aggregate (Proportions by volumes).

b. Coarse Grout: 1 part Portland Cement, 0-1/10 part Hydrated Lime, $2\frac{1}{4}$-3 times the sum of volumes of cementitious materials of fine aggregate, and 1-2 times the sum of the volumes of cementitious materials of coarse aggregate (Portions by volume).

c. Aggregates for Mixes: ASTM C 404.

d. Slump: 8" minimum, 11" maximum.

e. Compressive Strength: At least equal to the strength of the masonry, and not less than 2000 psi as determined by ASTM C1019 - Method of Sampling and Testing Grout.

2. Location

a. For spaces less than 2" in any direction, use fine grout.

b. For spaces 2" and more in any direction, use coarse grout.

2.05 SOURCE QUALITY CONTROL

A. The EOR will assign a Licensed Professional Engineer designated for Controlled Inspection who will inspect the masonry construction under the requirements of paragraphs 27-132 and 27-602, Tables 10-1 and 10-2 (Reinforced and Unreinforced Masonry), and R&R 9/29/83 (Appendix A) (Curtain Wall Construction) of the Building Code.

B. Preconstruction Testing

1. Preconstruction testing of mortar properties will be done in accordance with ASTM C780. The Contractor shall assist the EOR's laboratory by any means necessary and shall supply the approved base materials to the laboratory for testing.

2. Compressive strength tests of field mixed mortar are to be done during construction of the mock-up, or earlier if desired by the Contractor, to provide a benchmark for the strength based on actual field conditions and proportioning of the mortar. If mortar strengths are too high, proportions may be required to be modified if directed by the Architect or Engineer of Record.

3. Preconstruction testing of masonry grout properties will be done in accordance with ASTM C1019. The Contractor shall assist the EOR's laboratory by any means necessary and shall supply the approved base materials to the laboratory for testing and for making the molds.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine all adjoining Work on which this Work is in anyway dependent for proper installation and workmanship. Report to the EOR any conditions that prevent the performance of this Work.

3.02 PROTECTION

A. Cover top of masonry wall with waterproof plastic membrane at the end of the work period, when work is not in progress, and at other times when Work needs to be protected from rain and other precipitation. Extend cover down sides as needed to thoroughly protect the Work.

B. During cold weather, do not use wet masonry units and frozen masonry units.

C. Do not use frozen materials or lay masonry on frozen materials; remove frozen materials from wall. Refer to Part 1 of this Section, "Environmental Requirements" for temperature restrictions.

D. Remove excess mortar from walls as soon after laying units as practicable to prevent staining and to facilitate cleaning of wall.

E. Brace walls as needed until sufficiently set, or until intersecting walls provide lateral support.

F. Prevent masonry cleaners from coming in contact with adjacent glass, metal, and other masonry surfaces such as cast stone. Protect adjoining glass and metal surfaces and all other adjacent materials and property from masonry operations.

3.03 MIXING PROCEDURES FOR MORTAR

A. Measure material by volume or equivalent weight. In measuring by volume, measure ingredients by container. Do not measure by shovel.

B. Mix ingredients in a clean mechanical mixer for a minimum of 3 minutes, maximum of 5, with the minimum amount of water to produce a workable consistency.

C. Mortar that has stiffened because of evaporation of water from the mortar may be retempered only once, and only during the first hour of placement to restore the required consistency. Mortar shall be used within $2^1/_2$ hours after initial mixing. Limit amount of mortar batched at one time to stay within these requirements.

3.04 LAYING - GENERAL

A. Lay units true to dimensions, plumb and level, square; exterior and interior bond work in bond indicated on the Drawings or specified herein. Lay courses level with joints uniform; vertical joints spaced properly for plumb alignment. Provide masonry lines, plumb bobs, and utilize a 4 foot level to maintain wall within ¼" of theoretical dimensions.

B. Fill bed joints and cross joints solid with mortar. Furrowed bed and spotted cross joints not permitted. For hollow block units, apply mortar full length on all bearing surfaces.

C. "Tooth" temporary openings in exposed masonry walls, to maintain proper bond when closed.

D. Tool joints in exposed masonry with a concave jointer to provide a neat, smooth, compacted surface.

E. Rough cut joints in masonry that are to receive plaster, to provide good plaster bond.

F. Remove excess mortar, leaving masonry surface clean.

G. Cut brick and concrete masonry units with circular masonry wet saw.

H. Build-in miscellaneous metal inserts and other items not furnished under this Section but specified to be installed under this Section.

I. Lay brick in bond patterns as shown on the Drawings. If bond is not indicated on Drawings, use running bond, all stretchers.

3.05 FACE BRICK WORK

A. Lay face brick from scaffolding erected on face brick side of wall. Do not build or attach scaffolding into the brick face.

B. Use face brick for exterior walls, chimneys, bulkheads, and backs of parapets, except where concrete parapets are indicated.

C. Use 100% solid brick over exterior relieving angles/lintels or other brick projections on exterior face of building. (Use of solid brick with cores is acceptable if cores are filled solid with mortar and the cores are not visible to view.)

D. Wet clay and shale brick which have initial rates of absorption of more than 30 grams for each 30 square inches per minute (ASTM C67). Wet brick sufficiently to prevent excess absorption of mortar moisture, but keep surface dry enough to obtain bond.

E. Lay with shoved joints, avoiding dry contacts between brick.

F. Lay not more than 5 courses before setting backup units.

G. Clean loose mortar from wall as brick is laid.

H. Provide weep holes in the head joints of the first two courses of masonry above wall flashing (space at 24" o.c. linear in each course, staggering the first course with the second course). Provide weep holes at other locations as denoted on the Drawings.

J. Construct 1/2” wide vertical expansion joints at locations indicated on the drawings. If not indicated, provide at approximately 25’-0” o.c. and within 5’-4” from the corners.

3.06 CAVITY WALL

A. Keep the cavity free of mortar droppings. Do not permit mortar to collect on ties and bridge across the cavity.

B. Provide continuous row of mortar mesh at base of wall, over relieving angles and lintels, at all locations with flashing and weep holes, and as indicated, directly on flashing. Flashing shall extend above top of mortar mesh except where indicated otherwise. Trim mortar mesh to size indicated on the Drawings.

C. In laying up the wall, keep the cavity clean of mortar droppings by temporarily placing a wood strip 2" high and full width of cavity on each succeeding course of anchors as they are installed, removing the strip, cleaning it off, and reinserting it on the next course of anchors before laying up the next portion of wall. Do not leave any wood strips in the cavity.

D. Prepare CMU backup for application of fluid applied membrane air/vapor barrier specified in Division 7. Mortar joints shall be completely filled and struck flush with unit masonry. Leave surfaces clean, and without projections, voids, cracks, contaminants, or other irregularities that would hinder proper application of the membrane. Clean mortar droppings from surfaces and brick ties.

E. Provide reinforcement between brick and backing.

F. After the wall has been topped out, inspected and when directed by the Project Architect, flood the cavity with water to verify that all weeps drain freely and no water passes the backing.

3.07 INSULATION

A. Prior to installation of cavity insulation verify that:

1. Substrate is properly prepared.

2. Wall is clean.

3. Air barrier membrane provided under Section 07272 has sufficiently cured, if applicable for the membrane system used, as recommended by the membrane manufacturer.

B. Application

1. Install insulation horizontally within cavity space, against concrete block wall and other substrates, butt edges tightly, with vertical joints staggered. Cover wall completely.

2. Adhere insulation using one of the following methods, as recommended in writing by the air barrier manufacturer for the specific air barrier system provided for this Project:

a. Method A. Use this method for adhesive air/vapor barrier systems.

Embed the insulation into the membrane material and press firmly into place to ensure full contact and adhesion.

1) Install the insulation immediately after applying the continuous “Air-Bloc 21” system.

2) Adhere insulation to the continuous “Rub-R-Wall Airtight” system, after initial set time of 1 to 2 hours subject to temperature and humidity conditions, while material is still tacky.

b. Method B. Use this method for air/vapor barrier systems such as Henry Co. “Air-Bloc 32”, and W.R. Grace “Perm-A-Barrier Liquid”, requiring a separate application of adhesive. Upon completion of the air barrier membrane system, and after a curing period recommended by the membrane manufacturer, apply insulation adhesive in a serpentine pattern over the air barrier membrane using a notched trowel. Immediately after application of the adhesive, or within the time period recommended by the manufacturer, embed insulation board into the

adhesive and press firmly into place to ensure full contact and adhesion over entire area of board. Apply additional adhesive if allowed to skin over.

3. In addition to adhesive attachment of insulation to all substrates, provide an insulation retainer washer at each brick tie.

4. Fabricate insulation panels by means of saw, knife or other sharp tool to fit around obstructions across cavity such as vents, louvers, piping, conduits, and other penetrations. Make insulation continuous, filling all voids. Use largest pieces of insulation possible to minimize joints. Fill cracks with material compatible with insulation, air barrier, and masonry.

3.08 REINFORCEMENT

A. General

1. Brick ties: Shall be embedded a minimum of the midpoint of the brick to 2″ into brick, exclusive of the seismic clip and wire. Wire shall be ¾″ back from the face of the joint.

2. Block ties: Shall be embedded a minimum of 2/3 the block width

B. Exterior Walls - Brick with concrete back-up:

Provide ties at 16" o.c. vertical spacing, 24" o.c. horizontal spacing.

C. Exterior Walls - Brick with concrete masonry unit (CMU) back up:

1. Provide truss/ladder type horizontal joint reinforcement/box tie system between block and veneer brick, continuous at alternate block courses (16" o.c.), with loops spaced at 16" o.c. horizontally, maximum. Provide seismic interlock system, including seismic clips, and continuous wire. Provide retainer washer at each set of loops to lock insulation in place.

2. Provide ties with interior partitions at 16” o.c.

4. Provide spandrel anchor to anchor block masonry to steel spandrels. Provide anchors spaced 16” o.c. maximum vertically.

5. Install reinforcing bars in cells and bond beams at locations and spacing indicated on Drawings.

D. Exterior Brick Walls (multi-wythe with no cavity):

1. At multi-wythe walls without cavity, provide truss/ladder type joint reinforcement at 16 o.c. vertical spacing.

2. Install reinforcing bars at locations and spacing indicated on Drawings.

H. Exterior Walls – Veneer Brick with multi-wythe solid brick back-up:

1. Provide truss type horizontal joint reinforcement/box tie system between multi wythe brick back-up and veneer brick, continuous at 16" o.c., with loops spaced at 16" o.c. horizontally, maximum. Provide seismic interlock system, including seismic clips, and continuous wire. Provide retainer washer at each set of loops to lock insulation in place.

2. Install reinforcing bars at locations and spacing indicated on Drawings.

I. Exterior Brick with steel back-up:

Provide ties at 16" o.c. vertical spacing, 24" o.c. horizontal spacing. Provide seismic interlock system, including seismic clips, and continuous wire.

K. Expansion joints and control joints

Install “slip-set” stabilizer at 24” o.c. vertically in all masonry control and expansion joints of masonry partitions, CMU walls, and multi-wythe brick walls/parapets.

L. Lap ends of adjoining strips of continuous reinforcement 6".

M. Size (width) of reinforcement as required for 4", 6", 8", 10" partitions.

3.09 FIELD QUALITY CONTROL

A. The EOR will assign, under the requirements of paragraphs 27-132 and 27-602, Tables 10-1 and 10-2 (Reinforced and Unreinforced Masonry), and R&R 9/29/83 (Appendix A) (Curtain Wall Construction) of the Building Code a Licensed Professional Engineer designated for Controlled Inspection who will inspect the masonry construction.

B. The Contractor, upon award of the Contract, will receive a signed statement stating that the Engineer designated for Controlled Inspection has assumed the responsibility for masonry inspection and will file all reports as required by the Building Department.

C. The Engineer will make inspections and any testing deemed necessary. Testing of mortar properties shall be in accordance with ASTM C780. Mortar suspected or tested to be too strong or too weak will be subject to petrographic analysis or other methods deemed necessary by the Engineer of Record and Engineer designated for Controlled inspection. Testing of masonry grout shall be in accordance with ASTM C1019. The Contractor shall pay for all tests if they verify improper work. Inspection are to include, but not be limited to, the following:

1. Proper installation of reinforcement and placement of brick on angles.

2. Proper installation of mortar, including proportioning and mixing. Those mortar properties listed in the Appendix of ASTM C780 are to be tested at the discretion of Engineer designated for Controlled Inspection or the Architect/Engineer of Record Mortar strengths, when tested, will be determined in accordance with ASTM C780 using cubes.

3. Proper installation of weeps, flashing, mortar mesh, cleaning of cavity (if cavity wall construction), etc.

4. For cavity wall construction, all bed and head joints are filled completely. At solid masonry construction, all bed, head, and collar joints are filled completely.

D. If any results are found to be not in conformance with the applicable ASTM, industry practice, and the Specifications the masonry in question shall be removed and redone.

3.10 CLEANING

A. Before cleaning masonry walls, examine faces for holes, cracks, and other defects. If corrections cannot be made to provide an appearance acceptable to the Project Architect, replace defective units.

B. Exterior Masonry

1. After completion of laying and the completion of other adjacent work liable to soil masonry, clean face work and point all open joints.

2. Start cleaning operations at top and proceed downward, using solution not detrimental to material or mortar.

3. Use only masonry cleaners approved by the manufacturer of the specific face brick and follow the brick manufacturer's instruction for use of the product. The use of muriatic acid is not approved.

END OF SECTION

***

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:	_____	_____
1. Masonry unit data		
2. Reinforcement, anchors & ties		
4. Portland Cement Mfr & Brand		
5. Lime Mfr & brand		
6. Mortar Pigments Mfr & Brand		
7. Packaged Products: Mfr's specs & application instructions		
8. Sand: Location of pit, Owner's name, & previous test data		
9. Insulation		
10. Insulation adhesive		
11. Masonry cleaner		
Samples:	_____	_____
1. Face Brick		
Shop Drawings:	_____	_____
1. Control joint locations		
Quality Control Submittals:	_____	_____
1. Schedule of Uses (By mortar type)		
2. Certificates		
Notarized Bldg Dept. affidavit re: Mas. Producer, Materials comply (Form 10H)		
Notarized Bldg Dept. affidavit re: Mas. Supplier, Materials comply (Form 10J)		
Certification Polystyrene Insul. mfrd in compliance with Montreal Protocol:		

Mockups: _____ _____

1. Sample panels(B) incorporated into the project, for Face Brick.

* * *

SECTION 07900
JOINT SEALERS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide all joint sealer Work as indicated on the Drawings, as required for the completed Work, and as specified herein. This Section includes joint sealants for the following applications:

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:

   a. Construction joints in concrete.

   b. Joints in exterior insulation and finish systems.

2, Exterior joints in the following horizontal traffic surfaces:

   a. Control and expansion joints in brick pavers.

   b. Isolation and contraction joints in cast-in-place concrete.

   c. Joints in stone paving units, including steps.

   d. Other joints as indicated.

1.02 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work

1. American Society for Testing and Materials (ASTM)

1.03 SUBMITTALS

A. Product Data

Catalog sheets, specifications, and installation instructions for each type of joint sealant product specified except miscellaneous materials.

B. Samples for Initial Selection:

1. For general purpose use around windows and at relieving angles, Colors of Exposed Joint Sealants: Match Architect's samples.

2. For all other uses: provide Manufacturer’s color charts consisting of strips of cured sealants showing the full range of Manufacturer’s standard colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2"wide joints formed between two 6” long strips of material matching the appearance of exposed surfaces adjacent to joint sealants

D. Quality Control Submittals

1. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

2. Installer's Qualifications Data: Affidavit required under Quality Assurance Article.

3. Company Field Advisor Data: Name, business address, and telephone number of Company Field Advisor.

4. Preconstruction Test Results

a. Sealant manufacturer’s test reports certifying compatibility and adhesion with all contiguous materials.

b. Sealant manufacturer’s test reports certifying that the sealant will not stain contiguous materials.

c. The results of field adhesion testing.

E. Low Emitting Materials Compliance Submittals

1. Provide documentation for each sealant, sealant primer and cleaner to be used on site and within the weatherproofing/waterproof membrane (interior) of the building, indicating that the sealants and primers meet V.O.C. requirements as stated in Specification Section G01600.

1.04 QUALITY ASSURANCE

A. Installer's Qualifications

The persons installing the sealants and their supervisor shall be personally experienced in the installation of sealants and shall have been regularly employed by a company engaged in the installation of sealants for a minimum of two years.

1. Furnish a letter from the sealant manufacturer, stating that the Installer is authorized to install the manufacturer's sealant materials.

B. Container Labels

Include manufacturer's name, trade name of product, kind of material, federal specification number (if applicable), expiration date (if applicable), and packaging date or batch number.

C. Preconstruction field-adhesion testing

Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints as directed by Architect.

2. Conduct field adhesion tests for each kind of sealant and joint substrate.

3. Test using ASTM C1193 Method A: For joints with dissimilar substrates, verify adhesion to each substrate separately

4. Do not use sealants that fail to adhere to joint substrates during testing.

D. Mockups

Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joint sealer materials as recommended by the Manufacturer, to protect from damage.

1.06 PROJECT CONDITIONS

A. Environmental Requirements

1. Temperature: Unless otherwise approved or recommended in writing by the sealant manufacturer, do not install sealants at temperatures below 40°F or above 85°F.

2. Humidity and Moisture: Do not install the Work of this Section under conditions that are detrimental to the application, curing, and performance of the materials.

3. Ventilation: Provide sufficient ventilation wherever sealants, primers, and other similar materials are installed in enclosed spaces. Follow manufacturer's recommendations.

4. Do not proceed with installation of joint sealants under the following conditions

a. When joint substrates are wet.

b. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

c. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

d. Surfaces are frozen.

e. Surfaces are superheated by the sun.

B. Protection

1. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining.

2. Protect all other surfaces in the Work area with tarps, plastic sheets, or other approved covering to prevent defacement from droppings.

3. Protect any painted surfaces which are not included in the Work from impact or damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Momentive Performance Materials-GE Silicones, Waterford, NY 12188

B. Dow Corning Corp., Midland, Michigan 48686

C. Pecora Corp., Harleyville, PA

D. Tremco Sealants and waterproofing, Beachwood, OH 44122

E. Bostik, Middleton, MA 01949

F. Sika Corporation, Lyndhurst, NJ 07071

G. Schul International, Pelham, NH 03076

H. Emseal Joint Systems Ltd., Westborough, MA 01581

2.02 SEALANTS

A. Type 1 Sealant (for use in vertical expansion joints where movement occurs; for general purpose use around windows, door frames, louvers, and other junctures).

1. One-part low-medium modulus silicone sealant (plus or minus 50% movement); ASTM C920 classifications type S, grade NS, class 25, uses NT, M, G, and A: General Electric Silpruf SCS2000, Dow Corning 791, Pecora 864NST, Tremco Spectrem 2 or Sika SikaSil WS 295.

Silicones shall meet the following requirements:

- ASTM C719 - Low-Medium Modulus (+ or - 50%). Sealants shall not exhibit any cracking or surface degradation after 5000 hours exposure in the Atlas Twin Arc Weatherometer.

- ASTM C661 - Shall not incur a durometer increase greater than 10 points.

- Sealants shall contain zero parts of toxic isocyanurate ingredients.

Provide custom colors for use around window perimeters, to match window frame or masonry, or other colors as determined by the Architect.

B. Type 1A Sealant (for use for pavements, walks, and curbs)

1. For Horizontal Joints: Two-part, self-leveling polyurethane sealant for traffic bearing construction; ASTM C920 classifications type M, grade P, class 25, uses T, M, A, and O (granite): Pecora Urexpan NR-200, or , Tremco THC 900/901 or Sika Sikaflex 2C SL.

2. For Vertical Joints: Two-part, non-sag polyurethane sealant; ASTM C920 classifications type M, grade NS, class 25, uses NT, M, A and O (granite): Pecora Dynatrol II, or Bostik Chem-Calk 505, Tremco Dymeric 240FC or Sika Sikaflex 2C NS.

C. Type 1B Sealant (for Plaza Decks)

1. For Horizontal Joints: One-part, self-leveling polyurethane sealant for traffic bearing construction; Pecora UrexpanNR-201, or Sika Sikaflex-1C SL, or Tremco Vulkem 45SSL.

2. For Vertical Joints: One-part, non-sag polyurethane sealant; ASTM C920 classifications type S, grade NS, class 25, uses NT, M, A and O (granite): Pecora Dynatrol I-XL, or Sika Sikaflex 15 LM, Tremco Dymonic.

D. Type 1C Sealant - For general use around windows, store front systems, door frames, metal panel systems, metal coping, louvers, cast stone copings and other junctures where movement occurs.

One-part ultra-low modulus neutral cure silicone sealant; ASTM C920 classifications type S, grade NS, class 25, uses NT, M, G, A and O: Pecora 890 FTS; Tremco Spectrem-1 or Dow Corning 790 or Sika SikaSil WS 290.

Provide custom colors for use around window perimeters, to match window frame or masonry, or other colors as determined by the Architect.

E. Type 1D Sealant (use at interior wet areas only-- Bath and Shower areas)

One-part, mildew resistant silicone sealant; ASTM C920 classifications type S, grade NS, class 25, uses NT, M, G and A: Dow Corning 786-M, General Electric Sanitary SCS1700, Pecora 898-NST, Sika Sikasil -N plus or Tremco Tremsil 200 with fungicide.

F. Type 2 sealant (narrow joint seam sealer for joints & cracks 1/4" or less in width)

Silicone sealers: Pecora 1215 seam sealer or Dow Corning 1299

G. Type 3 Sealant (for concealed bedding only).

One-part butyl rubber sealant; Pecora BC-158, Bostik Chem-Calk 300, or Tremco Butyl.

H. Type 4 Sealant (use at high temperature applications, e.g., flues)

One-part silicone sealant for high temperature; ASTM C920 classifications type S, grade NS, class 25, uses NT, M, G, and A: Momentive Performance Materials-GE RTV 106, Dow Corning 736, Tremco Spectrem 1 or Sika Sikasil-GP HT Red

I. Type 5 Sealant (use at relieving angles - between brick and stainless steel sealant edge)

One-component polyurethane sealant; ASTM C920 classifications type S, grade NS, class 25, uses NT, M,

and A, Tremco – Dymonic 100, Sikaflex-15LM, Pecora Dynatrol I-XL

Provide custom paint colors for use at relieving angles.

J. Pre-formed Sealant for exterior applications

1. Low modulus silicone sealants: Pecora Sil-Span, Sealex ImmerSeal, GE Ultraspan US1100.

2. Acrylic impregnated flexible polyurethane foam, such as Sealtite Standard by Schul International Co., Tremco Illmod 600 or Compriband.

K. For sealants used on site and within the weatherproofing/waterproof membrane (interior) of the building comply with V.O.C. requirements specified in Section G01600.

L. Precompressed Sealant

Acrylic impregnated compressible polyurethane foam precompressed to 50% of its uncompressed length **for** use behind a primary sealant: "Sealtite B" by Schul International or “Backerseal” by Emseal.

2.03 JOINT FILLERS

A. Elastomeric Tubing Sealant Backings: (for precast panel joints not compatible with Silicone Sealants): Neoprene, butyl or EPDM tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26°F (minus 32°C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

ASTM D1056, Class SC (oil resistant and medium swell), 2 to 5 psi compression deflection.

B. Expanded Polyethylene Joint Filler (for existing joints) Flexible, compressible, closed-cell polyethylene of not less than 10 psi compression deflection (25 percent).

C. Closed-Cell Polyurethane or Closed-Cell Expanded polyethylene Joint Filler (for all cast-in-place concrete work).

Resilient, compressible, semi-rigid; W.R. Meadow Ceramar or equal.

D. ASTM D1056, Class RE41 (for masonry joints) where shown on the Drawings.

2.04 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

1. For primers used on site and within the weatherproofing/waterproof membrane (interior) of the building comply with V.O.C. requirements specified in Section G01600.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

1. For cleaners used on site and within the weatherproofing/waterproof membrane (interior) of the building comply with V.O.C. requirements specified in Section G01600.

C Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

D. Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material) or Type B (bicellular material with a surface skin), as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

E. Bond Breaker Tape

Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant; self-adhesive where applicable.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine all joint surfaces for conditions that may be detrimental to the performance of the completed Work. Do not proceed until satisfactory corrections have been made.

3.02 PREPARATION

A. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.

1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section.

2. Remove lacquers, protective coatings and similar materials from joint faces with manufacturer's recommended solvents.

3. Thoroughly clean surfaces on which sealant is to be applied using methods such as grinding, acid etching or other approved and manufacturer's recommended means, if required, to clean the joint surfaces, assuring that the sealant materials will obtain positive and permanent adhesion.

4. Prime surfaces, if required, as recommended by Manufacturer before applying sealant.

B. For Pavements, Walks, and Curbs

1. Set joint fillers at proper depth and position as required for installation of bond breakers, backer rods, and sealants. Do not leave voids or gaps between the ends of joint filler units.

a. Smooth Edged Joints: For joints between two concrete slabs or where new concrete abuts smooth-edged materials, use either cork joint filler or closed cell polyurethane joint filler.

b. Irregular Edged Joints: For joints where new concrete abuts granite curbs or other irregular edges, use closed cell polyurethane joint filler.

c. Priming Joint Surfaces:

1) Prime joints which are to receive Type 1A and 1B Sealants.

2) For joints of friable (crumbly, chalky) masonry surfaces and other surfaces which are to receive Type 1 Sealant, prime as recommended by Manufacturer.

3) Prime joints other than those above if so recommended by the manufacturer's printed instructions.

4) Do not allow the primer/sealer to spill or migrate onto adjoining surfaces.

3.03 JOINT BACKING INSTALLATION

A. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.

B. Install backer rod of sufficient size to fill the joint width at all points in a compressed state. Compress backer rod at the widest part of the joint by a minimum of 25 percent. Do not cut or puncture the surface skin of the rod.

3.04 SEALANT INSTALLATION

A. Except as shown or specified otherwise, install sealants in accordance with the manufacturer's printed instructions.

B. Install sealants with ratchet hand gun or other approved mechanical gun. Where gun application is impracticable, install sealant by knife or by pouring, as applicable.

C. Finishing

Tool all vertical, non-sag sealants so as to compress the sealant, eliminating all air voids and providing a neat smoothly finished joint. Provide slightly concave joint surface, unless otherwise indicated or recommended by the manufacturer.

1. Use tool wetting agents as recommended by the sealant manufacturer.

3.05 FIELD QUALITY CONTROL

A. Field Adhesion Testing of Sealants - Test completed elastomeric joints as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:

a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and join substrate.

b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method – Test joints by hand pull method described below:

a. Make knife cuts from one side of the joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2 inch piece.

b. Use fingers to grasp 2 inch piece of sealant between cross-cut end and 1” mark, pull firmly at a 90 degree angle or more in direction of side cuts while holding a ruler along sides of sealant. Pull sealant out of joint to the distance recommended by the sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension, hold this position for 10 seconds.

c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side.

3 Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.

4. Inspect tested joints and report on the following:

a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

b. Whether sealants filled joint cavities and are free of voids.

c. Whether sealant dimensions and configurations comply with specified requirements.

5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

6. Repair sealants pulled from test area by applying new sealants following same procedures used

originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

7. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.06 CLEANING

A. Immediately remove misapplied sealant and droppings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.

B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection and clean up remaining defacement caused by the Work.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product data:	_____	_____
1. Catalog sheets, specifications, installation instructions for each item specified		
Samples:	_____	_____
1. Manufacturer's color charts for Initial Selection		
2. Samples for Verification for each type and color of joint sealant		
3. Color samples for paint for type of sealant/application		
Quality Assurance	_____	_____
1. Manufacturer's Product Certificates		
2. Installer's Qualifications Data		
3. Company Field Advisor Data		
4. Manufacturer's test reports certifying compatibility		
5. Manufacturer's test reports certifying that sealant will not stain		
6. Pre-construction field adhesion test reports		
Mockups:	_____	_____
1. Each location		

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