

**PROJECT MANUAL AND SPECIFICATIONS
FOR
STATE STREET CHURCH
PORTLAND, MAINE
CHAPEL/CLERESTORY
EXTERIOR RESTORATION**



Prepared by:

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BSE Project No. W0 3230**

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DIVISION 1

GENERAL REQUIREMENTS

SECTION 01000 – Contract General Requirements

The Contractor by the acceptance of work at State Street Church (the Owner) hereby agrees to the following conditions and requirements relating to the performance of the work.

1) COMPLIANCE WITH LAWS

The Contractor at all times shall observe and comply with all applicable Federal, State and Local laws, by-laws, ordinances, codes and regulations, in any manner affecting the conduct of the work, or applying to any employees on the project. Further, the Contractor shall comply with U.S. Environmental Protection Agency’s “Renovation, Repair and Painting Rule” regarding renovation of buildings containing lead paint surfaces.

The Contractor shall indemnify and save harmless the Owner and all its officers, employees, representatives, consultants and agents from all suits, actions, or claims of any character or description brought for, made on account of, or arising from the violation of any such law, by-law, ordinance, regulation, order or decree or otherwise resulting from the performance of the work. Such indemnity shall include, but not be limited to the Owner’s legal fees.

2) PROTECTION OF PERSONS AND PROPERTY

It shall be the duty and responsibility of the Contractor and all Subcontractors engaged in work for the State Street Church to be familiar with, and comply with all requirements of Occupational Safety and Health Act of 1970 (OSHA) 29 CFR 1910.146 and 1926 all amendments, additions and referenced standards therein and to enforce and comply with all of the provisions of this Act regarding Confined Space Entry.

It shall also be the duty and responsibility of the Contractor and all Subcontractors to be familiar and comply with all requirements of Public Law 91-596, the Occupational Safety and Health Act of 1970 (OSHA) and all amendments, additions and referenced standards therein and to enforce and comply with all of the provisions of this Act.

The Contractor and all Subcontractors shall erect and maintain, as required by existing conditions, all necessary safeguards for personal and property safety and protection, including posting danger signs and other warnings against hazards.

The Contractor and all Subcontractors and employees thereof shall have no responsibility for the handling, removal or disposal of, or exposure of persons to hazardous materials in any form at the project site, including but not limited to asbestos, asbestos products, polychlorinated biphenyl (PCB) or hazardous or toxic materials. If the Contractor encounters or suspects hazardous or toxic materials, the Contractor shall advise the Owner immediately and stop work. The Owner and the Contractor shall make reasonable efforts prior to the commencement of work to identify and make provisions for such conditions.

The work in the affected area shall not be resumed by the Contractor until the hazardous material has been removed, rendered harmless or acceptable protective measures have been taken per Federal and State guidelines.

In addition to evidence of insurance and other documentation, a copy of the contractor’s General (for short-term projects) and/or Site-Specific (for long-term projects) health and safety plan (HASp) will be submitted to the State Street Church and/or Designated Representative for review as part of the

initial bid and contracting process. This review may include requests for supporting documentation associated with the contractor's safety history, including past citations and fines.

The State Street Church and/or Designated Representative will specify any applicable location-specific or other in-house safety policies and procedures to be incorporated in the HASP prior to the implementation of the contract.

Contractors will provide necessary oversight and inspections of their own work sites to ensure compliance with the HASP and applicable OSHA standards, and document the same for review by the State Street Church and/or Designated Representative. Work sites may also be inspected at random by the State Street Church and/or Designated Representative; inspections will include a review of any self-audit documentation, which will be maintained on-site by the contractor and provided upon request.

Observed safety violations will be brought immediately to the attention of both the contractor's on-site supervisor and the State Street Church and/or Designated Representative, and will be rectified by the contractor as soon as practicable. State Street Church retains the right to suspend contractor operations until noted safety violations are addressed to the State Street Church satisfaction. Repeated violations, or failure to comply with the provisions of the Contract General Requirements, may be reason to terminate the contract.

3) **SECURITY**

Contractors operating on State Street Church property will adhere to the following requirements:

- a) The names, contact numbers, and on-site locations of the contractor's supervisor(s) will be provided to the State Street Church prior to work commencing.
- b) Contractor employees with outstanding criminal warrants will not be allowed on-site.
- c) The names of employees retained under an approved work-release program will be given to the State Street Church prior to that person commencing work.
- d) Work sites will be properly fenced to control access according to state laws, and posted with the appropriate "no trespassing" signs citing potential violation of state law. Contractors will secure work site property and equipment to the extent feasible to reduce theft and/or damage, and will be expected to coordinate with Security in crime prevention efforts. The Owner shall have no liability under any circumstances for any damage, loss or theft of Contractor's tools, materials, equipment or the like.
- e) Contractor employees are not allowed into State Street Church buildings or spaces within buildings unless directly related to their job duties, and will refrain from disturbing, disrupting, or making comments towards State Street Church staff or building visitors.
- f) The use of tobacco and alcoholic beverages in any form is prohibited on Church property.
- g) The use of profanity is prohibited on Church property.
- h) Be advised that individuals who are registered sex offenders are not eligible to work on any State Street Church project. The contractor must initially check the Maine Sex Offender registry and search for the name of any employee to be assigned to work on this project. This applies to subcontractors and material/equipment suppliers as well.

4) INSURANCE

The Contractor shall purchase and maintain, for the duration of the work, such insurance as will protect the Owner and the Contractor from claims, which may arise out of or result from the Contractor's operations, actions or inaction.

The insurance required shall be written for not less than the following amounts or the amount required by law, whichever is greater. The Owner reserves its rights to request additional insurance coverage on a specific project. All policies must be purchased from carriers licensed in the State of Maine and said carrier shall be rated at least A VII in A. M. Best's Key Rating Guide.

Certificates of Insurance, acceptable to the Owner, shall be filed with the Owner prior to commencement of the work. The Contractor shall provide certificates of insurance evidencing insurance, as required herein, and shall name State Street Church as an additional insured for General and Auto Liability. The Certificate Holder shall be listed as State Street Church, 159 State Street, Portland, Maine.

Builder's Risk coverage will be provided by the Church, when required by contract.

A. Minimum Requirements:

1. Worker's Compensation: State Statutory Coverage as mandated by Maine Law.

NOTE: State Street Church must be named as Certificate Holder

2. Comprehensive General Liability (including Premises Operations; Independent Contractor's Protective; Products and Completed Operations; Broad Form Property Damage; Bodily Injury):
Minimum required: \$1 Million Dollars per occurrence; \$1 Million Dollars Aggregate

NOTE: State Street Church must be listed as additional insured on General Liability policy. Certificate of Insurance must indicate retention amounts.

3. Umbrella/Excess Liability Insurance:
The Contractor shall provide proof of umbrella/excess liability insurance on the certificate of insurance, if available.
4. Comprehensive Automobile Liability (owned, non-owned, hired):
Minimum Required: State Minimum Limits as required by Maine Law.

NOTE: State Street Church must be named as Certificate Holder. Certificate must indicate deductible amounts.

5. Pollution Liability:
The Contractor shall maintain Pollution Liability Insurance with a limit of \$2 Million per claim, site-specific, for waste management, abatement, or recycling projects. State Street Church shall be named as an Additional Insured.

Certificates of Insurance, acceptable to the Owner, shall be filed with the Owner prior to commencement of the work. Builder's Risk coverage will be provided by the State Street Church.

6. Professional Design Malpractice Insurance

In the event a Contractor shall be providing architectural or engineering services in connection with its scope of work, the Contractor shall provide a certificate that it, or its design subcontractor or consultant, has professional design malpractice insurance in at least the amount equal to the value of the contract at issue or on such other terms negotiated by the parties. The Owner shall be notified of any change in policy limits and shall receive a certificate of insurance prior to the start of work.

5) MINIMUM WAGE

All Contractors shall pay employees not less than the prevailing minimum wage.

6) PAYMENT

All invoices are to be forwarded to State Street Church Designated Representative for processing and shall include building name, project description and purchase order number. If the project has no requirements for labor and Performance Bonds, Lien waiver(s) will be required and attached to all invoices per paragraph 16 "Lien Waiver(s)." Invoices without this information will be returned to the Contractor unpaid.

7) MATERIAL SAFETY DATA SHEETS

In accordance with chapter 22, title 26. M. R. S. A., the Contractor shall provide the Owner with written communication addressing the identity and hazard of any chemicals that will be used in the work area. Hazardous chemicals shall be identified by means of chemical identification lists, labels and material safety data sheets and then forwarded to the State Street Church prior to start of work.

8) CLEANING UP

The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by operations. At the completion of the work the Contractor shall remove all waste materials and rubbish from and about the project as well as all his tools, construction equipment, machinery and surplus materials and clean the work site to the satisfaction of the Owner. All costs of debris disposal unless specified otherwise will be borne by the Contractor.

It is the responsibility of the Contractor to sort and dispose of all waste in accordance with the federal, state or municipal waste disposal rules and regulations and to bear the expense thereof.

If the Contractor fails to reasonably clean up and keep the job site safe and free from debris at any point during the project or at the conclusion of the project, the Owner may do so and the cost thereof shall be deducted from amounts due to the Contractor.

9) PROJECT PROGRESS SCHEDULE

The Contractor shall prepare a comprehensive computer generated, activities based, CPM (Critical Path Method) type progress schedule for the work. The schedule shall demonstrate a reasonable plan and sequence for completion of the work consistent with the project deadline. The Contractor shall coordinate with the Owner and Engineer in the preparation of the schedule.

The progress schedule must be completed, submitted, and approved prior to approval of the first payment application or upon earlier request of the Owner or Engineer.

The schedule, when approved by the Engineer and Owner shall establish the dates for starting and completing the work for the various portions of the project. It shall be the duty of the Contractor and each of its subcontractors to conform to the approved schedule, and to perform their work within time limits indicated. The Contractor shall coordinate the letting of subcontracts, material purchases, shop drawings submissions, delivery of materials, sequence of operations, etc. to conform to the approved progress schedule.

A program shall be established to evaluate and update the schedule at each project meeting. The progress schedule shall be updated and submitted for review as an attachment to each of the Contractor's progress payment applications. The final determination as to when a revision of the schedule is necessary rests with the Owner.

10) NO SMOKING POLICY

There shall be no smoking inside any buildings nor anywhere else on Church property.

11) WARRANTY

The Contractor warrants and guarantees all work against defects in materials, equipment and workmanship for a period of one (1) year from the final completion date of the entire project. In addition, the Contractor warrants to the best of his knowledge that the work and materials conform to the plans, specifications and applicable building codes and standards.

This warranty period shall not limit the period of time within which the Owner shall be required to initiate suit or arbitration related to breach of the contract, including claims for breach of warranty.

The Contractor will be fully responsible to remedy to the Owner's satisfaction any and all damages related to breach of the foregoing warranty including but not limited to the costs incurred by the Owner to remedy the defective work, materials or workmanship, including the Owner's legal fees.

12) ACCESS/KEY POLICY

Access to locked areas shall be prearranged with the Designated Representative and/or the Director of Safety and Security. Typically, keys and key cards are signed out by the Contractor, after providing proper identification, at the beginning of the work day and returned at the end of the work day.

13) LIST OF KEY PEOPLE

The Contractor shall supply in writing a list of all key personnel working on a project and contact information including a list of phone numbers to call, (24 hours a day), in case of an emergency.

14) LIEN WAIVERS

The Contractor will be required to submit a completed Lien Waiver (Form A attached). Said Lien Waiver will be attached to each invoice. In addition, if said Contractor contracts with any Subcontractor or materials/equipment supplier in excess of \$5,000 from a single project or an aggregate of all work, Form B shall be filled out and submitted with Form A on all invoices relating to the contract.

15) TOOLS AND EQUIPMENT

All equipment and tools shall be furnished by the Contractor. The State Street Church will not lend out equipment or tools. It is the Contractor's responsibility to furnish the proper equipment to perform the work of the project.

The Contractor is responsible for coordination to carefully protect, remove and deliver to within one mile of the project site any/all surplus equipment and materials identified to be retained by the Owner.

16) USE OF STATE STREET CHURCH UTILITIES

Existing State Street Church utilities such as water and 120V power can be used by the Contractor at no cost. If modifications, extensions, etc. are needed for the use by the Contractor, then such work will be at the expense of said Contractor.

17) NOTIFICATION OF DISRUPTION OF CHURCH UTILITIES

In the event the work requires the disruption of any campus utility, (such as electrical power, fire alarms, sprinkler systems, energy management system, etc.), the Contractor will be required to notify the State Street Church a minimum of 48 hours in advance. Notification shall include estimated start and completion of the disruption. All systems are to be thoroughly tested by Contractor prior to reactivation.

18) SUBMITTALS

Definitions:

Shop Drawings are drawings, diagrams, schedules and other data specifically prepared for the work by the Contractor or any subcontractor, manufacturer, supplier or distributor to illustrate certain portion of the work.

Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the work. The Contractor shall submit for review complete Shop Drawings and Product Data from subcontractors, manufacturers, suppliers, etc. for all material and equipment to be incorporated into the work prior to installation.

Each Shop Drawing shall indicate in the title block, and each Product Data package shall indicate on the cover sheet, the following information:

- 1) Title
- 2) Name and location of the project
- 3) Names of manufacturers, supplier, vendor, etc.
- 4) Date of submittal

Product Data shall be prepared by the manufacturers, suppliers, vendors, etc. and shall contain all of the following information:

- 1) Detailed dimensional drawings
- 2) Accurate and complete description of the materials of construction
- 3) Installation details and recommendations
- 4) Manufacturer's published performance characteristics and capacity ratings, (hand written performance data, alone, is not acceptable)

At the completion of the work and prior to final payment, the Contractor shall furnish operation and maintenance manuals for each item of electrical and mechanical equipment installed. Provide name, address and telephone number of the Manufacturer's representative and service company, for each piece of equipment so that service or spare parts can be readily obtained. Manuals will include a parts list, servicing frequencies and requirements. A listing of all finishes provided including their location(s), manufacturer, style, color, and finish shall be included. Contractor is required to provide to the Church electronic copy (PDF) and 3 hard copies.

19) RECORD DRAWINGS

At the completion of the work and before final payment authorization, the Contractor shall supply to the Owner "as built" drawings of the work in PDF format. The drawings are to show all changes from the original contract drawings. All changes are to be drawn to scale and present information clearly and accurately.

Recognizing that as-built (record) drawings are an important item of work, which must be accomplished just as any other item in the project's scope, and in an effort to assure that this item is completed as accurately and completely as possible, please note the following:

NOTICE: Periodically, throughout the duration of the project, as-built drawing review meetings will be scheduled and conducted on site to assure that as-built drawing are up-to-date, accurate, and complete. These meetings will be conducted in the presence of the contractor and its sub-contractors, the project architect and its subconsultants, the Owner and its agents and consultants as appropriate.

These review meetings shall be conducted a minimum of three times throughout the duration of the project. The meetings will be scheduled contingent on project schedule and at the discretion of the Owner and/or Engineer.

The Contractor is expected to fully cooperate with this process by properly maintaining as-built drawings throughout the duration of the project, and making them available for review and verification at any time.

**State Street Church
Portland, Maine
(FORM A)**

CERTIFICATE AND RELEASE OF LIENS

JOB _____

KNOW ALL MEN BY THESE PRESENTS:

That
CONTRACTOR _____
Legal Name

ADDRESS _____

In accordance with the Conditions of the Contract herein referred to and in consideration \$ _____ representing *final payment under contract dated _____ and any and all amendments thereto, hereby indemnifies, releases and forever discharges the Owner, State Street Church, from all liens, debts, claims and demands arising out of labor performed or material or equipment supplied by said Contractor under or in any way pertaining to the above contract, The Contractor further deposes and says (a) That all bills and claims against said Contractor of every nature and kind whatsoever arising out of labor performed or material or equipment supplied or because of the performance of the above Contract have been paid and satisfied, (b) That this Certificate and Release of Liens affidavit is made for the purpose of inducing payment under the above Contract, (c) That the undersigned has authority to execute this Certificate and Release of Liens in behalf of the above Contractor.

IN WITNESS WHEREOF the undersigned has duly executed this Certificate and Release of Liens.

This _____ day of _____, 20 ____.

(Corporate Seal)

Name of Contractor

ATTEST:

By _____
Authorized Signature

Notary Public

Also Type Name

_____ day of _____ 20_____

Title of Person Signing for Contractor

My Commission Expires _____

*Delete “final” if partial payment

Contractor Name _____

Address _____

**State Street Church
Portland, Maine
(FORM B)**

CERTIFICATE AND RELEASE OF LIENS JOB _____

KNOW ALL MEN BY THESE PRESENTS:

That SUBCONTRACTOR _____
Legal Name

ADDRESS _____

In accordance with the Conditions and the subcontract herein referred to and in consideration \$ _____ representing *final payment under Subcontract dated _____ and any and all amendments thereto, hereby indemnifies, releases and forever discharges the Owner, State Street Church, Contractor _____ from all liens, debts, claims and demands arising out of labor performed or material or equipment supplied by said Subcontractor under or in any way pertaining to the above Subcontract. Subcontractor further deposes and says (a) That all bills and claims against said Subcontractor of every nature and kind whatsoever arising out of labor performed or material or equipment supplied or because of the performance of the above Subcontract have been paid and satisfied, (b) That this Certificate and Release of Liens affidavit is made for the purpose of inducing payment under the above Subcontract, (c) That the undersigned has authority to execute thus Certificate and Release of Liens in behalf of the above Subcontractor.

IN WITNESS WHEREOF the undersigned has duly executed this Certificate and Release of Liens.

This _____ day of _____, 20_____.

(Corporate Seal)

Name of Subcontractor

ATTEST:

By _____
Authorized Signatures

Notary Public

Also Type Name

_____ day of _____, 20_____

Title Person Signing for Subcontractor

My Commission Expires _____

*Delete "final" if partial payment

SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

1. Base contract scope: Exterior work performed on North, South and West Elevations as indicated on the Drawings.

- B. Alternate Number 1:
 1. Alternate scope: Exterior work on East elevation. PROVIDE separate unit price for each of the items listed below.
 - 1) Masonry repointing (assume 25% of wall is to be repointed).
 - 2) Limestone and tracery repointing (100%).
 - 3) Clean masonry façade (100%).
 - 4) Application of silane sealer (100%).
 - 5) Wood window repair and replacement of 4 storm windows.
 - 6) Window perimeter sealant replacement.
 - 7) Large Chapel/Clerestory window covering replacement.
 - 8) Window lintel replacement (Assume 4 are to be replaced).

- C. Alternate Number 2:
 1. Alternate Scope: West elevation (front) door refurbishment and hardware replacement.

- D. Alternate Number 3:
 1. Alternate Scope: Exterior work on partial North elevation. (Extent and scope of work indicated on the Drawings)

- E. Alternate Number 4:
 1. Alternate Scope: Interior finish repairs to Chapel/Clerestory walls.

- F. Alternate Number 5:
 1. Alternate Scope: Through-wall flashing replacement at low West roof.

END OF SECTION 01230

SECTION 01270 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Division 1 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by bidders as price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A list of unit prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

- A. Unit Price Number 1
 - 1. Description: Full Depth Brick Masonry Wall Rebuild
 - 2. Unit of Measure: Square feet

- B. Unit Price Number 2
 - 1. Description: Brick Masonry/Limestone Joint Repointing
 - 2. Unit of Measure: Linear feet

- C. Unit Price Number 3
 - 1. Description: Limestone Repairs (Dutchman and Patching)
 - 2. Unit of Measure: Square feet

- D. Unit Price Number 4
 - 1. Description: Roof plank deck replacement (at locations where existing deteriorated decking needs to be replaced)
 - 2. Unit of Measure: Linear feet

- E. Unit Price Number 5
 - 1. Description: Repair of interior finishes.
 - 2. Unit of Measure: Square feet

- F. Unit Price Number 6
 - 1. Description: Wood window frame replacement (at locations where existing deteriorated framing needs to be replaced)
 - 2. Unit of Measure: Linear feet

END OF SECTION 01270



DIVISION 4

MASONRY

SECTION 04460 - DUTCHMAN REPAIR OF STONE MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. This procedure includes guidance on the dutchman repair of damaged limestone. As used here, the term "Dutchman" refers to any new or salvaged stone fitted into the existing facade stone. New stone shall match existing.
- B. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:
 - 1. Dutchman repairs of limestone as indicated on the Contract Drawings. Unless otherwise noted, all Dutchman repairs shall replace the full face of the stone.
 - 2. Sample of limestone repair.

1.03 RELATED SECTIONS

- A. Section 04470 - Patch Repair of Stone Masonry
- B. Section 04500 - Masonry Restoration and Cleaning

1.04 QUALITY ASSURANCE

- A. Dutchman Contractor: A skilled firm with not less than five (5) years experience in masonry restoration. The Contractor shall be required to submit references for five (5) successfully completed projects of similar nature.
- B. Work Standards: Repointing basic reference and standard for stone repointing shall be National Park Service Preservation Brief #2: Repointing Mortar Joints in Historic Brick Buildings, by Robert C. Mack AIA, de Teel Patterson Tiller, and James S. Askins for any aspect of masonry repointing work not herein specified.
- C. Source of Material: Obtain materials for stone restoration from a single source for each type of material required, to ensure match of quality, color, pattern, and texture.

1.05 SUBMITTALS

- A. Submit the following items in time to prevent delay of the work and to allow adequate time for review and resubmittals, if needed; do not order materials or start work before receiving the written approval:
1. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements, and material Safety Data Sheets (MSDS) as appropriate.
 2. Qualifications Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses owners, and other information specified
 3. Samples: Submit two 3" x 3" x 1" samples of each type of stone for color and texture approval.
- B. Shop Drawings: Where indicated to install stone Dutchman, field measure stone and submit shop drawings of each unit. Shop drawings shall include dimensions of each unit, tooling pattern to be replicated in stone, connection details including number of stainless steel pins and location in building elevation.
- C. Mockup: Prepare field samples for Dutchman repair to demonstrate aesthetic effects and qualities of materials and execution. Use materials and methods proposed for completed Work and prepare samples under same weather conditions to be expected during remainder of Work.
1. The Foreperson responsible for the respective work shall be present at the sample work. Samples shall be executed by the same individuals performing the work. Provide one sample for each type of stone for each individual executing repair work.
 2. Locate mockups on the building where directed by the Engineer.
 3. Dutchman Repair: Prepare sample Dutchman for each type of masonry material indicated to be repaired. Erect sample panels into an existing wall to demonstrate the quality of materials and workmanship.
 4. Notify Engineer 7 days in advance of the dates and times when samples will be prepared.
 5. Obtain Engineer's approval of mockups before starting the remainder of masonry restoration and cleaning. If samples are unsatisfactory, Contractor shall make the needed modifications and prepare new samples until they are satisfactory. No mechanic shall be allowed to complete repair work until mockup is approved for that individual.
 6. The samples accepted by the Engineer for each individual executing repair work shall serve as the standard for the entire job. They shall be marked and left unpointed until all other pointing is completed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Materials are to be delivered, stored, and handled to protect them from damage, extreme temperature, and moisture.

1.07 PROTECT / SITE CONDITIONS

- A. Environmental Requirements: Perform work only in dry and otherwise favorable weather conditions. Protect repaired masonry against freezing or excessively rapid drying for at least 48 hours after being laid; no masonry shall be laid when temperature is below 32°F on a rising thermometer or below 40°F on a falling thermometer. Substrate temperature must be above 32°F at all times and for 7 days after completion of work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Laticrete International, Inc., 1 Laticrete Park, North Bethany, CT 06524-3423. 800/243-4788 or 203/393-0010.
- B. Cathedral Stone Products, Inc., 7266 Park Circle Drive, Hanover, MD 21076; tel. (410) 782-9150; fax. (410) 782-9155; website: www.cathedralstone.com.
- C. Sika Corporation, 201 Polito Ave, Lyndhurst, NJ 07071, 201/933-8800
- D. Hilti Inc. (USA), PO Box 21148, Tulsa, OK 74121, 1-800-879-8000.

2.02 MATERIALS

- A. Polymer Admixture (for Setting Dutchman) such as "Laticrete 3701 or 4237 Grout and Mortar Admixture" (Laticrete International, Inc.), or approved equal.
- B. Metal attachments for setting stone Dutchman:
 - 1. All wire, pins, anchors, and bars shall be stainless steel, Type 304.
 - 2. Provide anchors as follows:
 - 3. 1/8" diameter round stock, stainless steel wire with turned-up ends for small veneers.
 - 4. 1/4" or 3/8" diameter round stock, stainless steel rod for direct pinning and drop dowels.
 - 5. 1" wide, 1/8" thick, stainless steel, flat strap anchors for larger panels.
 - 6. The quantity of individual attachments shall not be less than two attachments for small dutchman, and one additional attachment every two square feet for larger panels.
 - 7. All attachments shall be fastened by mechanical locking, in addition to appropriate adhesives and mortars.

- C. Adhesives for attaching anchors and for direct pinning: Anchors may be held in place with high modulus, high strength, moisture insensitive, epoxy adhesive or anchor setting mortar.
 - 1. Adhesive shall be two-component 100% solids, epoxy resin system "Sikadur Hi-Mod Gel" (Sika Corporation), Hilti HIT HY 150 MAX or approved equal.
 - 2. Anchor setting mortar shall be Jahn Anchor Setting Mortar (M80) or approved equal.
- D. Pigments for altering the color of cement: All pigments shall be alkali proof, non-fading, and of synthetic iron oxides.
- E. Water: Clean and free of amounts of oils, acids, alkalies, salts, organic materials, or other substances that may be deleterious to mortar or any metal in the wall.

PART 3 EXECUTION

3.01 PREPARATION

- A. Protection: Contractor shall take whatever precautions are necessary to protect the existing building from damage resulting from work under this section.
- B. Surface Preparation: Cut existing spalls to form rectangular losses with square corners, minimum 3" thickness. All cuts shall be vertical or horizontal. No sloping Dutchman will be allowed.

3.02 ERECTION, INSTALLATION, APPLICATION

- A. Mortar for setting Dutchman shall be mixed in a ratio of one part by volume white portland cement and three parts by volume sand, tempered to a workable consistency with a polymer admixture.
 - 1. The use of Laticrete 3701 shall produce the equivalent of high strength "thick set" mortar. The stone must be temporarily held in place with wood wedges or other means until the mortar has sufficiently set.
 - 2. "Thinset" mortars for special conditions shall employ Laticrete 4237, or approved equal. It can be used when the mortar bed is less than 3/8" thick to produce an initially tacky mortar exhibiting high strength properties when set.
- B. Dutchman shall be fastened with stainless steel wire, pins, and anchors, as necessary, designed to facilitate mechanical locking and to prevent possible slippage of the stone. The metal fasteners shall be positioned without weakening the stone in any way.
- C. Cement mortar containing "Laticrete" latex emulsion additives, or approved equal, shall be used for all setting purposes. All insertion shall be fully dressed on all sides, and carefully fitted to the patch opening, with an allowance of not more than 1/8" buttered joint between front edges. Undercutting shall not weaken the stone in any way. The joints between new and old work shall be finished to match the color and texture of the stone.

- D. The surface of the new stone shall be dressed to resemble the appearance of the adjoining stone by an approved method. All surface dressing of new work shall be done before the stone is set.
- E. Protect the stone during the process of stone restoration. Any mortar accidentally splashed onto existing stone shall be wiped and rinsed with water.

END OF SECTION

SECTION 04500 - MASONRY RESTORATION AND CLEANING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:
 - 1. Testing to determine physical properties of existing masonry.
 - 2. Repairing clay masonry, including replacing damaged units and full depth repairs.
 - 3. Repointing mortar joints.
 - 4. Cleaning exposed clay brick and limestone masonry surfaces.
 - 5. Patching scaffolding support anchor holes as scaffolding is removed. Coordinate work with scaffolding subcontractor.

1.03 RELATED WORK

- A. Section 04460 - Dutchman Repair of Stone Masonry.
- B. Section 04470 - Patch Repair of Stone Masonry.
- C. Section 07920 – Joint Sealants.

1.04 DEFINITIONS

- A. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s)
- B. Medium-Pressure Spray: 400 to 1000 psi (2750 to 6900 kPa); 6 to 8 gpm (0.4 to 0.8 L/s)

1.05 QUALITY ASSURANCE

- A. Restoration Specialist: Work must be performed by a masonry restoration and cleaning firm having not less than 5 years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration process and

operations indicated. At Contractor's option, the work may be divided between 2 specialist firms: 1 for cleaning work and 1 for repair work.

1. Field Supervision: Require restoration specialist firms to maintain an experienced full-time supervisor on the Project site during times that clay masonry restoration and cleaning are in progress.
- B. Source of Materials: Obtain materials for masonry restoration from a single source for each type material required (brick, cement, sand, etc.) to ensure match of quality, color, pattern, and texture.
- C. Chemical Manufacturer Qualifications: A company regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project site inspection and assistance at no additional cost.
- D. References:
 1. Friedman, Donald, Historical Building Construction, W.W. Norton & Company, 1995.
 2. United States Secretary of the Interior, National Park Service, Technical Preservation, Preservation Briefs.

1.06 SUBMITTALS

- A. Submit the following items in time to prevent delay of the work and to allow adequate time for review and resubmittals, if needed; do not order materials or start work before receiving the written approval:
 1. Mortar Mix Design and Product Data
 2. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
 3. Qualifications Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified
 4. Cleaning Program: Describe cleaning process in detail, including materials, methods and equipment to be used and protection of surrounding materials on buildings and project site, and control of runoff during operations.
 - a. If materials and methods other than those indicated are proposed for cleaning work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this project.
 5. Testing Program: Perform tests to determine the physical properties of the existing

masonry including compressive strength, expansion/contraction, water absorption and e-modulus. Submit to Engineer test results and recommended repointing mortar mix design that is compatible with the physical properties of the existing masonry.

- B. Mockup: Prepare field samples for restoration methods and cleaning procedures to demonstrate aesthetic effects and qualities of materials and execution. Use materials and methods proposed for completed Work and prepare samples under same weather conditions to be expected during remainder of Work.
1. The Foreperson responsible for the respective work shall be present at the sample work. Samples shall be executed by the same individuals performing the work. Provide one sample for each procedure for each individual executing repair work.
 2. Locate mockups on the building where directed by Engineer.
 3. Masonry Repair: Prepare sample panels approximately 16 sq. ft in area for each type of masonry material indicated to be patched, rebuilt, or replaced. Erect sample panels into an existing wall, unless otherwise indicated, to demonstrate the quality of materials and workmanship.
 4. Cleaning: Prepare sample approximately 16 sq. ft. in area for each type of masonry and surface condition. Use manufacturer's application instructions. Test cleaners and methods on samples of adjacent materials for possible adverse reactions, unless cleaners and methods are known to have a deleterious effect. Allow a waiting period of not less than 7 days after completion of sample cleaning to permit a study of sample panels for negative reactions..
 5. Repointing: Prepare 2 separate sample areas approximately 36 inches high by 72 inches wide for each type of repointing required; 1 for demonstrating methods and quality of workmanship expected in removing mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints.
 6. Notify Engineer 7 days in advance of the dates and times when samples will be prepared.
 7. Obtain Engineer's approval of mockups before starting the remainder of masonry restoration and cleaning. If samples are unsatisfactory, Contractor shall make the needed modifications and prepare new samples until they are satisfactory. No mechanic shall be allowed to complete repair work until mockup is approved for that individual.
 8. The samples accepted by the Engineer for each individual executing repair work shall serve as the standard for judging the completed Work for the entire job. They shall be marked and left undisturbed until all restoration work is completed.

1.07 DELIVERY, STORAGE AND HANDLING:

- A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.

1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structure as directed.
- B. Deliver other materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.
- C. Protect masonry restoration materials during storage and construction from wetting by rain, snow, or ground water, and from staining or intermixture with earth and other types of materials.
- D. Protect grout, mortar, and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage. Do not use cementitious materials that have become damp.
- E. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- F. Store lime putty covered with water in sealed containers.
- G. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.08 PROJECT CONDITIONS

- A. Repoint mortar joints and repair masonry only when air temperature is between and 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least 7 days after completion of work.
- B. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing:
 1. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
 2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 7 days after repair and pointing.
- C. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above.

- D. Patch masonry only when air and surface temperatures are between and 55 and 100 deg F (13 and 38 deg C) and are predicted to remain above 55 deg F (13 deg C) for at least 7 days after completion of work. On days when air temperature is predicted to go above 90 degF (32 deg C), schedule patching work to coincide with time that surface being patched will be in shade or during cooler morning hours.
- E. Clean masonry surfaces only when air temperature is 40 deg F (4 deg C) and above and is predicted to remain so for at least 7 days after completion of cleaning.
- F. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- G. Protect sills, ledges and projections from mortar droppings.

1.09 SEQUENCING/SCHEDULING

- A. Order replacement materials at earliest possible date, to avoid delaying completion of the Work.
- B. Perform masonry restoration work in the following sequence:
 - 1. Repair existing masonry, including replacing existing masonry with new masonry materials.
 - 2. Rake out existing mortar from joints indicated to be repointed.
 - 3. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
 - 4. Point existing mortar joints of masonry indicated to be restored.
 - 5. Clean masonry surfaces.
- C. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in masonry units to match existing color and texture. Patch holes in mortar joints to match existing color and texture. Coordinate work with Scaffolding Subcontractor.

PART 2 PRODUCTS

2.01 MASONRY MATERIALS

- A. It should be noted that the original construction drawings indicate two different types of brick, **waterstruck and common brick**. All attempts should be made to match size, profile, texture and style of existing brick masonry.
- B. Salvaged Face Brick and Accessories: Provide face brick to the greatest extent possible using salvaged bricks from the same job site. If salvaged bricks are not available in sufficient quantity or quality, provide new face brick and accessories.
 - 1. Remove mortar, paint and other foreign material from salvaged brick.

2. Provide replacement brick complying with ASTM C 62 and repair areas from which salvaged brick was removed.
- C. New Brick and Accessories: Provide new brick and accessories, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work.
1. Provide units with colors, size and shape, surface texture, and physical properties to match existing units. Note that two styles of brick masonry exist as noted from the original 1920's construction drawings: common brick and waterstruck brick.
 2. Provide specially molded shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
 3. Provide specially ground units, shaped to match patterns, for arches and where indicated.
- D. Building Brick: Provide building bricks complying with ASTM C 62, of same vertical dimension as face brick, for masonry work concealed from view.
1. Grade SW, MW, or NW for concealed backup.
- 2.02 MORTAR MATERIALS:
- A. Masonry Cement: Premixed Type N Mortar Cement by LaFarge North America, or approved equivalent.
- B. Mortar Sand: ASTM C 144, unless otherwise indicated.
1. For pointing mortar, provide sand with rounded edges.
 2. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands, if necessary, to achieve suitable match.
- C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.
- D. Water: Potable.
- 2.03 CLEANING MATERIALS
- A. Water for Cleaning: Potable
- B. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate (TSPP), 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.
- C. Light Duty Restoration Cleaner: Sure Klean Light Duty Restoration Cleaner manufactured by Prosoco, Inc., 3741Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255 or approved alternate.

- D. Heavy Duty Restoration Cleaner: Sure Klean Heavy Duty Restoration Cleaner manufactured by Prosoco, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255 or approved alternate.

2.04 MISCELLANEOUS MATERIALS

- A. Masonry Patching Compound: Cathedral Stone Products, Inc., "Jahn M100": Factory-mixed cementitious product that is custom manufactured for patching masonry, is vapor- and water permeable, exhibits low shrinkage, and develops high bond strength to all types of masonry.
- B. Masonry Repair Anchors, Expansion Type: Mechanical fasteners designed for masonry veneer stabilization consisting of a 1/4-inch - diameter, Type 304 stainless-steel rod with brass expanding shells at each end and a water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on other end.
1. Mechanical Repair Anchors by Dur-O-Wal, Inc.
 2. #521RA Repair/Restoration Anchor by Hohmann & Barnard, Inc.
- C. Masonry Repair Anchors, Spiral Type: Type 304 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.
1. Provide driven in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.
 - a. Helifix 6mm Stainless Steel Helibar™
 - b. Heckmann Building Products, Inc. #391 Remedial Tie
 - c. Hohmann & Barnard, Inc. Helix Spiro Ties
- D. Masonry Repair Anchors, Adhesive Type: Type 304 stainless-steel threaded rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.
1. Provide adhesive installed anchors complete with manufacturer's standard epoxy adhesive and injection tubes, screens, sleeves, or other devices required for installation.
 - a. Hohmann & Barnard, Inc. #520RA.

2.05 MORTAR MIXES:

- A. Mortar Proportions: Mix sand, water and masonry cement per masonry cement manufacturer's instructions meeting the requirements of ASTM C270 for the mortar types specified.

- B. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
 - 1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, workable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not re-temper or use partially hardened material.
- C. Do not use admixtures of any kind in mortar, unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION:

- A. General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.
- B. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.
 - 1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
- C. Prevent mortar from staining face of surrounding masonry and other surfaces.
 - 1. Cover sills, ledges, and projections to protect from mortar droppings.
 - 2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
 - 3. Immediately remove mortar in contact with exposed masonry and other surfaces.
 - 4. Clean mortar splatters from scaffolding at end of each day.
- D. Cleaning
 - 1. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be injured by such contact.
 - 2. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces. Neutralize and collect alkaline wastes for disposal off Owner's property. (NOTE: Contractor may seek approval for environmentally friendly materials, through Utility, to allow for their runoff into the city storm sewer.)
 - 3. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to

landscaping, and water penetration into building interiors.

4. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles that must remain in operation during course of masonry restoration work.

3.02 UNUSED ANCHOR REMOVAL

- A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.
 1. Remove items carefully to avoid spalling or cracking masonry.
 2. If item cannot be removed without damaging surrounding masonry, cut off item flush with surface and core drill surrounding masonry and item as close around item as practical.
 3. Patch holes where items were removed unless directed to remove and replace units.

3.03 BRICK REMOVAL AND REBUILDING

- A. Remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.
 1. When removing single bricks, remove material from center of brick and work toward outside edges.
- B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C. Notify Engineer of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.
- D. Remove in an undamaged condition (Salvage) as many whole bricks as possible.
 1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
 2. Store brick for reuse, as indicated.
 3. Deliver cleaned brick not required for reuse to Owner, unless otherwise directed.
- E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- F. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

G. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.). Use wetting methods that ensure that units are nearly saturated but surface is dry when laid. Maintain joint width for replacement units to match existing joints.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.

3.04 MASONRY UNIT PATCHING

A. Patch the following masonry units:

1. Units with holes.
2. Units with chipped edges or coners.
3. Units with small areas of deep deterioration.

B. Remove and replace existing patches, unless otherwise indicated or approved by Engineer.

C. Patching Bricks:

1. Remove loose material from brick surface. Remove additional material so patch will not have feathered edges and will be at least 1/4 inch (6 mm) thick, but not less than recommended by patching compound manufacturer.
2. Mask or remove surrounding mortar joints if patch will extend to edge of brick.
3. Rinse surface to be patched and leave damp, but without standing water.
4. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
5. Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch (6 mm) or more than 2 inches (50 mm) thick. Roughen surface of each layer to provide a key for next layer.
6. Trowel, scrape, or carve surface of patch to match texture and surface plane of surrounding brick. Shape and finish surface before or after curing, as determined by testing, to best match existing brick.
7. Keep each layer damp for 72 hours or until patching compound has set.

3.05 REPOINTING MASONRY

A. Rake out and re-point mortar joints to the following extent:

1. All joints in areas indicated.

2. Joints where mortar is missing or where they contain holes.
 3. Cracked joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
 4. Cracked joints where cracks are 1/8 inch (3 mm) or more in width and of any depth.
 5. Joints where they sound hollow when tapped by metal object.
 6. Joints where they are worn back 1/4 inch (6 mm) or more from surface.
 7. Joints where they are deteriorated to point that mortar can be easily removed by hand.
 8. Joints, other than those indicated as sealant-filled joints, where they have been filled with substances other than mortar.
- B. Do not rake out and repoint joints where not required
- C. Rake out joints as follows:
1. Remove mortar from joints to depth of 2 times joint width, but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar.
 2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
 3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Engineer.
 - a. Continuous Horizontal Joints: Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and mallet. Strictly adhere to written quality-control program. Quality-control program shall include provisions for demonstrating ability of operators to use tools without damaging masonry, supervising performance, and preventing damage due to worker fatigue.
 - b. Vertical Joints, Non-continuous Horizontal Joints and Horizontal Joint Ends: Cut out mortar by hand with chisel and mallet. Do not use power-operated grinders. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue.
- D. Notify Engineer of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.
- E. Point joints as follows:
1. Rinse masonry-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen masonry-joint surfaces before pointing.
 2. Apply pointing mortar first to areas where existing mortar was removed to depths

greater than surrounding areas. Apply in layers not greater than 3/8 inch (9 mm) until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch (6 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar over edges onto exposed masonry surfaces or to feather edge mortar.
 4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.
- F. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours including weekends and holidays.
1. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
 2. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
- G. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.06 CLEANING MASONRY

- A. General: Clean masonry utilizing a detergent cleaning first. Move to more aggressive products/cleaners as necessary to achieve clean surface. Provide test area prior to each successive step to ensure compatibility with masonry surface as indicated here within.
- B. Detergent Cleaning:
1. Wet masonry with cold water applied by low-pressure spray.
 2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.
 3. Rinse with cold water applied by medium-pressure spray to remove detergent solution and soil.
 4. Repeat procedure above where required to produce the cleaning effect established by mockup.

3.07 RESTORATION MASONRY CLEANING

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Start with light duty detergent and proceed to heavy duty cleaning methods as needed until clean.
- B. Use only those cleaning methods indicated for each masonry material and location.
 1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
 2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
 - a. Equip units with pressure gages.
 3. For water spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
- C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including comers, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.
- D. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, caulking, asphalt, and tar.
 1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
- E. Water Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.
- F. Application: Before applying, read “Preparation” and “Safety Information” sections in the Manufacturer’s Product Data Sheet for Light Duty Restoration Cleaner. Do not dilute or alter.
 1. Prewet the surface with clean water
 2. Apply cleaner using a brush or roller. Gently scrub to improve results.
 3. Let cleaner dwell for 5 to 15 minutes. Gently scrub heavily soiled areas. Don’t let cleaner dry on the surface. If drying occurs, lightly wet treated surfaces with fresh water. Reapply the cleaner in a gentle scrubbing manner.
 4. Rinse thoroughly with clean water. The best combination of rinsing pressure and water volume is provided by masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip. Equipment should be adjustable to reduce water flow rate and rinsing pressure as required for controlled cleaning of more sensitive surfaces. See also

“Equipment” section of the Product Data Sheet.

5. Repeat steps 1 through 4 above if necessary.
6. Note: Application to surfaces exposed to direct sunlight or high winds may cause rapid drying. When possible, clean when surfaces are shaded from direct sunlight. Wet hot surfaces with fresh water immediately before applying cleaner to remove loose soiling and reduce surface temperature. Do not let cleaner dry on the surface. If drying occurs, lightly wet treated surfaces with fresh water and reapply the cleaner in a gentle scrubbing manner.

3.08 FINAL CLEANING

- A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.
 1. Do not use metal scrapers or brushes.
 2. Do not use acidic or alkaline cleaners.
- B. Wash adjacent woodwork and other non-masonry surfaces. Use detergent and soft brushes or cloths.
- C. Clean masonry debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
- D. Sweep and rake adjacent pavement and grounds to remove masonry debris. Where necessary, pressure wash surfaces to remove mortar, dust, dirt, and stains.

3.09 PATCHING SCAFFOLDING ANCHOR HOLES

- A. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in masonry units to match existing color and texture. Patch holes in mortar joints to match existing color and texture. Coordinate work with Scaffolding Subcontractor.

END OF SECTION

SECTION 04470 - PATCH REPAIR OF STONE MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following
 - 1. Patch repairs of limestone as indicated on the Contract Drawings.
 - 2. Sample limestone patch repair.

1.03 RELATED WORK

- A. Dutchman Repair of Stone Masonry -Section 04460
- B. Masonry Restoration and Cleaning -Section 04500

1.04 QUALITY ASSURANCE

- A. Installer certification: All repairs should be performed by a trained installer holding a Training Workshop Certificate from Cathedral Stone Products, Inc.. Contractor shall maintain proof of this credential for each installer at the site at all times.
- B. Patch Contractor Experience: A skilled firm with not less than five (5) years experience in masonry restoration. The Contractor shall be required to submit references for five (5) successfully completed projects of similar nature.

1.05 SUBMITTALS

- A. Submit the following items in time to prevent delay of the work and to allow adequate time for review and resubmittals, if needed; do not order materials or start work before receiving the written approval:

1. Qualifications Data: Certificates should be submitted stating that all Installers of the repair mortar have successfully completed the training workshop for installation of the mortar. (Three day workshops for Installers of Jahn Restoration Mortars are offered by Cathedral Stone Products, Inc. and held at 7266 Park Circle Drive, Hanover, MD 21076; tel. (410) 782-9150; fax. (410) 782-9155.)
 2. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements. Material Safety Data Sheets (MSDS) as appropriate.
- B. Mockup: Prepare field samples for mortar patch repairs to demonstrate aesthetic effects and qualities of materials and execution. Use materials and methods proposed for completed Work and prepare samples under same weather conditions to be expected during remainder of Work.
1. The Foreperson responsible for the respective work shall be present at the sample work. Samples shall be executed by the same individuals performing the work. Provide one sample for each procedure for each individual executing repair work.
 2. Locate mockups on the building where directed by Engineer.
 3. Mortar Samples: Prepare a minimum of two samples of each type of stone repair using masonry removed from the building where designated by the Engineer. Prepare, install, and finish each sample repair according to the specifications. **All samples must be applied to masonry.** Prepare samples in an area where they will be exposed to the same conditions as will be present on the building during curing. **Allow samples to cure at least three days (or longer, if possible) before obtaining Engineer's approval for color match.** Mortar colors will continue to lighten as they cure and are exposed to the weather, so samples should be installed as far in advance as possible. A slightly darker color will give better long-term results. **Samples should be viewed from a minimum distance of 12 feet.**
 4. Notify Engineer 7 days in advance of the dates and times when samples will be prepared.
 5. Obtain Engineer's approval of mockups before starting the remainder of masonry restoration and cleaning. If samples are unsatisfactory, Contractor shall make the needed modifications and prepare new samples until they are satisfactory. No mechanic shall be allowed to complete repair work until mockup is approved for that individual.
 6. The samples accepted by the Engineer for each individual executing repair work shall serve as the standard for judging the completed Work for the entire job. They shall be marked and left undisturbed until all restoration work is completed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Materials are to be delivered, stored, and handled to protect them from damage, extreme temperature, and moisture in accordance with Manufacturer's written instructions.

- B. Deliver and store material in Manufacturer's original, unopened containers with the production date shown on the container or packaging.
- C. Comply with the Manufacturer's written specifications and recommendations for mixing, application, and curing of mortars.

1.07 PROTECTION/SITE CONDITIONS

- A. *Cold Weather Requirements:* Do not work in temperatures below 40° F, when the substrate is colder than 40° F, or when the temperature is expected to fall below 40° F for 48 hours after installation of repair mortars. Building an enclosure and heating areas to maintain this temperature may only be done with the written approval of the Engineer.
- B. *Hot Weather Requirements:* **Protect repair mortar from direct sunlight and wind.** Do not use or prepare mortar when ambient air temperature is above 90° F.

PART 2 PRODUCTS

2.01 MASONRY REPAIR

- A. Jahn Restoration Mortars are distributed by Cathedral Stone Products, Inc., 7266 Park Circle Drive, Hanover, MD 21076; tel. (410) 782-9150; fax. (410) 782-9155; website: www.cathedralstone.com. Jahn Mortars are premixed cementitious repair materials formulated to match the color and texture of the existing masonry, and do not contain any acrylic, latex, or other synthetic polymer additives. Mix the mortar with clean, potable water.
- B. **Substitutions:** If proposed equal is submitted, lab test to establish equivalent performance levels. Use an independent testing laboratory, as determined by the Engineer, and paid for by the submitting party.
- C. Setting anchors in existing masonry: Jahn Anchor Setting Mortar (M80).
- D. Mechanical anchors and dowels: Stainless steel threaded rod (ASTM F593) with a diameter as indicated on Contract Drawings, bent and cut to lengths required to achieve embedments shown on the Contract Drawings.

PART 3 EXECUTION

3.01 WORKMANSHIP

- A. Do not use any additives, such as bonding agents, accelerators, or retardants in the mortar.

3.02 PREPARATION FOR REPAIRS

- A. Remove all loose mortar and masonry prior to installation of the repair mortar. "Sound" masonry with a hammer to verify its integrity. If necessary, cut away an additional 1/2" of the substrate to ensure the surface to be repaired is solid and stable. Remove any sealant residue.

- B. Where cramp anchors, threaded rod anchors, or dowels have been cut and pieces remain embedded in the substrate: Anchors that are free of rust, solidly embedded, and do not project beyond the surface of the masonry unit may remain. All others should be removed.
- C. Cut the edges of the repair area to provide a minimum depth of 3/4". The edges of the repair should be square cut. **Do not allow any feathered edges in the repair area.**
- D. Install mechanical anchors in all repair areas if specified on the Contract Drawings.
- E. Install anchors as follows:
 - 1. Drill holes to diameter specified on Contract Drawing.
 - 2. Clean holes using compressed, oil-free air, and bristle brushes, until no dust cloud is produced when a brush, inserted the full depth of the hole, is pulled out of the hole.
 - 3. Embed anchors in back-up using Jahn M80, mixed according to Manufacturer's instructions.
 - 4. Anchors should be covered with a minimum of 3/4" repair material.
- F. Clean all dust from surface and pores of the substrate, using clean water and a scrub brush.
- G. Pre-wet the substrate ahead of time to prevent the substrate from drawing moisture out of the repair too quickly. Re-wet the surface immediately before applying the repair material.

3.03 MIXING MORTAR FOR REPAIR

- A. Follow all OSHA safety standards and protocols for silica requirements. Do not mix more material than can be used within 30 minutes. Discard any mixed material that has been unused for 30 minutes or more.
- B. Mixing ratios for limestone are as follows:
 - 1. Approximately 5 parts dry material to 1 part water:
 - 2. M70 - Limestone
- C. Add water to dry ingredients and mix well. Adjust amount of water according to the weather and the porosity of the substrate.
- D. The next step of the application is what CSP has termed the "Peanut Butter" coat. The Jahn mortar should be mixed with water to the consistency of wet putty. Apply the "Peanut Butter" coat to the glistening wet substrate approximately 1/8 inch thick. **Important - To achieve proper bond, the "Peanut Butter" coat must not dry out prior to application of Jahn Mortar (5:1) mix!**

3.04 APPLICATION OF REPAIR MATERIAL

- A. Apply the mortar mix (see data sheet) using a trowel to place and compress the mortar into the repair ensuring not to leave any voids. For overhead repairs thicker than 2", apply mortar in layers, allowing the first layer to cure for a two to four hours before applying the second layer. If applied in layers, scrape off any cement skin that has formed and continue application. Dampen the surface and before applying the next layer. Work mortar firmly into the surface of the masonry, including the corners, and under and around all mechanical anchors.
- B. Build up repair material so that it is slightly above the adjacent masonry surface. Allow mortar 30 to 60 minutes to set slightly (wait time will vary with temperature and humidity-longer in cool weather), and then scrape off excess material using a straight edge (a plasterer's miter rod is good for this). Do not press down or "float" the repair. Where repairs occur at panel edges or corners, form mortar to match the profile of the surrounding masonry. In all cases, finish and texture repair so that it is as indistinguishable as possible from the adjacent masonry.

3.05 FINISHING TECHNIQUES

- A. Patching mortar shall be textured to match existing tooled surfaces using a variety of finishing tools. Contact Cathedral Stone Representative for additional information on tooling techniques.
- B. To match existing smooth surfaces, should be scraped down to the original profile then trowelled to leave a smooth surface. This may cause the repair to lighten and may need to be stained to match.
- C. Clean any mortar residues from area surrounding the repair by sponging as many times as necessary with clean water. This should be done before repair material sets.
- D. After the repair has been cured and allowed to dry for at least one week, if the appearance of a repair does not meet the specifications of the job, the surface color of the repair may be enhanced by applying a vapor permeable, mineral based pigmented stain. (Silin Lasur, a mineral based pigmented stain is available from Cathedral Stone Products, Inc., 7266 Park Circle Drive, Hanover, MD 21076: tel. (410) 782-9150; fax. (410) 782-9155.)

3.06 CURING PROCEDURE

- A. Lightly mist the repair with water to wet the entire surface of the finished repair approximately 30 minutes to 1 hour after completion on hot sunny days, and approximately 2 hours or longer, on cool or cloudy days. Time will vary with temperature and humidity. Mist several times a day on the three days following the repair installation. Should access to the repairs be impossible for a period of time, plastic may be used to cover them temporarily. The application of plastic, however, does not remove the need for normal curing techniques. Never cover repairs with plastic immediately after finishing the water in the repair will be trapped on the surface, causing it to lighten.

3.07 CLEAN UP

- A. Remove uncured mortar from the perimeter of the repair before it dries using clean water and a rubber sponge. Repeat several times with clean water to prevent a halo effect (staining of adjacent masonry). Cured mortar may only be removed chemically or mechanically.
- B. Remove uncured mortar from tools and equipment with water as soon as possible. Cured material may only be removed chemically or mechanically.

END OF SECTION



DIVISION 7

THERMAL AND MOISTURE PROTECTION

SECTION 075323 – ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 DESCRIPTION OF WORK

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:
 - 1. Extent of EPDM roofing is shown on the drawing and includes (but not way of limitation removal and installation of adhered membrane roofing system.
 - 2. Removal of existing gravel surfaced built-up roofing system and related flashings.
 - 3. Roof accessories.

1.3 SUMMARY

- A. Section Includes:
 - 1. Adhered EPDM membrane roofing system.
 - 2. Roof insulation.
 - 3. Roof drain and accessories.
 - 4. Rough Carpentry – wood blocking and nailers.
- B. Related Sections:
 - 1. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
 - 2. Division 07 Section "Joint Sealants"

1.4 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.5 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals' markings.
 - 1. Fire/Windstorm Classification: Class 1A-105 (Field of Roof)
 - 180 (Perimeter of Roof)
 - 270 (Corner Areas)

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated. Provide installation instructions and general recommendations from manufacturer of EPDM membrane system for types of roofing materials required.
- B. Shop Drawings: For roofing system.
 - 1. Tapered insulation, including slopes.
 - 2. Fastener rate and pattern.
- C. Samples for Verification: For the following products, in manufacturer's standard sizes:
 - 1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 2. Roof insulation.
 - 3. Walkway pads or rolls.
- D. Qualification Data: For qualified Installer and manufacturer.
- E. Manufacturer Certificate: Signed by roofing manufacturer certifying that membrane roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of complying with performance requirements.
- F. Maintenance Data: For membrane roofing system to include in maintenance manuals.
- G. Warranties: Sample of special warranties.
- H. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- B. Source Limitations: Obtain components for roofing system from or approved by roofing system manufacturer
- C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- D. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
 - 1. Meet with Owner's Representative, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing system during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.
 - 10. Establish equipment and materials staging areas.
- E. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- F. Upon completion of the installation, an inspection shall be made by the system manufacturer to ascertain that the roofing system has been installed according to the applicable manufacturer's specifications and details. No "early bird" warranty will be accepted. The results of the warranty inspection shall be submitted in writing to Contractor and Engineer for their review and records.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Materials which are damaged shall be removed and replaced at the Installer's expense.
- D. Material shall be delivered in sufficient quantity to allow continuity of the Work.
- E. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- F. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
- G. Do not overload any portion of the building, either by use of or placement of equipment, storage of debris, or storage of materials.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Substrate Conditions: Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition. All surfaces shall be smooth, dry, clean, free of fins or sharp edges, loose or foreign materials, oil or grease. No work shall proceed when moisture is present on the roof or in the substrate materials.

1.10 WARRANTY

- A. General: The special warranties specified in this Section shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners and other components of roofing system.
 2. Warranty Period: 20 years from date of Substantial Completion.
- C. Special Project Warranty: Submit roofing Installer's written warranty, signed by Installer, covering Work of this Section, including all components of roofing system such as roofing membrane, base flashing, roof insulation, and fasteners, for the following warranty period:
1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM MEMBRANE ROOFING

- A. 0.060 inch thick, ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet designed for fully adhered application method in manufacture standard non-asphaltic adhesives. Membrane Color: Black.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle SynTec Incorporated.
 - b. Versico Incorporated.
 - c. Firestone Building Products.
 - d. Johns Manville.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.
- C. Protection Sheet: Epichlorohydrin or neoprene non-reinforced flexible sheet, 55- to 60-mil-thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.
- D. Bonding Adhesive: Manufacturer's standard.
- E. Seaming Material: Factory applied tape.
- F. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

- G. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- H. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.
- J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
- K. Nailins: Fed Spec FF-S-325, Group V, Type 2, Class 3; zinc alloy body, 1/4 inch (6.35 mm diameter); stainless steel pin. Length sufficient to penetrate substrate 2 inch (50 mm) minimum.
- L. Screws (ss): ASTM A 304, stainless steel, pan head screws, #10 x length required to penetrate substrate 1-1/2 inches (38 mm), 1/4 inch (12 mm) for fastening sheet metal. With neoprene washers where heads are exposed.

2.3 COVERBOARDS

- A. Cover Board (Roof Sheathing): ASTM C1289 Type II, Class 4 Grade 2, 1/2 inch minimum thick, factory primed, high density polyisocyanurate insulation board as recommended by the roofing manufacturer. Minimum compressive strength: 100 psi. Class A Fire Rating.

2.4 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces. Minimum R-value of 5.50 per inch. Base insulation thickness: 1-inch minimum.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- E. Insulation plates and screws as recommended by the roofing manufacturer.

2.5 BLOWN-IN INSULATION

- A. Fiberglass insulation, non-settling, resistant to mildew, mold or fungus. ASTM C764. Formaldehyde free and noncombustible. Minimum R-Value: R-38.
 - 1. Johns Manville – Attic Protector

2. Certaiteed - Insulsafe SP
3. Or approved equal.

2.6 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

2.7 ROOF DRAINS AND STORM DRAIN LINES

- A. Roof Drains: Cast iron roof drain with flange, cast iron flashing ring and cast iron mushroom dome. Provide drain receiver pans where flanges will be set at deck level. Field measure to fit existing storm drain lines.
 1. Relocate drain away from parapet wall 12 inches minimum. Provide all necessary connections to existing drain lines.
 2. Josam 2150 Series or approved equal.
- B. Overflow Drains: Cast iron overflow drain with flange, cast iron flashing ring and cast iron mushroom dome and internal waterguard.
 1. Provide all necessary piping and connections for overflow drain lines.
 2. Josam 21500-16 Series or approved equal.
- C. Downspout Nozzle: Bronze downspout nozzle with wall flange.
 1. Josam 25010 Series or approved equal.

2.8 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Wood nailers, curbs and blocking: Grade 2 or better SYP.
- B. Preservative Treatment by Pressure Process: AWWA C2.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

2.9 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, and integrally formed deck-mounting flange at perimeter bottom.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Babcock-Davis.
 - b. Bilco Company (The).
 - c. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
 - d. O'Keeffe's Inc.
 - e. Precision Ladders, LLC.
- B. Type and Size: Single-leaf lid, 30 by 36 inches
- C. Loads: Minimum 46-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.
- D. Hatch Material: Aluminum sheet, 0.090 inch thick.
1. Finish: Mill.
- E. Construction:
1. Insulation: Cellulosic-fiber board.
 2. Fabricate curbs to minimum height of 12 inches unless otherwise indicated.
- F. Hardware: Galvanized-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 DEMOLITION

- A. Roofing: Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weathertight. Refer to Division 7 Sections for new roofing requirements.
1. Remove existing EPDM roofing membrane, coverboard, gravel surfaced asphalt and felt built-up roofing membrane, insulation and base sheet down to the surface of the wood plank roof deck.
- B. Remove base flashings, counterflashing, gravel stop, gutters, downspouts, flashings and other items not indicated to be reused.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions to prepare substrate to receive EPDM membrane roof system.
- B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- D. Install tapered insulation under area of roofing to conform to slopes indicated.
- E. Install two or more layers of insulation under area of roofing with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- H. Trim surface of insulation where necessary at roof drains and gutters so completed surface is flush and does not restrict flow of water.
- I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.

1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
- J. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere EPDM roofing membrane over area to receive roofing in accordance with manufacturer's written instructions. Unroll membrane roofing and allow to relax for 30 minutes minimum before installing.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters as indicated.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
 1. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.
- H. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- I. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
- J. Install membrane roofing and auxiliary materials to tie in to existing membrane roofing to maintain weather-tightness of transition.
- K. Adhere protection walk pads over membrane roofing at locations indicated.

3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 WOOD PLANK DECK, BLOCKING, CURB AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Inspect tongue and groove wood plank decking prior to application of insulation and roofing membrane installation. Replace deteriorated and rotten wood deck. Immediately notify engineer if excess deck deterioration is noted.
- C. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- D. Provide unit price per linear foot for removal and replacement of deteriorated wood blocking or nailers indicated to be reused.

3.9 ROOF, OVERFLOW DRAIN AND STORM DRAIN LINE INSTALLATION

- A. Prior to starting membrane installation, install new cast iron roof drains.
 - 1. Field verify locations new drains prior to submitting tapered insulation Shop Drawings.
 - 2. Install primary roof drains so that top of flange will be 1 to 2 inches below surface of completed surrounding membrane and stripping. Set drain body and secure drain bodies with underdeck clamps and drain bearing pan.
 - 3. Overflow drain is to be set flush with the roofing membrane.
 - 4. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- B. Provide all plumbing accessories required to tie into existing storm drain lines in accordance with current plumbing codes.
- C. Immediately after installation of drains and piping, plug drain line and flood test connections for 30 minutes.

- D. To the greatest extent possible install overflow drain and piping from roof by removing roof planks as needed. Coordinate final location of overflow drain, routing of piping and daylight with Church Representative prior to installation.
- E. Provide positive 1/4 inch per foot minimum slope to exterior.
- F. Core drill through brick masonry to install overflow drain line. Install downspout nozzle and secure to brick masonry.

3.10 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Contracting Officer.
 - 1. Notify Owners Representative 48 hours in advance of date and time of inspection.
- B. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075323

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:
 - 1. Extent of sheet metal flashing is shown on the drawings and includes (but not by way of limitation) removal and installation of flashing at roof edges, copings, gutters, downspouts, and miscellaneous sheet metal accessories.
 - 2. Work at existing gutters and rain leaders.
 - 3. Fasteners.

1.03 RELATED WORK

- A. Section 07532 "EPDM Single-Ply Membrane Roofing" for installing sheet metal flashing and trim integral with membrane roofing.

1.04 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Copper Sheet Metal Standard: Comply with Revere's "Copper & Common Sense".
- E. Mockups: Sheet metal flashing to be part of mockup referenced in Section 07315.

1.05 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between

shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in Project.
 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 4. Details of termination points and assemblies, including fixed points.
 5. Details of special conditions.
 6. Details of connections to adjoining work.
 7. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples: as required for mockup and minimum 12" long fabricated sections. Include fasteners, cleats, clips closures and other attachments.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 PRODUCTS

2.01 SHEET METALS

- A. ASTM B 370, cold-rolled copper sheet, H00 temper, Non-Patinated, Bare/Bright finish.

2.02 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners for Copper Sheet: Copper or Stainless Steel nails, screws or pop rivets. Provide neoprene washers to screws where exposed.
- D. Solder Materials: 50% tin and 50% lead. Provide non-corrosive flux.
- E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Felt: ASTM D 226, Type II (No. 3), asphalt-saturated organic felt, nonperforated.
- G. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.

2.03 FABRICATION

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.
- E. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- F. Do not use graphite pencils to mark metal surfaces.

2.04 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Counterflashing: Fabricate from the following materials: 20 oz. Copper
 - 1. Fabricate with 3/4 inch hemmed drip edge at bottom and horizontal crimp in front face so when installed "spring action" causes bottom of counterflashing to hug base flashing.
 - 2. Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing with "spring action." Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant as indicated. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant. At corners secure with pop rivets and sealant with no sharp edges allowed. Solder joints at locations indicated.
- B. Copings: Fabricate in minimum 96-inch long, but not exceeding 10-foot long sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Secure roof side with stainless steel screws with neoprene washers. Miter all corners and solder watertight.
 - 1. Joint Style: Butt with 6-inch wide back-up and 12-wide exposed cover plate. Provide concealed bed of sealant.
 - 2. Fabricate from the following materials: 20 oz. Copper
- C. Drip Edge: Fabricate in minimum 96-inch long, but not exceeding 10-foot long, sections
 - 1. Joint Style: Provide soldered joints at roof side. Lapped and concealed sealant at exterior face.
 - 2. Extend drip edge onto nailers 4 inches minimum and secure with nails. Solder the roof side joints watertight and seal the exterior face with lapped and concealed bead of sealant.

3. Fabricate with horizontal crimp (stiffening rib) in front face if face is greater than 6 inches high.
 4. Fabricate from the following materials: 20 oz. Copper
- D. Gravel Stop: Fabricate in minimum 96-inch long, but not exceeding 10-foot long, sections
1. Fabricate from the following materials: 20 oz. Copper
 2. Joint Style: Provide soldered joints at roof side. Lapped and concealed sealant at exterior face.
 3. Fabricate with 1 inch high gravel stop at top edge.
 4. Extend gravel stop onto nailers 4 inches minimum and secure with nails. Solder the roof side joints watertight and seal the exterior face with lapped and concealed bead of sealant.
 5. Fabricate with horizontal crimp (stiffening rib) in front face if face is greater than 6 inches high.
- E. Hanging Gutter: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from copper of sizes indicated. Fabricate expansion joints and gutter accessories from the same metal as the gutters.
1. Fabricate from the following materials: 24 oz. Copper
 2. Gutter Style: Match size, and style to existing. Style L
 3. Expansion Joint: Provide one expansion joint in each gutter not exceeding 50 feet in length. Butt type style expansion joint with cover plate. Cover plate not to restrict movement of gutter expansion/contraction section.
 4. Accessories: Provide 1/8 inch by 1 inch hangers/spacers spaced 24 inches o.c.
 5. Joint Style: Lap 2 inches, pop rivet and solder.
- F. Downspout: Fabricate rectangular downspouts completed with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors.
1. Join sections with 1 ½ inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls. Locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
 2. Provide elbows at base of downspout to direct water away from building and provide extension to lower roof drains.
- G. Through-Wall Flashing (Add Alternate): Fabricate through-wall flashing completed
1. Fabricate through-wall flashing with drip edge/receiver for counterflashing unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and provide receiver for copper counterflashing.
 2. Fabricate from the following materials: 16 oz. Copper
 3. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar.
 4. Solder all seams water tight and secure back leg to rising wall with nailins, or at stud framed walls with screws penetrating backup material soundly into studs. Provide up and out turned end dams with full soldered seams at all terminations.
 5. Place mortar bed on flashing and set brick masonry units with joint spacing (Head and bed) and alignment to match existing surrounding masonry wall. Place weep vent in every third head joint, with a minimum of two vents at each run of flashing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Provide continuous cleats. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 - 5. No fasteners shall be exposed in final condition without the approval of the Engineer.
 - 6. Hem all raw edges.
 - 7. Install sealant tape where indicated.
 - 8. Torch cutting of sheet metal flashing and trim is not permitted.
 - 9. Do not use graphite pencils to mark metal surfaces.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and NRCA and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 12-inch centers.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
 - 1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates install a course of underlayment – reference Section 07315.
- D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Seal joints as shown and as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

2. Soldering
 - a. Unless otherwise noted, soldering shall meet the requirements of the AWS “Soldering Handbook”.
 - b. Surfaces shall be cleaned and fluxed prior to soldering.
 - c. Lap Seam joints shall be riveted with copper rivets prior to soldering. Seal rivets in addition to joint
 - d. Cleat Lock Seam joints to underlying structure prior to soldering.
 - e. After soldering, encourage joint to cool as quickly as possible without warping.

3.03 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07920 - JOINT SEALANTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract

1.02 DESCRIPTION OF WORK

- A. This Section includes joint sealants for the following locations:
 - 1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
 - a. Joints between wood trim and window.
 - b. Metal flashing joints specified to receive sealant.
 - c. Joints between wood window trim and adjacent masonry.
 - d. All other locations where sealant is shown or required to make condition weather tight.

1.03 RELATED SECTIONS

- A. Section 04500 - Masonry Restoration and Cleaning
- B. Section 07620 - Sheet Metal Flashing and Trim
- C. Section 09900 - Painting

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous seals without staining or deteriorating joint substrates.

1.05 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated. Include manufacturer's specifications, installation instructions, laboratory test reports and other data showing compliance with specifications and specified standards.

- B. Samples for Approval: For custom and standard colors of joint sealant required. Install joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants. Obtain Engineer's approval.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of owners, and other information specified.
- D. Warranties: Special warranties specified in this Section.

1.06 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following, except as otherwise indicated:
 - 1. SWR "Applying Liquid Sealants."
 - 2. SWR "Sealants: The Professionals Guide."
 - 3. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- C. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:
 - 1. Locate test joints as directed by Engineer.
 - 2. Conduct field tests for each application indicated below:
 - a. Each type of elastomeric sealant and joint substrate indicated.
 - 3. Notify Engineer seven days in advance of dates and times when test joints will be erected.
 - 4. Test Method: Test joint sealants by hand-pull method described below:
 - a. Install joint sealants in 36-inch-long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.

- b. Make knife cuts from one side of 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.
 - c. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - d. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
5. Report whether sealant in joint 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. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
- E. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:
1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver Materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.08 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg. F.
 2. When joint substrates are wet.

- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than or greater than that allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.09 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- D. If material surface shows any of defects listed below, supply labor and material to repair all defective areas.
 - 1. Any adhesive or cohesive failures.
 - 2. Weathering.
 - 3. Surface Cracking.
- E. Perform any repair under this warranty at no cost to Owner.
- F. Before Construction, provide Engineer with sample of final warranties Warranties shall be provided by manufacturer and installer.
- G. Vandalism and abnormally abrasive maintenance equipment are exempted from warranty.

PART 2 PRODUCTS

2.01 MATERIALS GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and

application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Match existing.

2.02 ELASTOMERIC JOINT SEALANTS

A. Single Component Nonsag Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

a. NP 1; Sonneborn Building Products Div., BASF

b. Sikaflex – 1a; Sika Corporation.

c. Approved equal.

2. Compliances: ASTM C 920, Type S, Grade NS, Class 35, Use NT, M, A, G and I, SWR Institute validated, and Federal Specification TT-S-00230C, Type II, Class A.

3. Movement Capability: 35 percent movement in extension and 35 percent in compression for a total of 70 percent movement.

2.03 JOINT SEALANT BACKING

A. General: 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.

B. Polyethylene Backer Rod: preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible material and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint-surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.04 MISCELLANEOUS MATERIALS

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

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 in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

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

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance.
- B. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean masonry, sandstone, brownstone, concrete, wood and similar porous joint substrate surfaces by brushing, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressor.
 - 3. Remove laitance and form release agents from concrete.
 - 4. Clean metal and similar nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants
- B. Joint Priming: **Prime joint substrates unless sealant manufacturer provides a written exception based on preconstruction joint sealant substrate tests or prior experience.** Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond: do not allow spillage or migration onto adjoining surfaces. Remove any spillage or migration.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
 - 1. Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- E. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
 - 1. Remove excess sealants from surfaces adjacent to joint.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.04 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION



DIVISION 8

OPENINGS

SECTION 08550 – WOOD WINDOW RESTORATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:
 - 1. Replacement of missing or deteriorated beyond repair wood framing.
 - 2. Repair and consolidation of deteriorated exterior surfaces of wood framing.

1.03 RELATED SECTIONS

- A. Section 09900 – Paints and Coatings

1.04 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this section. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. American National Standards Institute (ANSI) and National Wood Window and Door Association (NWWDA):
 - a. ANSI/ NWWDA IS-2 – Industry Standard for Wood Windows.
 - b. ANSI/ NWWDA IS-4 – Industry Standard for Water Repellant Preservative Non-Pressure Treatment for Millwork.
 - 2. American Society of Testing and Materials (ASTM): C1036 – Flat Glass.
 - 3. All materials and workmanship shall be Architectural Woodwork Institute (AWI) Premium Grade Quality (Architectural Woodwork Quality Standards), 6th Edition, Version 1.1, 1994 printing. Reference the following AWI sections:
 - a. Section 1000, Exterior Windows.

1.05 QUALITY ASSURANCE

- A. Restoration Specialist: Work must be performed by a firm having not less than (5) years successful experience in comparable wood consolidation and treatment on at least three (3) similar buildings in the last five (5) years, and employing personnel in the restoration processes and operations indicated.
 - 1. Only skilled workmen who are familiar and experienced with the methods specified are to be used for wood consolidation and treatment work.
 - 2. One skilled workman shall be present at all times during execution of the work and shall personally direct the work.
 - 3. In acceptance or rejection of wood consolidation and treatment work, no allowance will be made for lack of skill on the part of the workmen.

1.06 SUBMITTALS

- A. Submit the following items in time to prevent delay of the work and to allow adequate time for review and re-submittals, if needed; do not order materials or start work before receiving the written approval:
 - 1. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements, and material Safety Data Sheets (MSDS) as appropriate.
 - a. Additional information required for glazing products: Provide chemical, functional and environmental characteristics, size limitations, and special application requirements. Identify available colors.
 - 2. Qualifications Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses owners, and other information specified.
- B. Mockup: Prepare field samples for wood consolidation and wood filling and repair to demonstrate aesthetic effects and qualities of materials and execution. Use materials and methods proposed for completed Work and prepare samples under same weather conditions to be expected during remainder of Work.
 - 1. The Foreperson responsible for the respective work shall be present at the sample work. Samples shall be executed by the same individuals performing the work. Provide one sample for wood consolidation and one sample of wood filling and repair for each individual executing repair work.
 - 2. Locate mockups on the building where directed by the Engineer.
 - 3. Notify Engineer 7 days in advance of the dates and times when samples will be prepared.

4. Obtain Engineer's approval of mockups before starting the remainder of wood repairs. If samples are unsatisfactory, Contractor shall make the needed modifications and prepare new samples until they are satisfactory. No mechanic shall be allowed to complete repair work until mockup is approved for that individual.
5. Protect approved mockup until completion of all work. Approved mock-ups will serve as minimum acceptable standard for finish carpentry work.
6. The samples accepted by the Engineer for each individual executing repair work shall serve as the standard for the entire job. They shall be marked and remain accessible until the Work of this Section is complete.

C. Select Sample:

1. Provide samples of each type of putty, paints, epoxies, adhesives and other materials proposed for use.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store epoxy products and glazing sealant materials in original, sealed packaging showing manufacturer's identification, year of production, net weight, date of packaging, location of packaging and expiration dates.
- B. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions. Prevent edge damage to glass and glazing materials from effects of moisture including condensation, temperature changes, direct exposure to sun, and from other causes.
- C. Store all materials inside, under cover, and in a manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.
- D. Handle window units in a manner, which will prevent damage thereto.

1.08 PROJECT / SITE CONDITIONS

- A. Products: All products used in the work of this section must be compatible with products of other related sections.
- B. Coordination: Coordinate wood consolidation and repair with painting work so that wood requiring treatment is treated as soon as practicable after being exposed and that consolidated and repaired wood is primed as soon as possible. Existing frames shall be stripped of all paint before window restoration work shall commence.
- C. Weather: Proceed with consolidation and repair only when existing and forecasted weather permits work to be performed in accordance with manufacturers' recommendations.
- D. Surface Conditions: Proceed with work of this Section only when surfaces are completely dry.

- E. Protection:
 - 1. Use all necessary means to protect interior of building from all damage caused by precipitation and other environmental conditions during work of this Section.
 - 2. Protect all adjacent building surfaces from damage or deterioration resulting from wood window restoration work.
- F. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.
- G. Safety: Take all means necessary to ensure that no person (whether involved with the work of this section or not) is harmed or injured due to the work of this Section.
- H. Security: Coordinate work with Owner to ensure that building is secured at the end of each work period. Review security procedures with owner prior to proceeding with the work of this Section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Epoxy Consolidant:
 - a. Abatron, Gilberts, IL; Product: Liquid Wood.
 - b. Conservation Services, Kinnelon, NJ; Product: ConServe (t) Flexible Consolidant 100.
 - c. Engineer approved equal.
 - 2. Epoxy Paste Filler:
 - a. Abatron, Gilberts, IL; Product: WoodEpox.
 - b. Conservation Services, Kinnelon, NJ; Product: ConServe (t) Flexible Patch 200.
 - c. Engineer approved equal.
 - 3. Window Hardware:
 - a. Rejuvenation
 - b. Engineer approved equal.

2.02 MATERIALS

- A. Epoxy repair materials: Window Care Systems, Pembroke, MA, epoxy and conservation systems products “Repair Care, USA”, or conventional consolidant/filler below.
- B. Low Viscosity Epoxy Consolidant: Two-part epoxy consolidant of viscosity to thoroughly penetrate deteriorated wood:
 - 1. Abatron, Gilberts, IL; Product: Liquid Wood.
 - 2. Conservation Services, Kinnelon, NJ; Product: ConServe (t) Flexible Consolidant 100
- C. Medium Viscosity Epoxy Consolidant: Two-part epoxy consolidant suitable for mixing with fillers for patching and filling holes.
 - 1. Abatron, Gilberts, IL; Product: WoodEpoxy.
 - 2. Conservation Services, Kinnelon, NJ; Product: ConServe (t) Flexible Patch 200.
- D. Fillers for Epoxies: As required to provide epoxy putty of correct viscosity for each application. Provide fillers specifically recommended by resin manufacturer and approved by Engineer for use intended.
- E. Dispensers: Provide manufacturer’s special pumps designed to be used in dispensing and measuring resins and hardeners.
- F. Other Materials: All other materials required but not specifically described shall be selected by the Contractor and subject to the approval of the Engineer.

2.03 WINDOW COVERING

- A. Window Covering: Provide 3/8 inch clear, UV resistant Lexan XL-10 Polycarbonate sheet.
- B. Vents: Provide 2 inch diameter aluminum or plastic louvered vents.
- C. Construction Adhesive: Provide UV resistant construction adhesive approved for exterior application smooth plastic and masonry surfaces.
- D. Window Covering Termination: Provide 1/8” thick minimum aluminum termination bars to secure the window coverings.
 - 1. Shapes: ‘S’ and ‘H’ as indicated on the Drawings.
- E. Fasteners: Provide non corrosive fasteners including screws and masonry anchors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine each window carefully to determine work required to restore window to first class condition.

- B. Inspect all surfaces and verify that they are in proper condition to receive the work of this section.
- C. Beginning of installation means acceptance of existing substrate and project conditions.

3.02 INSPECTION

- A. After all loose and deteriorated coatings have been removed as specified in Section 09900 – Paints and Coatings, inspect surfaces of all existing wood in conjunction with the Engineer to verify method and extent of treatment.
 - 1. All surfaces where the wood is rotted or spongy require consolidation.
 - 2. All areas that do not match their original profiles require patching and repair.
 - 3. Areas of major damage and deterioration require replacement.
 - 4. Engineer's decision regarding extent of required consolidation and repair shall be final.

3.03 PREPARATION

- A. Cut back and remove all loose, soft and flaking deteriorated wood.
- B. Scrape and sand as required to properly roughen surfaces without removing sound wood or changing existing profiles to remain.
- C. Take all steps necessary to ensure areas to be consolidated or repaired are free of dirt, paint, oil, grease, and other substances that might inhibit successful consolidation and repair.
- D. Take all steps necessary to ensure that wood is dry. No open flames shall be used.

3.04 CURATIVE REPAIRS

- A. General: The objective of curative repairs is to preserve and repair decayed wood components to original profiles. Two methods are acceptable, both are epoxy based. In general, apply epoxy materials in strict accordance with their manufacturer's instructions and specified herein.
- B. Preparation for curative repairs:
 - 1. Remove all paint and coatings from area to be repaired.
- C. Epoxy Primer and Filler Method:
 - 1. Remove all decayed soft wood and discolored wood until sound material is located.
 - 2. Ensure moisture content is less than 18 percent.
 - 3. Sand bare wood to remove all loose fibers, paint, compounds, sawdust and dirt.

4. Pretreat bare and sanded wood thoroughly with low viscosity epoxy primer. Allow to penetrate for a period of time recommended by manufacturer. Apply epoxy repair compound over primer; ensure filler has optimal contact with wood. Fill joints full, even and smooth in a single application.
5. After curing, sand smooth. There shall be no visible transitions or irregularities between wood and epoxy. Fill any surface voids remaining with fast curing epoxy filler.
6. File and sand to match desired profile and to produce uniformly smooth surface. No coarse-grained sandpaper mark or other imperfections shall be permitted.
7. Allow a full curing time of 16 hours before preparation of windows to receive finishes.

D. Epoxy Consolidant and Filler Method:

1. Consolidating Wood:

- a. Remove wood which is too wet (18 percent moisture content and above) and wood that will otherwise not be able to receive consolidant
- b. Drill 3/16" holes in honeycomb pattern, with drilling through boards. Apply plasticene oil clay to dam cracks and through-wood holes to prevent consolidant from draining.
- c. Inject consolidant to full penetration and saturation, reworking areas as required. Use low viscosity and medium viscosity epoxy consolidants as appropriate to each situation. Check for penetration by drilling or cutting out small areas prior to consolidant hardening and re-apply consolidant for full saturation.
- d. Cure following manufacturer's directions.

2. Paste Patching:

- a. Apply paste filler in layers not to exceed 1 inch. Allow each layer of paste to completely cure prior to application of subsequent layers.
- b. Plane and sand filler smooth with existing wood, matching profiles and dimensions.

E. Fabricate individual frame or trim components to replace unsalvageable materials. Fabricate replacement components from solid stock matching existing profile and dimensions; complying with AWI Premium Grade.

1. Fit new components to existing, plumb, flush, level, true, and securely fastened together with full-concealed fastening devices.
2. Fabricate framing, mullions and sash members with mortise and tenon joints. Glue and pin joints to hairline fit, weather tight.

3. Treat all (non-epoxy) components, new and existing, with water repellent preservative in accordance with NWWDAIS-4, interior exposed surfaces suitable for opaque interior finish.

3.05 RESTORATION

A. Preservation and sealing of seam joints:

1. Remove all decayed, soft and weathered wood at seam and joints.
2. Ensure moisture content of wood is less than 18 percent.
3. Sand bare wood to remove all loose fibers, paint, compounds, sawdust and dirt.
4. Pretreat bare and sanded wood thoroughly with low viscosity epoxy primer or consolidant. Allow to penetrate for period of time recommended by manufacturer. Apply epoxy repair compound over primer; ensure filler has optimal contact with wood. Fill joints full, even and smooth in a single application.
5. After curing, sand smooth. There shall be no visible transitions or irregularities between wood and epoxy.

B. Refurbish all existing finish hardware to “like-new” condition and replace all defective and non-repairable hardware items with new.

3.06 ADJUSTING

- A. Remove and replace any repair or consolidation work that does not match existing surfaces and profiles and any consolidant that is loose and has not bonded or cured properly to the satisfaction of the Engineer at no additional cost to the Owner.
- B. Clean all surfaces or materials damaged or stained by work of this Section.
- C. Protection: Protect wood consolidation work and maintain conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

3.07 CLEANING

- A. Clean glass surfaces promptly after restoration work, exercising care to avoid damage to the same. Remove excess glazing compounds, paint. Dirt, and other contaminants.
- B. Upon completion of work of this section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

END OF SECTION



DIVISION 9

PAINTING

SECTION 09200 PLASTER REPAIR AND PATCHING

PART 1 General

- 1.01 All work shall be completed in such a way as to protect existing architectural features from damage and to retain as much historic fabric as possible, with a minimum of loss.
- 1.02 The work of this section includes repair of plaster damaged during stained glass window and window tracery work, and other plaster damage incidental to construction activities. New veneer plaster at loft area is included in section 09250 – Veneer plaster and is not part of the work included in this specification section.
- 1.03 Quality assurance
- A. Standards: For materials; as noted here within.
 - B. Materials: as stated or by approval of the Engineer.
 - C. Qualifications of Historic Plaster Repair Contractor: Must be experienced in all phases of historic plaster repair, specifically lime based plasters, the preservation and reproduction thereof. The contractor must have six years and/or four projects of similar historical significance. They should have had training at a nationally recognized hands-on training program in historic plaster repair that stresses the stabilization of historic plaster with conservation adhesives.
- 1.04 Submittals, prior to commencement of work:
- A. Submit written repair procedures to Engineer.
 - B. Execute two sample panels of replacement plasters to be used as standards for the patching material.
 - C. Submit documentation of adhesive reattachment plaster projects.
- 1.05 Job conditions
- A. Protect and cover all adjacent architectural features and work completed by other trades.
 - B. Determine what substrates to which plaster materials are to be applied are sound and free from defects affecting proper application of the lime plaster. Report defective surfaces to the Engineer and the General Contractor.
 - C. Insure that a minimum temperature of 65 degrees F is maintained for an adequate period prior to, during and after application of plaster and that heating and/or ventilation is properly regulated to insure correct curing of the lime plaster.

- 1.06 Product Handling: Follow manufacturers directions, and store materials where directed on site to prevent damage.

PART 2 Materials

- 2.01 Basecoat Plasters, for application on wood lath or masonry
- A. Mix lime putty, 1:3, with sand, for the scratch coat, well haired
 - B. Mix lime putty, 1:2.0-2.5, with sand, for the float coat, haired
 - C. OR: formulate according to mortar analysis or volumetric test
- 2.02 Finish coat Plasters or small area, crack repair
- A. Mix lime putty, 1:1, with graded sand, for the finish coat, OR;
 - B. Mix lime putty, 3:1, with gauging plaster, OR;
 - C. Mix according to the mortar analysis or volumetric test
- 2.03 Gauging Plaster: USG Champion Quality Gauging Plaster or equal
- 2.04 Lime: Lime putty that has emley plasticity greater than 400, 98% or better calcium, and a high surface area of 30m²/gram or better. Lime putty matching these specifications is available from Traditional & Sustainable Building, www.traditionalandsustainable.com at 443-822-0983,
- 2.05 Sand: Sand shall be well graded, masons, and shall be clean and free of dirt, and organic substances. Or match the existing historic sand. Provide mortar analysis for the determination of existing historic sand if chosen.
- 2.06 Fiber for Scratch and Float coats: The allowable fibers are as determined by mortar analysis or as follows in order of priority, hemp, goat hair, cattle hair, hog hair, jute, sisal, or manila. The fiber should be 1" to 1/2", in length. It shall be added in the proportion of 1/2 pound of fiber to 2.25 cubic feet of course stuff.
- 2.07 Water: Clean, fresh, potable, and free from organic substances.
- 2.08 Bonding agents will not to be used without specific permission of the Engineer.
- 2.09 Adhesive, for the reattachment and stabilization of loose plasters, use Big Wally's Plaster Magic Adhesive (or approved equal) and Big Wally's Plaster Magic Conditioner (or approved equal) will be used according to, manufacturer's directions
- 2.10 Metal Lath, not for application on sound exposed wood lath or over sound masonry
- A. Galvanized steel expanded (diamond) mesh lath if needed.
 - B. The tie wire shall be 18 ga. galvanized soft annealed wire.

2.11 Fasteners

- A. For wood lath to wood framing, stainless steel, ring shank siding nails.
- B. For metal lath to wood framing, galvanized or stainless steel bugle head deck screws and galvanized metal plaster washers.

PART 3 EXECUTION

3.01 Evaluation of plaster condition: The Plaster Repair and Patching Contractor shall conduct an evaluation and in conjunction with the Engineer and General Contractor formulate a plan for the plaster repair on these surfaces. Submit plan for review and approval.

3.02 Adhesive reattachment- Big Wally's Plaster Magic Adhesives (or approved equal) are to be used according to manufacture's specifications. For contact information please call Big Wally's Adhesives, Inc., 802-254-1330, or e-mail, info@plastermagic.com.

3.03 Preparation; for plaster repair

- A. At modern patches, evaluate their soundness and remove if necessary.
- B. At exposed wood lath, re-secure to existing framing with stainless steel nails or pre-drill holes for deck screw attachment. Clean out keys and vacuum clean. Attach perimeter of sound plaster with an approved conservation adhesive, allow to coalesce as necessary. Rake perimeter of hole, to cut it back, for replacement plaster to tuck in behind the existing plaster.
- C. Dampen wood lath until the surface is damp; using Big Wally's Plaster Magic Conditioner (or approved equal).
- D. Replace missing wood lath with similar materials. It is not appropriate to mix wood and metal lath.
- E. At existing sound plaster bases/ delaminating top coats: Determine, in consultation with the CO, which delaminations are to be saved and which are to be removed. Reattach the ones that are to be saved with the conservation adhesive and remove the others.
- F. The cracks are not to be raked out. This cuts the fiber binder that is still bridging the crack. This raking would weaken the plaster stability. If the fibrous binder is rendered by the width of the crack it is permissible to rake out the crack after stabilization with adhesives.

3.04 Application of plaster

- A. Large area repair, adhere the perimeter of the opening and fill with two to three layers of the lime/sand/hair basecoat plaster, no more than 5/16" per coat, and a finish coat, flush with the surrounding surfaces.

- B. Small area repair, two inches or larger, fill with large area material, smaller, fill with crack fill material, flush with the surrounding surfaces.
 - C. Crack fill rake out crack , (only if fibrous binder is rendered, if crack fiber is intact do not rake out) to approximately 1/2" depth and fill with non sanded finish coat material, flush with the surrounding surfaces. If crack is not open then topping with a thin layer of ready mix joint compound after stabilization is appropriate.
 - D. Surface delaminations, remove as necessary, and replace with non-sanded finish coat material, flush with the surrounding surfaces.
 - E. Skim surface for cosmetic effect with joint compound, either ready mix or setting type.
 - F. Moldings, remove old repairs, evaluate conditions in conjunction with the Engineer and decide on course of repair. Repair to follow crack repair specifications keeping true to profile.
- 3.05 Painting: Refer to specification 09900. Surface shall match surrounding adjacent surfaces in the final condition

END OF SECTION

SECTION 09900 – PAINTS AND COATINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:
 - 1. Removal of existing lead paint in accordance with OSHA rules and regulations. Assume lead paint at all locations.
 - 2. Cleaning and painting the following areas:
 - a. Wood doors.
 - b. Wood window trim and framing.

1.03 RELATED SECTIONS

- A. Section 07920 – Joint Sealants

1.04 REFERENCES

- A. SSPC-SP 1 - Solvent Cleaning
- B. SSPC-SP 2 - Hand Tool Cleaning
- C. SSPC-SP 3 - Power Tool Cleaning
- D. SSPC-SP 6 – Commercial Blast Cleaning
- E. EPA-Method 24
- F. OTC-Regulation No. 41

1.05 SUBMITTAL

- A. Submit under provisions of Section 01330, Submittal Procedures.

- B. Product Data: Manufacturer's data sheets on each paint and coating product should include:
 - 1. Product characteristics
 - 2. Surface preparation instructions and recommendations
 - 3. Primer requirements and finish specification
 - 4. Storage and handling requirements and recommendations
 - 5. Application methods
 - 6. Cautions
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.
- D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

1.06 MOCKUP

- A. Finish surfaces for verification of products, colors, & sheens
- B. Finish area designated by Engineer.
- C. Provide samples that designate prime & finish coats
- D. Do not proceed with remaining work until the Engineer approves the mock-up samples.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:
 - 1. Product name, and type (description)
 - 2. Application & use instructions
 - 3. Surface preparation
 - 4. VOC content
 - 5. Environmental issues
 - 6. Batch date
 - 7. Color number

- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- C. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.08 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. ICI-Dulux / Devoe Coatings., Strongsville, OH, 800-654-2616 or 800-984-5444, www.iciduluxpaints.com or www.devoecoatings.com
- B. Glidden Professional, <http://www.gliddenprofessional.com/dealers>
- C. The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115, Tel: (800) 321-8194, Fax: (216) 566-1392, www.sherwin-williams.com

2.02 SCHEDULE

- A. Wood Window Trim and Framing
 - 1. Semi-Gloss Finish
 - a. 1st coat on bare wood: Dulux Prep & Prime Hydrosealer 6001, Acrylic Primer
 - b. 2nd coat: Dulux Fortis 6407
 - c. 3rd coat: Dulux Fortis 6407
- B. Wood Door
 - 1. Solid Stain
 - a. 1st coat: Wood Pride 2600 Series, Solid Color Stain
 - b. 2nd coat: Wood Pride 2600 Series, Solid Color Stain

2.03 ACCESSORIES:

- A. Coating Application Accessories:
 - 1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared. Notify Engineer of unsatisfactory conditions before proceeding.
- B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.
- C. Proceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.02 SURFACE PREPARATION

- A. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
- B. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
- C. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F, unless products are designed specifically for these conditions.
- D. Methods:
 - 1. Wood—Exterior: Remove loose paint to a sound surface from previously painted surfaces. Sand to feather edges of adhered paint. Remove all mildew by washing. Prime bare areas with specified primer. Surface must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks shall be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.03 INSTALLATION

- A. Apply all coatings and materials in accordance with manufacturer's specifications. Mix and thin coatings according to manufacturer's recommendation.
- B. Do not apply to wet or damp surfaces.
 - 1. Wait until wood is fully dry after rain or morning fog or dew.
- C. Apply coatings using methods recommended by manufacturer.

- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Exterior Woodwork: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 2 weeks.
- H. Inspection: The coated surface must be inspected and approved by the Engineer just prior to each coat.

3.04 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION