

STONE BUILDING RE-ROOFING

Florida State University
Tallahassee, FL

Technical Specifications

100% Complete Contract Documents

Issued by:
Gilchrist Ross Crowe Architects

September 1, 2015

TECHNICAL SPECIFICATIONS

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SECTION 01100 – SUMMARY GENERAL CONSTRUCTION

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 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: FSU STONE BUILDING RE-ROOFING

- 1. Project Location: Main Campus of The Florida State University, Tallahassee, Florida.

- B. Architect Identification: The Contract Documents were prepared for the Project by Gilchrist Ross Crowe Architects, P.A., 413 All Saints Street, Tallahassee, FL 32301. The Architect's consultants are identified on the drawing sheets.

- C. Owner Project Coordinator: FSU's Director of Facilities Design and Construction shall assign a staff member as project coordinator for the Owner.

D. The Project

- 1. Work includes, but is not limited to:
 - a. Reroofing including, including, but not limited to removal of existing roofing and insulation, temporary roofing, new lightweight insulating concrete, raising existing equipment curbs, new flashing and incidental painting of roof access components.

1.3 USE OF PREMISES

- A. General: The Contractor shall have partial use of premises for construction operations, including use of Project site, during construction period.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

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 specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

- A. The Architect will issue **Architect's Supplemental Instructions (ASI's)** authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect's Supplemental Instructions or an equivalent format.

- 1. An ASI may be issued for all interior and exterior colors scheduled and noted on the drawings.

1.4 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests **Request for Proposal (RFP's)**: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

- 1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
 - 2. Within 14 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.

- a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

- B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. **Construction Change Directive (CCD):** When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.7 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Proposal Request, the Construction Manager shall initiate and prepare multiple copies of the Change Order in the Board of Regents' format for the Architect's and Owner's signatures.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01250

SECTION 01330 - SUBMITTAL PROCEDURES

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 submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Closeout Procedures" for submitting warranties, Project Record Documents and operation and maintenance manuals.
 - 7. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's and Construction Manager's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals, unless otherwise agreed to by the A/E and at the expense of the Contractor.

1) Contractor's Use Of Architect/Engineers' Cad Files

- a) At Contractor's written request, copies of Architect's CAD files may be provided to Contractor for Contractor's use in connection with Project, subject to submittal of the following agreement to be provided on the Vendor's letterhead:

RELEASE OF LIABILITY FOR USE OF A/E'S CAD FILES

Project: *(COMPLETE)*

Electronic file copies of Gilchrist Ross Crowe Architects' (GRC) *(AND/OR CONSULTING ENGINEER)* drawings being provided to the Contractor, _____ do not represent the project's Contract Documents. They are being provided as information

only to assist the Contractor in preparation of submittal materials and drawings required by the Contract Documents. The Contractor is responsible for verification of information represented in the Contract Documents drawings and specifications.

The undersigned, as the authorized representative of _____, shall not hold GRC responsible for the accuracy of information provided in any electronic files.

(NAME, SIGNATURE AND DATE)"

- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow 21 days for initial review of each submittal.
 3. If intermediate submittal is necessary, process it in same manner as initial submittal.
 4. Allow 15 days for processing each resubmittal.
 5. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately **4 by 5 inches** on label or beside title block to record Contractor's review and approval markings and action taken by Construction Manager.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect

- d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
- G. Minor Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- H. Finishes: All finishes and colors shall be made by the Architect. Submittals for non-architectural specified items such as Mechanical, Plumbing and Electrical equipment and components shall clearly identify the manufacturer's finish and color selections. If a color selection is required by the Architect, the contractor's transmittal cover form shall indicate that a color approval required by the Architect.
- J. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- K. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Submittal and transmittal distribution record.
 - i. Remarks.
 - j. Signature of transmitter.

- L. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- M. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit six copies of each submittal, unless otherwise indicated. Architect will return minimum of three copies. The CM shall mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.

- e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
 4. Number of Copies: Submit six copies of each submittal, unless otherwise indicated. Architect will return minimum of three copies. The CM shall mark up and retain one returned copy as a Project Record Document.
- D. Coordination Drawings: Comply with requirements in Division 1 and other sections of the specifications, specifically Division 15 requirement for coordination drawings.
- E. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
 5. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
 - a. Size limitations.
 - b. Compliance with recognized standards.
 - c. Availability.
 - d. Delivery time.

6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 7. Number of Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 8. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of Contractor, testing agency, or design professional responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of the company.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- I. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
- J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.

6. Test procedures and results.
 7. Limitations of use.
- N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
- O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- S. Construction Photographs and Videotapes: Comply with requirements in Division 1 Section "Photographic Documentation."
- T. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect .
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Final Unrestricted Release: Where submittals are marked "**Reviewed for Design Conformance**," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 - 2. Final-But-Restricted Release: When submittals are marked "**Reviewed as Noted or Make Corrections Noted**," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 - 3. Returned for Resubmittal: When submittal is marked "**Rejected, Revise and Resubmit**," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark..
- C. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01330

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SECTION 01332A – STATE OF FLORIDA PRODUCT APPROVAL SYSTEM

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 submitting documentation to the Building Code Administrator for the project in accordance with Florida Statute 553.842.
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Requirements" for submitting traditional product information and shop drawings to the Architect for review.

1.4 SUBMITTAL PROCEDURES

- A. General: UCF's Building Code Administrator is responsible for implementing this process and will initiate a submittal and review process at the time the building permit is issued.
- B. Coordination: Coordinate and processing of approval numbers with the various trade contractors under the management of the Construction Manager.
- C. Product Approval Specification Sheet: Refer to pages PRODUCT APPROVAL SPECIFICATION SHEET that follow this section.

END OF SECTION 01332A

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PRODUCT APPROVAL SPECIFICATION SHEET

Location: _____

Project Name: _____

As required by Florida Statute 553.842 and Florida Administrative Code 9B-72, please provide the information and the product approval number(s) on the building components listed below if they will be utilized on the construction project for which you are **applying for a building permit on or after April 1, 2004**. We recommend you contact your local product supplier should you not know the product approval number for any of the applicable listed products. More information about statewide product approval can be obtained at www.floridabuilding.org

Category/Subcategory	Manufacturer	Product Description	Approval Number(s)
A. EXTERIOR DOORS			
1. Swinging			
2. Sliding			
3. Sectional			
4. Roll up			
5. Automatic			
6. Other			
B. WINDOWS			
1. Single hung			
2. Horizontal Slider			
3. Casement			
4. Double Hung			
5. Fixed			
6. Awning			
7. Pass -through			
8. Projected			
9. Mullion			
10. Wind Breaker			
11. Dual Action			
12. Other			
C. PANEL WALL			
1. Siding			
2. Soffits			
3. EIFS			
4. Storefronts			
5. Curtain walls			
6. Wall louver			
7. Glass block			
8. Membrane			
9. Greenhouse			
10. Other			
D. ROOFING PRODUCTS			
1. Asphalt Shingles			
2. Underlayments			
3. Roofing Fasteners			
4. Non-structural Metal Rf			
5. Built-Up Roofing			
6. Modified Bitumen			
7. Single Ply Roofing Sys			
8. Roofing Tiles			
9. Roofing Insulation			
10. Waterproofing			
11. Wood shingles /shakes			
12. Roofing Slate			

Category/Subcategory (cont.)	Manufacturer	Product Description	Approval Number(s)
13. Liquid Applied Roof Sys			
14. Cements-Adhesives – Coatings			
15. Roof Tile Adhesive			
16. Spray Applied Polyurethane Roof			
17. Other			
E. SHUTTERS			
1. Accordion			
2. Bahama			
3. Storm Panels			
4. Colonial			
5. Roll-up			
6. Equipment			
7. Others			
F. SKYLIGHTS			
1. Skylight			
2. Other			
G. STRUCTURAL COMPONENTS			
1. Wood connector/anchor			
2. Truss plates			
3. Engineered lumber			
4. Railing			
5. Coolers-freezers			
6. Concrete Admixtures			
7. Material			
8. Insulation Forms			
9. Plastics			
10. Deck-Roof			
11. Wall			
12. Sheds			
13. Other			
H. NEW EXTERIOR ENVELOPE PRODUCTS			
1.			
2.			

The products listed below did not demonstrate product approval at plan review. I understand that at the time of inspection of these products, the following information must be available to the inspector on the jobsite; 1) copy of the product approval, 2) the performance characteristics which the product was tested and certified to comply with, 3) copy of the applicable manufacturers installation requirements.

I understand these products may have to be removed if approval cannot be demonstrated during inspection.

Contractor or Contractor's Authorized Agent Signature

Print Name Date

Location

Permit # (FOR STAFF USE ONLY)

SECTION 01731 - CUTTING AND PATCHING

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 procedural requirements for cutting and patching.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Where instructions are not provided elsewhere in the Drawings and Specifications, submit a proposal describing procedures at least 5 working days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - 5. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- B. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 1. Water, moisture, or vapor barriers.
 - 2. Membranes and flashings.
 - 3. Equipment supports.
- C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.

- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 01731

SECTION 01770 - CLOSEOUT PROCEDURES

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 contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Year-End Warranty Inspection
- B. Related Sections include the following:
 - 1. Section 01781 for "Record Documentation"

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Punch List: Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete. Review with Architect the format for the punch list at least 30 days prior to the proposed date of Substantial Completion.
 - a. No A/E Inspection shall be made unless the completed list is provided to the Architect 48 hours prior to the scheduled inspection.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection including a contractor's punchlist for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: The Contractor shall submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

1.7 YEAR END WARRANTY INSPECTION

- A. Not later than four weeks prior to the expiration of the one year guarantee/warranty, the Contractor shall schedule a walkthrough with the A/E and Owner Representatives for the exclusive purposes of observing items covered by the warranties for the project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

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 Project Record Documents, including the following:

- 1. Record Drawings.
- 2. Record Specifications.
- 3. Record Product Data.

- B. DEFINITION

- 1. There is no requirement for "as-builts", just "record drawings and record documents." The term "as-builts" is not acceptable since it can imply "as it was built" or "plans without error." Where requested, the documents shall be stamped RECORD DRAWINGS, RECORD SPECIFICATIONS and RECORD SHOP DRAWINGS.

- C. Related Sections include the following:

- 1. Division 1 Section "Closeout Procedures" for general closeout procedures.

- D. Routine Updates to Documents:

- 1. The Contractor shall maintain record documents commensurate with the work completed to date. As a condition of accepting the pay application from the Contractor each month to offer the record documents for review by the Architect and Owner, and at that time to review their accuracy and timeliness of record keeping.
- 2. The contractor is responsible for monitoring that the trade contractors are keeping up with the same level of responsibility.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:

- 1. Number of Copies: Submit one copy of marked-up Record Prints.
 - a. Initial Submittal: Submit one copy with complete markups as directed in the content of the record drawings. The Architect will review for thoroughness only and return the incomplete set for further documentation requiring a resubmittal.
 - b. Final Submittal: Submit one set of marked-up Record Prints, one set of Record Transparencies, and one copy printed from Record Transparencies. Print each Drawing, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit two copies of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit two copies of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Architect's Supplemental Instructions
 - b. Request for Clarifications
 - c. Change Orders and Construction Change Directives
 - d. Changes made following Architect's written orders.
 - e. Details not on the original Contract Drawings.
 - f. Field records for variable and concealed conditions.
 - g. Record information on the Work that is shown only schematically.
 - d. Additional content may include, but not be limited to:
 - 1) Dimensional changes to Drawings.
 - 2) Revisions to details shown on Drawings.
 - 3) Revisions to routing of piping and conduits.
 - 4) Actual equipment locations.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference.

END OF SECTION 01781

03521 - LIGHTWEIGHT INSULATING CONCRETE ROOF INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES:

- A. NVS Lightweight Insulating Concrete Application to Prepared Substrate

1.02 RELATED SECTIONS

- A. Section 07552 – Modified Bitumen Membrane Roofing
- B. Section 07620 - Sheet Metal Flashing and Trim

1.03 REFERENCE STANDARDS

References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

ASTM American Society for Testing and Materials
Philadelphia, PA

FM Factory Mutual Engineering and Research
Norwood, MA

UL Underwriters Laboratories
Northbrook, IL

1.04 SUBMITTALS

All submittals which do not conform to the following requirements will be rejected.

1. Submit a sample copy of the roof system guarantee covering the proposed lightweight insulating concrete system and roof membrane system.
2. Submit a letter from the roof membrane manufacturer confirming the intention to issue the roof system guarantee covering the proposed lightweight insulating concrete system and roof membrane system at project completion.
3. Submit a letter from the proposed lightweight insulating concrete system supplier confirming that the Contractor is approved to install the proposed lightweight insulating concrete system.

1.05 QUALITY ASSURANCE

- A. Acceptable Contractor: The contractor must be certified in writing prior to bid by the supplier to install the proposed lightweight insulating concrete system.

- B. Agency Approvals: The proposed lightweight insulating concrete system shall conform to the following requirements. No other testing agency approvals will be accepted.
1. Underwriters Laboratories: Tested by Underwriters Laboratories in accordance with the procedures of ASTM E 119 and listed in the most recent Underwriters Laboratories Fire Resistance Directory. Lightweight insulating concrete roof insulation components are defined by Underwriters Laboratories under sections CCVW for foamed plastic and CJZZ for floor or roof - topping mixture in the latest edition of the Underwriters Laboratories Fire Resistance Directory.
 2. Factory Mutual: Tested by Factory Mutual Research and listed in FM Global RoofNav as non-combustible or Class 1, and for 1-120 windstorm classification utilizing the specific roof membrane system proposed for use on this project.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials in the supplier's original unopened packages, fully identified as to manufacturer, brand or other identifying data and bearing the proper Underwriters Laboratories label.
- B. Storage: Store bagged concrete aggregate products in a dry location until ready for application. Expanded polystyrene board should not be stored in areas of standing water prior to application but can be exposed to rainwater before application. Boards must be clean and free from foreign substances.

1.07 PROJECT/SITE CONDITIONS

A. Requirements Prior to Job Start

1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.
2. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.
3. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

B. Environmental Requirements

1. Precipitation: Do not apply materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials and building interiors are protected from possible moisture damage or contamination.
2. Temperature Restrictions: When air temperatures of 40°F (4.4°C) or above are predicted to occur within the first 24 hours after placement, normal mixing and application procedures may be used. When air temperatures of 32°F to 40°F (0°C - 4.4°C) are predicted to occur within the first 24 hours after placement, warm water may be used. The mix temperature

should not exceed 100°F (37.8°C) at point of placement. Do not install the lightweight insulating concrete system when air temperatures are below 32°F (0°C).

1.08 WARRANTY/GUARANTEE

A. Roof System Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the roof system manufacturer's 20 year labor and materials roof system guarantee. The roof system guarantee shall include both the roofing and flashing membranes, and the specified new lightweight insulating concrete system consisting of aggregate fill, patented-pre-formed polystyrene panels, and base sheet fasteners. All repair or replacement costs covered under the guarantee shall be borne by the roofing membrane manufacturer. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and be issued at no additional cost to the Owner. Specific items covered under the roof system guarantee include:

1. The actual resistance to heat flow through the roof insulation will be at least 80% of the design thermal resistance, provided that the roofing membrane is free of leaks;
2. Should a roof leak occur, the insulating performance of the roof insulation will be at least 80% of the design thermal resistance within a 2 year period following repair of the leak.
3. The roof insulation will remain in a reroofable condition should the roof membrane require replacement (excluding damage caused by fastener pullout during removal of the old membrane.)
4. The roof insulation material will not cause structural damage to the building as a result of expansion from thermal or chemical action.

Siplast 20 Year Roof System Guarantee

PART 2: PRODUCTS

2.01 MATERIALS

A. Acceptable Manufacturer: Provide a lightweight insulating concrete roof insulation system incorporating vermiculite aggregate and expanded polystyrene board supplied by a single manufacturer.

- > NVS Roof Insulation System by Siplast, Inc., Irving, TX

2.02 SYSTEM DESCRIPTION

A. Lightweight Concrete System Description: Provide materials used in the lightweight concrete roof insulation system conforming to the following.

1. Portland Cement: Portland cement conforming to Type I, II, or III as defined by ASTM C 150.
2. Vermiculite Aggregate: Vermiculite concrete aggregate conforming to ASTM C 332.

- > NVS Concrete Aggregate by Siplast, Inc., Irving, TX
- 3. Expanded Polystyrene Insulation Board: Expanded polystyrene (EPS) insulation board having a nominal density of 1 pcf (16 kg/m³) defined as Type I by ASTM C 578 and containing approximately 3% open area. Each bundle of board shall be delivered to the job site with clear identification as to manufacturer and shall carry the Factory Mutual approval label and the Underwriter's Laboratories Classified label on each bundle.
 - > Insulperm Insulation Board by Siplast, Inc., Irving, TX
- 4. Water: Potable water that is clean and free of deleterious amounts of acid, alkali and organic materials.

2.03 MIX DESIGN

- A. Density: Mix Portland cement and vermiculite concrete aggregate in 1:3.5 volume ratio with water to achieve a wet density ranging from 60 to 68 pcf (960 to 1089 kg/m³), resulting in a minimum dry density of 35 pcf (561 kg/m³), and minimum compressive strength of 300 psi (2068 kPa).

PART 3: EXECUTION

3.01 EXAMINATION

- A. General: Ensure that all surfaces to receive lightweight insulating concrete are free of oil, grease, paints/primers, loose mill scale, dirt, or other foreign substances. Where necessary, cleaning or other corrections of surfaces to receive lightweight insulating concrete is the responsibility of the party causing the unacceptable condition of the substrate.
- B. Substrate Acceptance: With the general contractor present, examine surfaces to receive the roof insulation system and determine that the surfaces are acceptable prior to placement of the lightweight insulating concrete system.

3.02 PREPARATION

- A. General: Remove water or any other substance that would interfere with bonding of the lightweight concrete system.

3.03 APPLICATION

- A. General: Provide equipment and application procedures conforming to the material supplier's application instructions.
- B. Application: Fill the flutes and place a 1/8 inch (3 mm) minimum slurry over the top corrugation of metal deck before embedding the expanded polystyrene insulation panels. Place the thickness of expanded polystyrene insulation panels shown in the approved shop drawings within 30 minutes of applying the insulating concrete slurry coat to the substrate. When metal deck substrates are used, place the expanded polystyrene insulation panels in a brick-like pattern. The maximum allowable panel step

in a stair-step design is 1 inch (25 mm). The following day, fill the holes in the expanded polystyrene insulation panels and place a 2 inch (25 mm) minimum thickness of insulating concrete over top of the expanded polystyrene insulation panels.

- C. Thermal Resistance: Install the specified lightweight insulating concrete system to provide for an average thermal value of **R-23 with average thickness 6"** or as shown on the architectural details/drawings.
- D. Slope: Install the specified lightweight insulating concrete system to provide for a minimum positive roof slope of 1/4 inch per foot (2 %). See the structural drawings for slope provided by the roof framing system.

3.04 FIELD QUALITY CONTROL

- A. Protection: Avoid roof-top traffic over the roof insulation system until one can walk over the surface without creating surface damage.
- B. Compressive Strength Testing: The Owner has the option to select an independent testing laboratory to randomly sample the top placement of insulating concrete to verify the thickness and density, and to secure and test compressive strength cylinders in accordance with ASTM C 495. The Owner will be responsible for the cost and engagement of the independent testing laboratory services.
- C. Application Monitoring: Monitor the thickness and wet density of the lightweight insulating concrete at the time of placement to determine conformance to the manufacturer's requirements. Monitor the placement of proper thickness of polystyrene insulation board in accordance with the contract documents.
- D. Fastener Withdrawal Testing: Conduct a base ply fastener pull test 3 or more days following the application of the lightweight insulating concrete to ensure a minimum withdrawal resistance of 40 pounds (18 kg) per fastener.

3.05 PATCHING

- A. Patching: Perform all patching and repairing of insulating concrete using Zono-Patch or other materials approved by the lightweight insulating concrete supplier.

END SECTION 03521

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SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Rooftop equipment bases and support curbs.
 - 2. Wood blocking, cants and nailers.
 - 3. Wood furring and grounds.

1.3 DEFINITIONS

- A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA - National Lumber Grades Authority.
 - 2. SPIB - Southern Pine Inspection Bureau.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

1.5 PRODUCTS

1.5 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated.
 - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

1.6 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and the following:
 - a. Ammoniacal copper citrate (CC).
 - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing members less than 18 inches (460 mm) above grade.
 - 4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

1.7 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

1.8 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including the following:
 - 1. Rooftop equipment bases and support curbs.
 - 2. Blocking.
 - 3. Cants.
 - 4. Nailers.
- B. For items of dimension lumber size, provide No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:
 - 1. Mixed southern pine; SPIB.
 - 2. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

1.9 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - B. Nails, Brads, and Staples: ASTM F 1667.
 - C. Power-Driven Fasteners: CABO NER-272.
 - D. Wood Screws: ASME B18.6.1.
 - E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
 - F. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
 - G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
 - H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 2 - EXECUTION

2.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

2.2 WOOD GROUND, SLEEPER, BLOCKING, 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. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

END OF SECTION 06100

SECTION 07520 - MODIFIED BITUMINOUS MEMBRANE ROOFING**PART 1 GENERAL****1.01 SECTION INCLUDES:**

- A. Preparation of Substrate to Receive Roofing Materials
- B. Base Sheet Application to Prepared Substrate
- C. Roof Membrane Application
- D. Roof Flashing Application
- E. Incorporation of Sheet Metal Flashing Components and Roofing Accessories into the Roof System

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Sheet Metal Flashing and Trim
- B. Sheet Metal Parapet Coping.

1.03 RELATED SECTIONS

- A. Division 06 - Rough Carpentry
- B. Division 03 – Lightweight Insulating Concrete
- C. Division 07 - Roof Specialties for parapet coping
- D. Division 07 - Sheet Metal Flashing and Trim

1.04 REFERENCE STANDARDS

References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout this specification section.

ASTM	American Society for Testing and Materials Philadelphia, PA
FM	Factory Mutual Engineering and Research Norwood, MA
NRCA	National Roofing Contractors Association Rosemont, IL

OSHA	Occupational Safety and Health Administration Washington, DC
SMACNA	Sheet Metal and Air Conditioning Contractors National Association Chantilly, VA
UL	Underwriters Laboratories Northbrook, IL

1.05 DESCRIPTION OF WORK

The basic work descriptions required in this specification are referenced below.

Project Type: Tear-off

Deck: Existing LWIC, Slope: Less than 1/8 inch

Base Sheet: Parabase FS, mechanically attached.

Temporary Roof: Paradiene 20 TG, torch applied.

Substrate: NVS Lightweight Concrete Roof Insulation. See Specification Section 03521.

Base Sheet: Parabase FS, mechanically attached.

Roof System: Paradiene 20 TAG, applied in PA-311 M Adhesive;
Paradiene 30 FR BW TAG, applied in PA-311 M Adhesive;

Flashing System: Veral Aluminum, torch applied and Parapro 123 Flashing.

1.06 SUBMITTALS

All submittals which do not conform to the following requirements will be rejected.

A. Submittals Prior to Contract Award:

1. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.
2. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

B. Submittals Prior to Project Close-out:

1. Certificate Of Analysis from the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 7051 and indicate Quality Assurance/Quality Control data

as required to meet the specified properties. A separate Certificate Of Analysis for each production run of material shall indicate the following information:

- a) Material type
 - b) Lot number
 - c) Production date
 - d) Dimensions and Mass (indicate the lowest values recorded during the production run);
 - Roll length
 - Roll width
 - Selvage width
 - Total thickness
 - Thickness at selvage (coating thickness)
 - Weight
 - e) Physical and Mechanical Properties;
 - Low temperature flexibility
 - Peak load
 - Ultimate Elongation
 - Dimensional stability
 - Compound Stability
 - Granule embedment
 - Resistance to thermal shock (foil faced products)
2. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

1.07 QUALITY ASSURANCE

- A. Acceptable Products: Primary roofing products, including each type of sheet, all manufactured in the United States, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years.
- B. Product Quality Assurance Program: Primary roofing materials shall be manufactured under a quality management system that is monitored regularly by a third party auditor under the ISO 9001 audit process. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required prior to project close-out.
- C. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.
 1. Underwriters Laboratories Class A acceptance of the proposed roofing system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings.
 2. Factory Mutual- Roof System configuration shall comply with an FM-135
- D. Acceptable Contractor: Contractor shall have a minimum of 2 years experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.

- E. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.
- F. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.
- G. Manufacturer Requirements: Ensure that the primary roofing materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

1.08 PRODUCT DELIVERY STORAGE AND HANDLING

- A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.
- B. Storage: Store materials out of direct exposure to the elements on pallets placed over clean, flat and dry surfaces. Storage of pallets over dirt, grass-covered ground or newly placed concrete may result in upward moisture transpiration and contamination of product. Store rolls of roofing on end. For roof-top storage, avoid overloading of deck and building structure. Factory packaging is not intended for job site protection. Slit factory packaging immediately upon arrival at the job site to prevent build-up of condensation and cover materials using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings shall not be used. Store flammable or temperature sensitive materials away from open flame, ignition sources or excessive heat.
- C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.
- D. Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the Contractor's expense.

1.09 PROJECT/SITE CONDITIONS

- A. Requirements Prior to Job Start
 - 1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.

2. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.
3. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

B. Environmental Requirements

1. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.
2. Temperature Restrictions - cold adhesive: At low temperatures, the specified cold adhesive becomes more viscous, making even distribution more difficult. The optimal temperature of the adhesive at point of application is 70° - 100°F (21° - 38°C). To facilitate application when ambient temperatures are below 50°F (10°C), store the adhesive and roll goods in a warm place immediately prior to use. Bulk warmers, inline heaters, or other pre-heating equipment should be used to maintain the proper viscosity of the adhesive when using mechanical application equipment. Consider "flying in" the pre-cut roofing sheets in by placing them into the adhesive rather than rolling them into position. Roll or broom the sheets to ensure contact with the underlying adhesive. Suspend application in situations where the adhesive cannot be kept at temperatures allowing for even distribution.
3. Temperature Restrictions - self-adhered membrane: The minimum required substrate temperature at point of application is 40°F (4°C). Maintain a minimum roof membrane material temperature above 60° F (16° C). In low temperature conditions, materials should be kept warm prior to application. In temperatures below 60° F (16° C) the specified tacky primer, required for vertical applications, should be considered to facilitate proper bonding of self-adhered membrane for horizontal applications. The minimum ambient temperature range at the time of tacky primer application is 45°F to 105°F (7°C - 40°C). Suspend application in situations where the self-adhered base ply cannot be kept at temperatures allowing for proper adhesion.

C. Protection Requirements

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.
2. Torch Safety: Crew members handling torches shall be trained by an Authorized Certified Roofing Torch Applicator (CERTA) Trainer, be certified according to CERTA torch safety guidelines as published by the National Roofing Contractor's Association (NRCA), and follow torch safety practices as required by the contractor's insurance carrier. Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas during roof construction activity, and for the minimum period required by CERTA guidelines after roofing material application has been suspended for the day.

3. Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.
4. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.
5. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.10 GUARANTEE/WARRANTY

A. Roof System Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the roof system manufacturer's 20 year labor and materials roof system guarantee. The roof system guarantee shall include both the roofing and flashing membranes, and the specified new lightweight insulating concrete system consisting of aggregate fill, patented-pre-formed polystyrene panels, and base sheet fasteners. All repair or replacement costs covered under the guarantee shall be borne by the roofing membrane manufacturer. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and be issued at no additional cost to the Owner. Specific items covered under the roof system guarantee include:

1. The actual resistance to heat flow through the roof insulation will be at least 80% of the design thermal resistance, provided that the roofing membrane is free of leaks;
2. Should a roof leak occur, the insulating performance of the roof insulation will be at least 80% of the design thermal resistance within a 2 year period following repair of the leak.
3. The roof insulation will remain in a reroofable condition should the roof membrane require replacement (excluding damage caused by fastener pullout during removal of the old membrane.)
4. The roof insulation material will not cause structural damage to the building as a result of expansion from thermal or chemical action.
 - > Siplast 20 Year Roof System Guarantee

PART 2 PRODUCTS

2.01 ROOFING SYSTEM ASSEMBLY/PRODUCTS

- A. NVS Lightweight Concrete Roof Insulation: See Specification Section 03 52 00.
- B. Base Sheet
 1. Base Sheet: A fiberglass reinforced, asphalt coated sheet with a polyolefin film backing, having a minimum weight of 20 lb/sq. The sheet shall conform to ASTM D 4601, Type II requirements.

- > Siplast Parabase FS

C. Temporary Roof Ply Sheet

1. Torchable Modified Bitumen Ply Sheet: A fiberglass mat reinforced modified bitumen sheet, coated on one side with a high quality torch grade SBS modified bitumen blend, having a minimum weight of 76 lb/sq.

- > Siplast Paradiene 20 TG

2.02 DESCRIPTION OF SYSTEMS

- A. Roofing Membrane Assembly: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate. Reinforcement mats shall be impregnated/saturated and coated each side with SBS modified bitumen blend. The cross sectional area of the sheet material shall contain no oxidized or non-SBS modified bitumen. The roof membrane base and finish plies shall have radio frequency identification (RFID) chips encapsulated within each roll of modified bitumen material. The RFID chips shall enable wireless, non-contact scanning identification through a standard ultra-high frequency (UHF) scanning device to identify the product name, lot number, and manufacturing date. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

- > Siplast Paradiene 20/30 FR BW TAG roof system

1. Modified Bitumen Base and Stripping Ply

- a) Thickness (avg): 91 mils (2.3 mm) (ASTM D 5147)
- b) Thickness (min): 87 mils (2.2 mm) (ASTM D 5147)
- c) Weight (min per 100 ft² of coverage): 62 lb (3.0 kg/m²)
- d) Peak filler content in elastomeric blend - 35% by weight
- e) Low temperature flexibility @ -15°F (-26°C): PASS (ASTM D 5147)
- f) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
- g) Peak Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147)
- h) Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
- i) Compound Stability (max): 0.1% (ASTM D 5147)
- j) High Temperature Stability (min): 250°F (121°C) (ASTM D 5147)
- k) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
- l) Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria
- m) Product Identification: radio frequency identification (RFID) tag

> Siplast Paradiene 20 TAG

2. Modified Bitumen Finish Ply

- a) Thickness (avg): 130 mils (3.3 mm) (ASTM D 5147)
- b) Thickness at selvage (coating thickness) (avg): 98 mils (2.5 mm) (ASTM D 5147)
- c) Thickness at selvage (coating thickness) (min): 94 mils (2.4 mm) (ASTM D 5147)
- d) Weight (min per 100 ft² of coverage): 90 lb (4.4 kg/m²)
- e) Peak filler content in elastomeric blend: 35% by weight
- f) Low temperature flexibility @ -15° F (-26° C): PASS (ASTM D 5147)
- g) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
- h) Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
- i) Ultimate Elongation (avg.) @ 73°F (23°C): 55% (ASTM D 5147)
- j) Compound Stability (max): 0.1% (ASTM D 5147)
- k) High Temperature Stability (min): 250°F (121° C) (ASTM D 5147)
- l) Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)
- m) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
- n) Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria
- o) Product Identification: radio frequency identification (RFID) tag
- p) Surfacing: specially treated ceramic granules for cool roofing appliaction

> Siplast Paradiene 30 FR BW TAG

- B. Flashing Membrane Assembly: A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 and the following physical and mechanical property requirements.

> Siplast Veral flashing system, aluminum finish

1. Cant Backing Sheet and Flashing Reinforcing Ply

- a) Thickness (avg): 102 mils (2.6 mm) (ASTM D 5147)
- b) Thickness (min): 98 mils (2.5 mm) (ASTM D 5147)
- c) Weight (min per 100 ft² of coverage): 72 lb (3.5 kg/m²)
- d) Maximum filler content in elastomeric blend: 35% by weight
- e) Low temperature flexibility @ -15° F (-26° C) - PASS (ASTM D 5147)
- f) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
- g) Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
- h) Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
- i) Dimensional Stability (max): 0.1% (ASTM D 5147)
- j) Compound Stability (min - sheet): 250°F (121°C) (ASTM D 5147)
- k) Compound Stability (min – adhesive coating): 212°F (100°C) (ASTM D 5147)
- l) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
- m) Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
- n) Back Surfacing: polyolefin film

> Siplast Paradiene 20 SA

2. Metal-Clad Modified Bitumen Flashing Sheet

- a) Thickness (avg): 142 mils (3.6 mm) (ASTM D 5147)
- b) Thickness (min): 138 mils (3.5 mm) (ASTM D 5147)
- c) Weight (min per 100 ft² of coverage): 92 lb (4.5 kg/m²)
- d) Coating Thickness – back surface (min): 40 mils (1 mm) (ASTM D 5147)
- e) Low temperature flexibility @ 0° F (-18° C): PASS (ASTM D 5147)
- f) Peak Load (avg) @ 73°F (23°C): 85 lbf/inch (15 kN/m) (ASTM D 5147)
- g) Peak Load (avg) @ 0°F (-18°C): 180 lbf/inch (31.7 kN/m) (ASTM D 5147)
- h) Ultimate Elongation (avg) @ 73°F (23°C): 45% (ASTM D 5147)
- i) Tear-Strength (avg): 120 lbf (0.54 kN) (ASTM D 5147)
- j) Dimensional Stability (max): 0.2% (ASTM D 5147)
- k) Compound Stability (min): 225°F (107°C) (ASTM D 5147)
- l) Cyclic Thermal Shock Stability (maximum): 0.2% (ASTM D 7051)
- m) Approvals: UL Approved, FM Approved (products shall bear seals of approval)
- n) Reinforcement: fiberglass scrim mat or other meeting the performance and dimensional stability criteria
- o) Surfacing: aluminum metal foil

> Siplast Veral Aluminum

- C. Catalyzed Acrylic Resin Flashing System: A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.

> Parapro 123 Flashing System by Siplast; Irving, TX

- D. Substitute Roof Systems: The following substitute roof systems are approved for use in lieu of the specified roof system. No other substitutions are allowed.

MANUFACTURER

The Garland Company
Cleveland, OH

Base Ply – Stressply Plus

Finish Ply - Stressply Plus FR Mineral

Flashing Sheet - Stressply Plus FR Mineral

Stripping Ply and Flashing Reinforcing Sheet – Stressply Plus

Adhesive – Weather King

MANUFACTURER

Tremco
Cleveland, OH

Base Ply - POWERply Premium Smooth
Finish Ply - POWERply Premium FR
Flashing Sheet - POWERply Premium FR
Stripping Ply and Flashing Reinforcing Sheet - POWERply Premium Smooth
Adhesive – POWERply Standard Cold Adhesive

2.03 ROOFING ACCESSORIES

A. Roofing Adhesives

1. Membrane Cold Adhesive: An asphalt, solvent blend conforming to ASTM D 4479, Type II requirements.
 - > Siplast PA-311 M Adhesive by Siplast; Irving, TX

B. Bituminous Cutback Materials

1. Primer: An asphalt, solvent blend conforming to ASTM D 41 requirements.
 - > Siplast PA-1125 Asphalt Primer by Siplast; Irving, TX
2. Primer for Self-Adhesive Sheets: A quick drying, low-VOC, water-based, high-tack primer specifically designed to promote adhesion of roofing and waterproofing sheets to approved substrates. Primer shall meet South Coast Air Quality District and Ozone Transport Commission requirements.
 - > Siplast TA-119 Primer by Siplast; Irving, TX
3. Mastics: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.
 - > Siplast PA-1021 Plastic Cement by Siplast; Irving, TX

- ### C. Sealant:
- A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:
- > Siplast PS-209 Elastomeric Sealant by Siplast; Irving, TX

- ### D. Ceramic Granules:
- No. 11 grade specially treated ceramic granules for cool roofing application.
- Siplast BW(Bright White) granules by Siplast; Irving TX

- ### E. Perlite Cant Strips:
- A cant strip composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.

F. Fasteners

1. Base Sheet Fasteners: Base sheet fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable base sheet fasteners for specific substrate types are listed below.

- a) Lightweight Concrete Substrates

- A single unit, precision formed, electro zinc coated steel fastener having a 2.7 inch diameter rib reinforced cap and 1 inch long rectangular legs, designed to expand when fully driven into the lightweight concrete. Fasteners for lightweight concrete shall meet FM Standard 4470 requirements for corrosion resistance.

- > NVS Fasteners by Siplast; Irving, TX

2. Flashing Reinforcing Sheet Fasteners for Wood/Plywood Substrates to Receive Flashing Coverage: Fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable fasteners for specific substrate types are listed below.

- a) Wood/Plywood Substrates

- A 12 gauge, spiral or annular threaded shank, zinc coated steel roofing fastener having a minimum 1 inch head.

- > Square Cap by W.H. Maze Co.; Peru, IL

- > 12 Gauge Simplex Nail by the Simplex Nail and Manufacturing Co., Americus, GA

G. Roof Moisture Relief Vents Vent Caps: Roofing manufacturer's spun aluminum assembly

H. Walktread: A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.

1. Thickness: 0.217 in (5.5 mm)
2. Weight: 1.8 lb/ft² (8.8 kg/m²)
3. Width: 30 in (76.2 cm)

- > Paratread Roof Protection Material by Siplast; Irving, TX

PART 3 EXECUTION

3.01 PREPARATION

- A. General: Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing.

3.02 SUBSTRATE PREPARATION

- A. NVS Lightweight Concrete Roof Insulation: See Specification Section 03 52 00.
- B. Base Sheet Securement to Prepared Substrate: Lay the base sheet over the entire area to be roofed, lapping sides 3 inches and ends 6 inches. Using the specified fasteners, fasten each sheet every 7 1/2 inches through laps and stagger fasten the remainder of the sheet in 2 equally spaced rows with fasteners in each row on 10 inch centers. Increase the fastening pattern by 70% at the perimeter of the roof and 160% at the corners.

3.03 ROOF MEMBRANE INSTALLATION

- A. Membrane Application: Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing membrane components shall immediately follow application of base sheet and/or insulation as a continuous operation.
- B. Aesthetic Considerations: Construction of an aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials including granules, and exercise care in ensuring that the finished application is acceptable to the Owner.
- C. Priming with tacky primer: Apply the specified tacky primer by roller or spray in an even film. Refer to the manufacturer's literature for the approved rate of application over various substrate types. Allow the primer to dry until it leaves a slightly sticky surface without transfer when touched.
- D. Priming with asphaltic primer: Prime metal and concrete and masonry surfaces with a uniform coating of the specified asphalt primer.
- E. Bitumen Consistency: Cutting or alterations of bitumen, primer, and sealants will not be permitted.
- F. Roofing Application: Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.
 - 1. Apply all layers of roofing perpendicular to the slope of the deck.
 - 2. Fully bond the base ply to the prepared substrate, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.
 - 3. Fully bond the finish ply to the base ply, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet

- application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.
4. For cold adhesive application, heat weld all side and end laps of the modified bitumen plies during each day's application in areas where standing water accumulates.
 5. Maximum sheet lengths and special fastening of the specified roof membrane system may be required at various slope increments where the roof deck slope exceeds 1/2 inch per foot. The manufacturer shall provide acceptable sheet lengths and the required fastening schedule for all roofing sheet applications to applicable roof slopes.
- G. Granule Embedment: Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.
- H. Flashing Application: Cut the cant backing sheet into 12 inch widths and peel the release film from the back of the sheet. Set the sheet into place over the primed substrate extending 6 inches onto the field of the roof area and 6 inches up the vertical surface utilizing minimum 3 inch laps. Set the non-combustible cant into place dry prior to installation of the roof membrane base ply. Flash walls and curbs using the reinforcing sheet and the metal foil flashing membrane. After the base ply has been applied to the top of the cant, prime the base ply surfaces to receive the reinforcing sheet. Fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps onto the primed base ply surface and up the primed wall or curb to the desired flashing height. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall or curb to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the vertical/horizontal surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).
- I. Catalyzed Acrylic Resin Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer's printed installer's guidelines and other applicable written recommendations as provided by the manufacturer.
- J. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.04 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

- A. Roof Moisture Relief Vents - vented lightweight insulating concrete substrates: Completely prime the metal flanges and allow to dry prior to installation. After the base ply

has been applied, mark the venting designations. Cut a 2 inch diameter core from the roof membrane assembly. Set the vent flange in mastic, centered over the core cut. Strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the flange-throat juncture of the vent. SEE ITEM: SEALANT for finish of this detail.

- a. Install one vent for every 600 square feet of roof area.
- B. Walktread: Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8 inch thickness to the back of the product in 5 inch by 5 inch spots in accordance with the pattern as supplied by the walktread manufacturer. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2 inches between sheets to allow for proper drainage.
- C. Sealant: Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system.

3.05 FIELD QUALITY CONTROL AND INSPECTIONS

- A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.
- B. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.
- C. Final Inspection
 1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.
- D. Issuance Of The Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:

- 1.
2. Through-wall flashing.
3. Manufactured reglets.
4. Formed low-slope roof flashing and trim.
5. Formed equipment support flashing.

- B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 7 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify 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 fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 12 inches (300 mm) long. Include fasteners, closures, and other attachments.
 - 2. Trim: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
 - 3. Accessories: Full-size Sample.

1.5 QUALITY ASSURANCE

- A. 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.
- B. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- C. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- D. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.6 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
 - 1. Mill Finish: One-side bright.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.
- C. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.
- D. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.
 - 1. Nonpatinated Exposed Finish: Mill.

2.2 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- B. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 - 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- E. Solder for Lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- F. Burning Rod for Lead: Same composition as lead sheet.
- G. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- H. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions.
1. Available Manufacturers:
 - a. Cheney Flashing Company, Inc.
 - b. Fry Reglet Corporation.
 - c. Heckmann Building Products Inc.
 - d. Hickman, W. P. Company.
 - e. Keystone Flashing Company, Inc.
 - f. Sandell Manufacturing Company, Inc.
 2. Material: Aluminum, 0.024 inch (0.6 mm) thick.
 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 4. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 5. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.5 FABRICATION, GENERAL

- 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, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate 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.
1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with elastomeric sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Caps: Fabricate in minimum 96-inch- (2400-mm long, but not exceeding 10-foot- (3-m-) long, sections. Furnish with 6-inch- (150-mm-) wide joint cover plates.
 - 1. Joint Style: Lap, 5 inches wide.
- B. Roof Expansion-Joint Cover: Fabricate from the following material:
 - 1. Aluminum: 0.050 inch (1.2 mm)thick.
- C. Base Flashing: Fabricate from the following material:
 - 1. Aluminum: 0.040 inch (1.0 mm) thick.
- D. Counterflashing: Same as principal base flashing.
- E. Flashing Receivers: Fabricate from the following material:
 - 1. Aluminum: 0.0320 inch (0.8 mm) thick.
- F. Roof-Penetration Flashing: Fabricate from the following material:
 - 1. Lead: 4.0 lb/sq. ft. (1.6 mm thick), hard tempered.
- G. Roof-Drain Flashing: Fabricate from the following material:
 - 1. Lead: 4.0 lb/sq. ft. (1.6 mm thick), hard tempered.
- H. Roof-Drain Flashing: Fabricate from the following material:
 - 1. Lead: 4.0 lb/sq. ft. (1.6 mm thick), hard tempered.
- I. Parapet Through-Wall Scuppers: Fabricate from the following material:
 - 1. Copper: 16 oz./sq. ft. (0.55 mm thick).

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION, GENERAL

- 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. Torch cutting of sheet metal flashing and trim is not permitted.
- B. 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 fabricator or manufacturers of dissimilar metals.
 - 1. Coat side of uncoated aluminum and lead sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- E. 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.
 - 1. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
 - 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
 - 2. Aluminum: Use aluminum or stainless-steel fasteners.
 - 3. Copper: Use copper, hardware bronze, or stainless-steel fasteners.
 - 4. Stainless Steel: Use stainless-steel fasteners.
- H. Seal joints with elastomeric sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 - 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except where pre-tinned surface would show in finished Work.
 - 1. Do not solder aluminum sheet.
 - 2. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.
- J. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements[, sheet metal manufacturer's written installation instructions,] and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 24-inch (600-mm) centers.

- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
 - 1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
 - 2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

3.4 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with sealant to equipment support member.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. 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 07620

SECTION 07710 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof Curb for existing roof hatch.
2. Premanufactured Copings.

B. Product Data: For each type of product.

C. Shop Drawings: For roof specialties.

1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.

D. Samples: For each type of roof specialty and for each color and texture specified.

1.2 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For tests performed by a qualified testing agency.

B. Sample warranty.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class.

1.5 WARRANTY

A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section "Modified Bitumen Roofing."

B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. FM Approvals' Listing: Manufacture and install **copings** that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, **Class 1-135**. Identify materials with FM Approvals' markings.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): **120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**, material surfaces.

2.2 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding **12 feet (3.6 m)**, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
 1. **Basis-of-Design Product**: Subject to compliance with requirements, provide **Paraguard** by Siplast or comparable product by one of the following:
 - a. [Architectural Products Company.](#)
 - b. [ATAS International, Inc.](#)
 - c. [Castle Metal Products.](#)
 - d. [Cheney Flashing Company.](#)
 - e. [Hickman Company, W. P.](#)
 - f. [Merchant & Evans, Inc.](#)
 - g. [Metal-Era, Inc.](#)
 - h. [Metal-Fab Manufacturing, LLC.](#)
 - i. [Perimeter Systems; a division of Southern Aluminum Finishing Company, Inc.](#)
 - j. [Petersen Aluminum Corporation.](#)
 2. Formed Aluminum Sheet Coping Caps: Aluminum sheet, **0.050 inch (1.27 mm)** thick.
 - a. Surface: Smooth finish.
 - b. Finish: Two-coat fluoropolymer.

- c. Color: As selected by Architect from manufacturer's full range
3. Corners: Factory mitered and continuously welded.
4. Coping-Cap Attachment Method: Face leg hooked to continuous cleat with back leg fastener exposed, fabricated from coping-cap material.
 - a. Face-Leg Cleats: Concealed, continuous stainless steel.

2.3 MATERIALS

- A. Aluminum Sheet: **ASTM B 209 (ASTM B 209M)**, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
 1. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- B. Elastomeric Sealant: ASTM C 920, elastomeric [**polyurethane**] [**silicone**] polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

2.5 ROOF CURBS

- A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, integral metal cant and integrally formed deck-mounting flange at perimeter bottom.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [AES Industries, Inc.](#)
 - b. [Curbs Plus, Inc.](#)
 - c. [Custom Solution Roof and Metal Products.](#)
 - d. [Greenheck Fan Corporation.](#)
 - e. [LM Curbs.](#)
 - f. [Metallic Products Corp.](#)
 - g. [Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.](#)
 - h. [Pate Company \(The\).](#)
 - i. [Roof Products, Inc.](#)
 - j. [Safe Air of Illinois.](#)
 - k. [Thybar Corporation.](#)
 - l. [Vent Products Co., Inc.](#)

- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Loads: <Insert load requirements>.
- D. Material: Aluminum sheet, [0.090 inch (2.28 mm)] <Insert dimension> thick.
 - 1. Finish: Mill.
 - 2. Insulation: Factory insulated with 1-1/2-inch thick glass-fiber board insulation.
 - 3. Liner: Same material as curb, of manufacturer's standard thickness and finish.
 - 4. Factory-installed wood nailer at top of curb, continuous around curb perimeter.
 - 5. Fabricate curbs to minimum height of [12 inches (300 mm)] <Insert dimension> unless otherwise indicated.
 - 6. Top Surface: Level around perimeter with roof slope accommodated by sloping the deck-mounting flange.
 - 7. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.

2.6 FINISHES

- A. Coil-Coated Aluminum Sheet Finishes:
 - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 3. Torch cutting of roof specialties is not permitted.
 - 4. Do not use graphite pencils to mark metal surfaces.
- B. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of **12 feet** with no joints within **18 inches** of corners or intersections unless otherwise indicated on Drawings.
 2. When ambient temperature at time of installation is between **40 and 70 deg F (4 and 21 deg C)**, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- C. Seal concealed joints with silicone sealant as required by roofing-specialty manufacturer.
- D. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below **40 deg F (4 deg C)**.
- A. Roof Curb Installation: Install each roof curb so top surface is level.
- B. Roof Curb Installation: Install each roof curb so top surface is level.

3.2 ROOF CURB INSTALLATION

- A. Existing roof hatch to be salvaged and reinstalled.
- B. Installation: Install curb so top surface is level.

3.3 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed.

END OF SECTION 07710

SECTION 09912 - PAINTING AND COATINGS

PART 1 - GENERAL

1.1 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. Related Sections include the following:
 - 1. Division 9 Section "Painting Existing Painted Surfaces."

1.2 SUMMARY

- A. This Section includes surface preparation and field painting of exposed exterior and interior surfaces.
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint all existing exterior painted surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
 - 1. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

- A. Product Data: For each paint system indicated. Include block fillers and primers.
 - 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. Samples for Initial Selection: For each type of finish-coat material indicated.

1.5 QUALITY ASSURANCE

- A. **Applicator Qualifications:** A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. **Benchmark Samples (Mockups):** Provide a full-coat benchmark finish sample for each type of coating and substrate required.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of **45 deg F (7 deg C)**. Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

- A. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between **45 and 95 deg F (7 and 35 deg C)**.
- B. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than **5 deg F (3 deg C)** above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Available Products:** Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

- B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
1. Benjamin Moore & Co. (Benjamin Moore).
 2. PPG Industries, Inc. (Pittsburgh Paints).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors:
1. Match existing color.

2.3 EXTERIOR PRIMERS

- A. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.
1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than **2.0 mils (0.051 mm)**.
 2. Pittsburgh Paints; 90-712 Pitt-Tech One Pack Interior/Exterior Primer Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than **3.0 mils (0.076 mm)**.

2.4 EXTERIOR FINISH COATS

- A. Exterior Full-Gloss Alkyd Enamel: Factory-formulated full-gloss alkyd enamel for exterior application.
1. Benjamin Moore; Moore's IMC Urethane Alkyd Enamel M22: Applied at a dry film thickness of not less than **2.0 mils (0.051 mm)**.

2. Pittsburgh Paints; 7-814 Pittsburgh Paints Industrial Gloss-Oil Interior/Exterior Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- B. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 1. Provide barrier coats over incompatible primers or remove and reprime.
 2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - a. Treat bare clean metal with a metal treatment wash coat before priming.
 - b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

- C. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 - 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- D. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
 - 1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 - 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 - 3. Provide finish coats that are compatible with primers used.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 - 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 - 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 - 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
 - 1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.

- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- F. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
 - 1. Owner may engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
 - 2. Testing agency will perform appropriate tests for the following characteristics as required by Owner:
 - 3. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces.

3.7 EXTERIOR PAINT SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
 1. Full-Gloss Alkyd-Enamel Finish: Two finish coats over a rust-inhibitive primer.
 - a. Primer: Exterior ferrous-metal primer.
 - b. Finish Coats: Exterior full-gloss alkyd enamel.

END OF SECTION 09912

SECTION 09992 - PAINTING EXISTING PAINTED SURFACES

PART 1 - GENERAL

1.1 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. Related Sections
 - 1. Division 9 painting Section "Painting" for use of modern (conventional) paint materials and application methods.

1.2 SUMMARY

- A. Work in this section includes painting of existing historical components including monumental wood windows, other historical wood doors and sidelights, and metal windows. This Section includes the following:
 - 1. Cleaning and paint removal for exterior surfaces as specified in this section and as specified in lead abatement by the painting contractor.
 - 2. Surface preparation for painting of exterior surfaces.
 - 3. Components include:
 - a. Metal ladders

1.3 PROJECT CONDITIONS

- A. All work under this section shall be sheltered within tarped environment protected from the weather.
 - 1. Protection of the finished roofing and roofing components is required. Chemical wash across roofing surfaces shall be avoided to prevent damage.
- B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).
- C. Do not apply paint in rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 PAINT CLEANING AND REMOVAL MATERIALS

- A. Biodegradable Paint Remover: Manufacturer's standard biodegradable formulation for removing paint coatings from masonry, stone, wood, plaster, and metal.

1. Available Products:

- a. Soy-Gel Professional Paint Stripper
- b. Back to Nature Products Company; Multi-Strip.
- c. Back to Nature Products Company; Ready-Strip.

- B. Metal Paint Stripper: Paint stripper specifically designed to remove coatings from metal surfaces and recommended for use for applications indicated.

1. Available Products:

- a. Dumond Chemicals, Inc.; Peel Away ST1.
- b. ProSoCo, Inc.; Sure-Klean T1375.

- C. Contractor's Option - Mineral-Powder-Based Paint Removal System: Cleaning and coating removal system for removing coating from masonry, stone, concrete and metals with compressed air to scour coating without damaging substrate.

1. Available Products:

- a. ArmaKleen Company (The); ARMEX Cleaning and Coating Removal System.
- b. JOS-Quintek Corporation; Rotec Vortex Cleaning Process.

2.3 FINISH COATINGS

- A. Refer to Division 9 Section "Painting" for primers and finish coats.

2.4 MISCELLANEOUS MATERIALS

- A. Detergent Cleaning Solution: Mix **2 cups (0.5 L)** of tetrasodium polyphosphate, **1/2 cup (125 mL)** of laundry detergent, **5 quarts (5 L)** of 5 percent sodium hypochlorite bleach, and **15 quarts (15 L)** of warm water for each **5 gal. (20 L)** of solution required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements.
 - 1. Comply with manufacturer's requirements for inspection.
 - 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
 - 3. Apply paint only after unsatisfactory conditions have been corrected.
- B. Notify Architect a minimum of one working day prior to painting about possible problems resulting from using the specified materials over previously finished substrates.
- C. Coordination of Work: Review other sections in which primers are specified to ensure compatibility for the total system with various substrates.

3.2 SURFACE PREPARATION, GENERAL REQUIREMENTS

- A. Prepare existing surfaces as follows:
 - 1. Clean existing surfaces to remove loose dirt and dust.
 - 2. Remove surface films that will prevent proper adhesion.
 - 3. Treat metal paint finishes with gloss sheen to dull the surface with de-glosser.
 - 4. Remove loose, blistered, or otherwise defective paint; smooth edges with sandpaper.
 - 5. Clean corroded iron or steel surfaces to bright metal.
 - 6. Spackle and sand gypsum and plaster surfaces.
 - 7. Prime bare surfaces.
- B. If existing surfaces cannot be prepared to an acceptable condition for proper finishing by using specified surface-preparation methods, notify Architect in writing.
- C. Clean and prepare surfaces to be painted according to surface-preparation schedule at the end of Part 3 and with manufacturer's written instructions for each substrate condition.
 - 1. Provide barrier coats over incompatible previously painted surfaces or primers or remove coats and prime prepared surfaces. Notify Architect in writing about possible problems resulting from using the specified finish-coat material over substrates previously finished.
- D. Deteriorated Paint: The following classifications of deteriorated paint films shall be used to determine the degree of surface preparation required. Measure adhesion by ASTM D 3359 Method A, tape test (multiply results by 2 to correlate with the 0 to 10 rating system).
 - 1. Sound Existing Paint, Including Tightly Adhered Paint Film: No evidence of cracking, checking, blistering, or lack of adhesion; slight chalking and mildew may be present.
 - a. Adhesion: Rating of 10.
 - b. Wash areas to be repainted; use mild detergent solution, and rinse with clean water until all detergent has been removed.

- c. Remove dirt and chalking from the surface without damaging the substrates or adjacent areas.
 - d. Allow washed areas to dry before painting.
 - 2. Slightly to Moderately Deteriorated Paint Including Cracked or Loose Paint Film: Moderate cracking, checking, blistering, erosion, and loss of adhesion.
 - a. Adhesion: Rating of 6 to 8.
 - b. Treat areas as specified for sound existing paint above.
 - c. After washing, carefully examine surface for cracking, blistering, peeling, or flaking paint.
 - d. Remove cracked, blistered, and nonadhering paint.
 - e. Scrape and sand edges smooth so that edges will not telegraph through new paint finish.
 - f. Wipe surface clean to remove remaining dust.
 - 3. Severely Deteriorated Paint Including Extensive Cracked and Loose Paint Film: Considerable cracking, checking, blistering, erosion, loss of adhesion, and severe chalking or mildew.
 - a. Adhesion: Rating of 0 to 4.
 - b. Remove old paint film down to bare substrate by using hand-tool removal, scraping and sanding, chemical removal, or a combination of all three methods.
- E. Selection of surface-preparation tools and methods shall be the responsibility of painting restoration specialist, provided surface preparation complies with requirements specified for type of existing surface condition. Comply with the following general requirements for equipment:
- 1. Do not use power tools including sanders, grinders, and power brushing tools.
 - 2. Heat gun (flameless) with temperature range of 700 to 1000 deg F (389 to 555 deg C) maximum temperature may be used.

3.3 SURFACE-PREPARATION METHODS

- A. General: Use the cleaning methods specified in this article, using the gentlest appropriate method necessary to clean the surface.
- B. Wash surfaces by hand cleaning using clean rags, sponges, water, and detergent.
- C. Hand-Tool Cleaning: Use wet sanding and wet scraping methods only. Lightly mist substrate before sanding or scraping. Acceptable hand-tools include scrapers, wire brushes, sandpaper, steel wool, nonmetallic pads, and dusters. Because of varying substrates, selection of tools shall be the responsibility of Contractor. After hand-cleaning is attempted, power tool cleaning may be required to complete cleaning and surface preparation.
- D. Solvent Cleaning: Solvent cleaning may be used to remove oil, grease, smoke, tar, and asphalt from painted or unpainted surfaces before preparation work begins. In addition, if necessary, spot-solvent cleaning may be employed just prior to the commencement of paint application,

provided enough time is allowed for complete evaporation. Clean solvent and clean rags shall be used for the final wash to ensure that all foreign materials have been removed.

- E. Power Tool Cleaning: Do not use power-operated cleaning equipment without Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging historic surfaces. Quality-control program shall include provisions for supervising performance. Power tool equipment shall be used with vacuum filter attachments. The substrate to be cleaned and its existing condition will dictate the specific tools to be employed. Contractor shall select and use a combination of tools appropriate to the substrate.

3.4 PAINT REMOVAL METHODS.

- A. Removal Methods, General: Where cleaning methods have been attempted and further removal of the paint is required because of incompatible or unsatisfactory surfaces for repainting, use paint removal methods specified in this Article. Completely remove paint film from those items indicated or specified to have existing paint completely removed.
- B. Chemical Removal: Chemical removal systems may be employed to remove parts or complete coatings of paint. Spread the remover over the surface from which coatings are to be removed. Remove the softened paint with a scraper (broad knife) or similar tool that painting restoration specialist may select. Repeat the procedure until all paint and residue are removed as directed by manufacturer's written instructions. Rinse and neutralize as required by remover manufacturer. Allow enough time to elapse to permit the surface to dry before proceeding with refinishing.
- C. Heat Removal: Use and selection of heat removal equipment shall be the responsibility of painting restoration specialist. Care must be taken to protect flammable materials. When a heat device is used, one hand shall direct the heat device to the surface and the other hand shall follow behind with the scraper. Scrape the paint off while it is soft and bubbling. Fire-fighting equipment shall be located directly at hand during this process. All burned-off surfaces shall be wet sanded and cleaned before coatings are applied.
- D. Mechanical Removal: Use and selection of mechanical removal equipment shall be the responsibility of painting restoration specialist. Use of hand or power paint removal tools shall be the option of Contractor. Acceptable tools for manual paint removal include scrapers, wire brushes, sandpaper, and steel wool.
- E. Contractor's Option - Mineral-Powder-Based Removal System: Remove existing deteriorated paint film with air-blasting, mineral-powder-based system according to manufacturer's written instructions.

3.5 SURFACE PREPARATION FOR EXISTING PAINTED METAL

- A. Metal Solvent Cleaning: Clean with solvents to remove oil, grease, and other contaminants before other cleaning treatments are used. Do not use solvents, including primer thinner and turpentine, that leave residue.

- B. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces; remove rust, oil, grease, dirt, and other foreign substances. Use removal or cleaning methods that comply with paint manufacturer's written recommendations.
 - 1. Touch up bare areas and prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as shop coat.
- C. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents until surfaces are free of oil and surface contaminants.
- D. Metal Conditioner (Apply to Bare Metal): Apply phosphoric acid-based, etching-type surface treatments after solvent cleaning and according to manufacturers' written instructions. Rinse with clear water when reaction is complete. Allow at least 15 to 30 minutes but not less time than recommended by manufacturer for metal conditioner to condition the metal surface. Do not allow conditioner to dry before rinsing. If white rust (zinc oxide) appears after drying, wash clean with denatured alcohol immediately before priming.
- E. Surface-Preparation Methods: Remove loose rust and mill scale, spatter, slag, and flux deposits. Prepare surfaces as follows:
 - 1. SSPC-SP 3, "Power Tool Cleaning."
- F. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate to provide a dry film thickness of not less than 1.5 mils (0.03 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of paint to inaccessible or concealed surfaces.

3.6 APPLICATION, GENERAL

- A. Comply with manufacturers' requirements for application methods and with other Division 9 painting Sections.

3.7 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.8 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.9 PAINT REMOVAL SCHEDULE

- A. General: Prepare existing surfaces according to requirements for paint removal specified in this Schedule, which include descriptions of existing surface conditions before restoration painting begins.
- B. Paint Removal Class PR-1:
 1. Description: Existing paint film in good condition and tightly adhered.
 2. Paint Removal: Paint removal not required.
- C. Paint Removal Class PR-2:
 1. Description: Paint film cracked or broken but adhered.
 2. Paint Removal: Scrape by hand-tool cleaning methods to remove all loose paint film until only tightly adhered film remains.
- D. Paint Removal Class PR-4:
 1. Description: Painted surface indicated to have paint completely removed as part of Lead Paint Abatement.

3.10 SURFACE-PREPARATION SCHEDULE

- A. General: Prepare existing surfaces according to applicable requirements specified in this Schedule, which include descriptions of existing surface conditions before restoration painting begins.
- B. Surface-Preparation Class SP-1:
 1. Description: Existing paint film in good condition and tightly adhered.
 2. Surface Preparation: Detergent wash with specified cleaning methods. Roughen or degloss existing paint surfaces to ensure adhesion.
- C. Surface-Preparation Class SP-2:
 1. Description: Paint film cracked or broken but adhered.
 2. Surface Preparation: Following removal methods, detergent wash. Prepare bare cleaned surfaces to be repainted according to specified surface-preparation methods for substrate construction materials.

END OF SECTION 09992