PROJECT MANUAL

for

POUDRE SCHOOL DISTRICT

LAUREL ELEMENTARY SCHOOL

RECOATING OF SPF ROOFING SYSTEM

FORT COLLINS, COLORADO

WJE No. 2020.7098

100% For Construction
April 20, 2021

Architect/Engineer
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PROJECT DIRECTORY

PROJECT: Laurel Elementary School
Recoat of Existing Roofing System

LOCATION: 1000 Locust Street
Fort Collins, Colorado

OWNER's REPRESENTATIVE: Poudre School District
2413 Laporte Avenue
Fort Collins, Colorado

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LIST OF DRAWINGS

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A002	General Notes
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A501	Roofing Details
A502	Roofing Details

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SECTION 01 01 00

SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK INCLUDED IN PROJECT

A. *Roof System Recoat.* At all roof areas indicated in the Drawings: furnish labor, materials, services, and equipment necessary for recoating of existing roofing system and installation of sheet metal flashings as shown in the Drawings.

B. *Existing SPF Roof System Repair.* At all roof areas indicated in the Drawings: furnish labor, materials, services, and equipment necessary for repair and/or replacement for portions of the existing roofing system prior to application of the new coating. It is the Contractor's responsibility to verify the presence of moisture within the existing roofing system and properly remove and repair defective areas prior to the application of the new urethane coating.

C. *Existing Sheet Metal Parapet Coping.* At all perimeter parapet wall locations indicated in the Drawings: furnish labor, materials, services, and equipment necessary for the installation of new 3-coursing at the existing parapet wall to sheet metal coping transitions.

D. *Existing Sheet Metal Counter flashings at Existing Monitors.* Furnish labor, materials, services, and equipment necessary for the installation of new three-coursing along the termination of the new urethane coating system at the base of the existing monitors. In addition, the installation of new 24 Ga. prefinished counter flashing engaged with the existing closure metal. All work to occur at locations indicated in the Drawings.

E. *Existing Utility Line.* Provide temporary support for existing utility lines throughout duration of work. Furnish labor, materials, services, and equipment necessary for the installation of new adjustable supports. Paint existing gas line safety yellow.

F. *Roof Area Divider Curb.* Furnish labor, materials, services, and equipment necessary for the installation of new 24 ga. prefinished sheet metal coping along the existing roof area divider curb (color approved by Owner) at locations indicated in the Drawings.

G. ***Alternate No. 1.*** Furnish labor, materials, services, and equipment necessary for the removal of the existing sheet metal parapet copings and installation of new 24 ga. prefinished sheet metal copings to match existing profile and color (approved by Owner). Provide double s-lock joint covers at coping seams. Provide 22 ga. continuous cleat at outside face of wall, attached at 8-inches on-center with masonry anchors.

H. ***Alternate No. 2.*** Furnish labor, materials, services, and equipment necessary for the removal of the existing SPF roofing along the existing roof area divider curb. If existing roof area divider curb is an expansion joint, install new Johns Mansville Expand-O-Flashing at locations indicated in the Drawings.

1.2 CONTRACTOR'S DUTIES:

A. Except as specifically noted, provide and pay for:
   1. Labor, materials, and equipment.

2. Tools, construction equipment, and machinery.
3. Water, heat, and utilities required for construction.
4. Other facilities and services necessary for proper execution and completion of Work.

B. Pay legally required sales, consumer, and use taxes.

C. Secure and pay for, as necessary for proper execution and completion of Work:
1. Permits
2. Government fees
3. Licenses

D. Give required notices

E. Comply with codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities that bear on performance of Work.

F. Promptly submit written notice to Architect/Engineer of observed variance of Contract Documents from legal requirements. It is not Contractor's responsibility to make certain that drawings and specifications comply with codes and regulations.
1. Propose appropriate modifications to Contract Documents for necessary changes.
2. Assume responsibility for Work known to be contrary to such requirements, without notice.

G. Enforce strict discipline and good order among employees. Do not employ on Work:
1. Unfit persons.
2. Persons not skilled in assigned task.

H. The Contractor shall provide for the safe and secure storage of scaffold equipment, manlifts, or other working platforms at the site. At least two persons responsible for the security of the lines and cables shall be accessible by telephone 24 hours a day. The name and telephone number of these persons shall be given to the Owner’s Agent at the start of the Project.

I. Conditions of Work:
1. The building will remain in operation through the duration of the project. All Work must be conducted to minimize inconvenience and disruption to occupants and the public, and to maintain at least the pre-existing level of water-tightness of the exterior at all times.

1.3 CONTRACTS

A. Project will be constructed under a single contract under the direction of a single designated Contractor.

B. The Owner reserves the right to award other contracts for additional Work in connection with this Project as required.

C. There shall be complete cooperation between Contractor and Subcontractors to ensure satisfactory progress and performance of the Work.

1.4 CONTRACTORS USE OF PREMISES

A. Contractor shall limit use of the premises for Work and for storage so as not to impede normal operation of the building. Storage space will be available as indicated by Owner’s Agent.

B. Coordinate use of premises, including elevators, under direction of the Owner’s Agent.

C. Assume full responsibility for the protection and safekeeping of products under this Work, which are stored on the site.

D. Contractor shall be responsible for tools or equipment left by Contractor or for tools or equipment not stored in an appropriate location or manner by the Contractor.

E. Special access provisions may be required as directed by the Owner's Agent.

1.5 QUALITY ASSURANCE

A. Contractor is solely responsible for conformance of the Work to the Contract Documents. Review and testing by the Architect/Engineer or Owner's Testing Agency in no way relieves the Contractor of sole responsibility for the Work and for maintaining a Quality Assurance Program.

B. Contractor shall keep at the project site, during the period when work is being performed, a competent superintendent/working foreman satisfactory to the Owner. Refer to Section 01 20 00 - Project Meetings for further requirements.

C. The approved superintendent/working foreman shall not be removed from the project without cause or upon prior notification of the Owner. If removal is for cause, Contractor shall submit justification in writing within 24 hours of the removal. All work will cease until a new superintendent/working foreman is on site at no additional cost to the Owner.

D. All work is to be performed by skilled workmen who are thoroughly trained, qualified and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the Work.

E. Work is to be done in strict accordance with the Drawings, Specifications and other Contract Documents. Any deviation from same will be at the discretion of the Owner and will be authorized in writing.

F. The Contractor shall exercise caution in performing the work so as not to damage adjacent building elements. It shall be the Contractor's responsibility to protect the adjacent building elements from mechanical damage due to scaffolding and other equipment.

G. If adjacent elements are damaged due to Contractor's negligence during the execution of the work, the Contractor shall be responsible for repairing or replacing the damaged items at no additional cost to the Owner.

H. If in the opinion of the Contractor or any subcontractor, any Work is indicated on Drawings or is specified in such manner as will make it impossible to produce Work of a first-class quality, or should discrepancies appear between any of the various Contract Documents, the Contractor, or the Subcontractor through the Contractor, shall refer this matter to the Architect/Engineer for interpretation before proceeding with Work. If the Contractor or Subcontractor fails to make such reference, no excuse will thereafter be considered for failure to carry out Work in a satisfactory manner. In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect/Engineer's interpretation.

1.6 SCAFFOLDING AND CANOPY PROTECTION

A. Contractor shall be responsible for providing all scaffolding and necessary canopy protection as required for the proper execution of the work specified herein.

B. All scaffolding and safety equipment and their operation must comply with applicable requirements of all laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction over this work. The most stringent requirements shall apply.

C. Protect the building components from mechanical damage due to scaffolding and related equipment.

1.7 SCHEDULE OF WORK

A. The work shall be performed in accordance with the designated schedule. The time of day or night that on-site work activity may be performed shall be per the Poudre School District's requirements in effect at the time the Work is performed.
   1. Current City of Fort Collins noise limits allow construction work to be performed without restriction between 8:00 AM and 6:00 PM 7 days a week and work that does not exceed 80 decibels may be performed between 6:00 PM and 8:00 PM 7 days a week.

B. In no instances will the time that the work is performed be grounds for additional compensation or additional time.

C. In no instances will weather conditions be grounds for additional compensation or additional time.
   1. If snow removal is required to maintain schedule, this Work shall be performed by the Contractor at no additional cost to the Owner

D. Costs caused by ill-timed or defective work, or work not conforming to the contract documents, are the responsibility of the Contractor.

E. The Owner's Agent may designate certain operations as "audible noise" with associated working hour restrictions. Such requirements will be determined by the Owner's Agent at the pre-construction conference.

F. The Owner's Agent may designate certain construction activities as "odor-causing" or "particulate-generating" with associated working hour restrictions. Such requirements will be determined by the Owner's Agent at the pre-construction conference.

1.8 FIELD MEASUREMENTS

A. Verify the accuracy of elevations, dimensions, locations, and site conditions relating to existing or other work. Errors due to failure to verify such information shall be promptly rectified without additional cost to the Owner.

1.9 REFERENCED STANDARDS, BUILDING CODES AND OTHER APPLICABLE CODE PUBLICATION DATES

A. All referenced documents shall comply with the most current version as of the date of the Construction Contract (Agreement between the Owner and Contractor) or the date of permit (if applicable), whichever is later.

1.10 HAZARDOUS MATERIALS

A. If the Contractor encounters, or reasonably suspects that it has encountered, hazardous materials in the project, the Contractor shall cease activity on the project and promptly notify the Owner's Agent. The Owner's Agent shall initiate the action, where appropriate, to identify and investigate the nature and extent of hazardous materials in the project and to abate and/or remove the same as may be required by federal, state or local statute, ordinance, code, rule, or regulation now existing or hereinafter enacted or amended. Unless otherwise specially provided in writing, the services to be provided by the Contractor and Architect/Engineer do not include identification of hazardous materials and neither the Contractor nor the Architect/Engineer have any duty to identify or attempt to identify the same within the area of the project.

B. "Hazardous materials" includes, but is not limited to, any substance, waste pollutant (including mold and mildew) or contaminant, in whatever form, now or hereinafter included with such terms under any federal, state or local statute, ordinance, code, rule or regulation existing during the course of the project.

END OF SECTION

SECTION 01 20 00

PROJECT MEETINGS

PART 1 - GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. Schedule and Location: 28 days prior to Start of Construction at the project site.

B. Attendance: Contractor's site superintendent, Architect/Engineer, and Owner's Representative.

C. Agenda to Include:
1. Discuss tentative construction schedule and availability of materials
2. Critical work sequencing
3. Submittal of product data and samples, and specified products list
4. Procedures for maintaining record documents, including Daily Log of the Work
5. Use of site for office and storage areas
6. Site use, access, staging, and set-up location limitations
7. Safety and first-aid procedures
8. Designation of personnel responsible for safe storage of scaffolding
9. Security procedures
10. Housekeeping procedures
11. Working hours, work days
12. Forecast weather conditions
13. Utilities
14. Surface preparation and substrate condition and pretreatment
15. Installation procedures
16. Testing and inspection requirements
17. Coordination of observations by Architect/Engineer
18. Plan for sidewalk protection

D. The Contractor shall submit the Construction Schedule to the Architect/Engineer and the Owner's Representative at this meeting. The Contractor shall describe in detail when each portion of the work is to be accomplished.

E. Content of the Construction Schedule:
1. Provide a complete sequence of the construction by activity.
2. Identify the work of separate areas, or separate phases, or other logically grouped activities.
3. Show the projected percentage of completion for each item of work as of the first day of each week.

1.2 PROGRESS MEETINGS

A. Conduct progress meetings at a regularly scheduled day and time each week at the project site.

A. Agenda: Review extent of Work completed; Work projected to occur over subsequent 2 weeks; site access, cleanliness, and management; unforeseen condition; and other pertinent and timely issues that may affect implementation of the Work in accordance with the Construction Documents and Scheduled Completion Date.

B. Attendance: Contractor's site superintendent, Subcontractors, Architect/Engineer, and Owner's Representative as pertinent to agenda.

1.3 JOB SITE ADMINISTRATION

A. The Contractor shall have a project superintendent/working foreman at the site, a minimum of 6 hours per day (excluding project meeting time) each day during the progress of the Work.

B. The Architect/Engineer will have a representative at the site periodically during the progress of the Work.

C. The Owner's Representative will be available during the progress of the Work that may be reached between 8:00 a.m. and 5:00 p.m., Monday through Friday.

D. The Contractor shall provide at least two emergency contact numbers for the 24-hour use of the Owner's Representative.

END OF SECTION

SECTION 01 30 00

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Administrative and procedural instructions for submittals required for performance of the Work.

1.2 SUBMITTAL REQUIREMENTS

A. Contractor Responsibilities:
   1. Review product data and samples prior to submission.
   2. Verify field measurements, field construction criteria, catalog numbers, and similar data.
   3. Coordinate each submittal with the requirements of the Work and of the Contract Documents.
   4. The Contractor's responsibility for errors and omissions in submittals is not relieved by the Architect/Engineer's review of submittals.
   5. The Contractor's responsibility for deviations in submittals from requirements of the Contract Documents is not relieved by the Architect/Engineer's review of submittals, unless the Architect/Engineer gives written acceptance of specific deviations. The Contractor shall notify the Architect/Engineer of all such deviations in writing on the submittals at the time of submission.
   6. Begin no work that involves submittals until the return of submittals with the Architect/Engineer's stamp and initials or signature indicating review.
   7. After the Architect/Engineer's review, distribute copies as directed.

B. Submissions shall be scheduled at least 14 days before dates when reviewed acceptable and complete, submittals will be needed. If submittals are not acceptable or not complete a longer review period will be required.

C. The Contractor shall submit either an electronic document in PDF format or hard copies of paper-based submittals. If hard copies are used, submit the number of copies of product data required to be returned, plus two copy that will be retained by the Architect/Engineer and Owner’s Representative.

D. The Contactor shall submit physical samples and not photographs or representations. The number, size, and other requirements for samples shall be as required by each specification section.

E. Accompany submittals with transmittal letter, containing:
   1. Date
   2. Project title and number
   3. Contractor's name and address
   4. The format (PDF or hard copy) and number of each product data and sample submitted
   5. Notification of deviations from Contract
   6. Other pertinent data

F. The Architect/Engineer will check and review, with reasonable promptness, all submitted documents and samples only for conformance with the design concept of the project and with the

information given in the Contract Documents. Revised copies will be returned to the Contractor and any further distribution required will be the responsibility of the Contractor. Review of separate item(s) does not constitute review of an assembly in which the item functions. Conformance to all requirements of the Contract Documents remains the responsibility of the Contractor.

G. Samples shall be sufficient size to show general visual effect. When samples must show range of color, texture, finish, graining, or other properties, submit in sets of three showing the full scope of this range. Each sample shall bear identifying labels stating project name, material, manufacturer, and location on project. Each sample or set of samples shall be accompanied by a transmittal.

H. Samples will be reviewed and the Contractor notified in writing if the sample conforms to the design concept and requirements of the Contract Documents.

I. Samples will be retained by the Architect/Engineer and will serve as the standard by which all material delivered to the job will be judged.

J. Submittals shall include:
   1. Date and revision dates
   2. Project title and number
   3. Names of:
      a. Architect/Engineer
      b. Contractor or Subcontractor, as applicable
      c. Supplier
      d. Manufacturer
      e. Separate detailer, when pertinent.
   4. Identification of product or material.
   5. Relation to adjacent structure or material.
   6. Field dimensions, clearly identified as such.
   7. Specification Section and page number.
   8. Applicable Standards, such as ASTM number.
   9. A blank space 3-in. x 3 in., for Architect/Engineer's stamp.
   10. Identification of deviation(s) from Contract Documents.
   11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract.

K. Submittals received by the Architect/Engineer which do not bear the Contractor’s stamp of approval or contain numerous errors indicating a superficial check on the part of the Contractor will be returned without review.

1.3 RESUBMISSION REQUIREMENTS

A. Submit new product data and samples as required for initial submittal.

B. Make all resubmittals so as not to delay Work. No extension of contract will be allowed for delays due to improper submittals.

1.4 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

A. Distribute copies of product data which carry Architect/Engineer's stamp to:
   1. Contractor's file

2. Job site file
3. Record documents file

B. Distribute samples as directed in accordance with Contract Documents.

END OF SECTION

SECTION 01 43 00

MOCKUPS

PART 1 - GENERAL

1.1 SUMMARY

A. The first type of each unique installation will be considered a mockup. Location of mockups shall be coordinated between Contractor and Architect/Engineer. The purpose of these individual mockups is to provide the Contractor, Owner's Representative and Architect/Engineer with a unified understanding of the type, quality, and finished appearance of Work that will satisfy the requirements of the Project.

B. All Work must be performed with tools similar to those that will be used on the remainder of the Project.

C. If in the course of erecting and reviewing the mock-up, changes are required to satisfy the Project requirements or existing conditions, such changes shall be observed and documented by Architect/Engineer. Such documented changes will be additional technical requirements of the Project.

D. When completed and approved by the Architect/Engineer and Owner's Representative, the mock-ups shall become the standard of quality for the remainder of the Project. All concealed portions of the mock-ups may be inspected by the Architect/Engineer and, if approved, photographed for future reference. The completed mockup areas may become part of the finished repair of the building.

E. Coating Mock-up: Contractor shall prepare surface and apply coating system to representative locations designated by Architect/Engineer to demonstrate aesthetic affects and quality of materials and execution. Leave portion of prepared surface and each coating layer exposed to view.
   1. Coating manufacturer's representative shall observe mock-up and approve in writing surface preparation and coating application.
   2. Architect/Engineer may perform field adhesion tests (with the assistance of the manufacturer) of coatings as part of acceptance.
   3. If Architect/Engineer determines mock-up does not comply with requirements, modify mock-up or construct new mock-up until mock-up is approved. Do not proceed with work until mock-up is approved.
   4. Approved mock-up will be acceptance of standard for remainder of work.
   5. Approved mock-up may become part of completed work if undisturbed at time of substantial completion.

1.2 QUALITY ASSURANCE

A. All portions of each section of the specifications are to be followed for each item or procedure utilized in the construction of the mockups.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Requirements for installation, maintenance, and removal of temporary utilities, facilities, controls, and construction aids needed for the Work, as well as cleaning requirements.
   2. Preconstruction Condition Survey of project site and adjacent areas affected by the Work to document pre-existing damage. Submit documentation of pre-existing damage, if any, to Architect/Engineer and Owner's Representative prior to commencing Work.

1.2 QUALITY ASSURANCE

A. Comply with applicable federal, state, and local laws, regulations and ordinances.

B. Conduct periodic inspections to ensure that construction facilities and temporary controls conform to pertinent requirements.

C. Do not allow accumulation of waste, debris, construction water, rubbish, etc. that can create hazardous conditions.

D. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

1.3 PROJECT SITE CONDITIONS

A. Fire Protection:
   1. Regulations: Comply with applicable federal, state, and local laws, regulations and ordinances.
   2. Fires: Do not permit lighting of fires about premises. Use due diligence to see that such prohibition is enforced. Promptly remove debris and waste materials from construction site to prevent accumulation of combustibles on site or within the work area.
   3. Smoking: Restrict smoking to designated smoking break areas. Furnish and post "NO SMOKING" signs at appropriate locations throughout job site where operations are conducted.
   4. Flammables: Store gasoline and other fuels in safety cans meeting OSHA, NFPA, and Factory Mutual standards. Store flammables away from hazardous work areas.

B. Security
   1. The Contractor shall provide for the security of materials and equipment stored at the site.

C. Limit of Contractor's Operations:
   1. Work Areas: Confine work areas to limits of construction areas. General schedule of operations and use project site shall be subject to approval of the Owner Representative or Architect/Engineer.

2. Access: Uncontrolled or unrestricted access for materials, debris or equipment will not be permitted. Control access routes and methods so as to minimize disruption of Owner's operations. Access to the Work shall be from the exterior.
3. Cooperate with the Owner's Representative in the scheduling and execution of the Work and use of the site. Notify and obtain authorization prior to commencement of any work which would interfere with normal occupant use of the building and site.
4. Parking: No parking will be allowed that blocks vehicular or pedestrian access to the building unless the Owner's Representative grants permission. Short term parking for unloading will be allowed if driver remains present. Contractor shall park in area designated in the Drawings or as otherwise approved by the Owner's Representative.

PART 2 PRODUCTS

2.1 UTILITIES

A. Electric Power:
1. The Contractor may use building's exterior power outlets at existing locations and capacities. Supplemental power, if necessary, shall be provided by the Contractor.
2. All supplemental equipment and wiring for power shall be in accordance with the applicable provisions of the governing codes. All temporary wiring shall be maintained in a safe manner and utilized so as not to constitute a hazard to persons or property.
3. If parts of the permanent electrical systems are to be used, the Contractor must: (1) obtain approval of the Owner's Representative; (2) assume full responsibility for systems used, including cleaning and restoration, and (3) remove all temporary facilities upon completion.
4. All electrical cords used by Contractor shall contain ground fault circuit interrupters.

B. Water:
1. The Contractor may use the building's exterior hose bibs for water at existing locations and capacities. The Contractor shall provide whatever temporary valves, fittings, and lines as necessary to distribute water.
2. If parts of the permanent water systems are to be used, the Contractor must: (1) obtain approval of the Owner's Representative; (2) assume full responsibility for systems used, including cleaning and restoration, and (3) remove all temporary facilities upon completion.

2.2 MECHANICAL, ELECTRICAL, AND PLUMBING

A. Provide temporary heating, cooling, ventilating, lighting, fire protection, and plumbing as required for proper execution of the Work.

2.3 SANITARY FACILITIES

A. Contractor shall provide temporary bathroom facilities outside the building where designated by the Owner's Representative. Maintain facilities in a sanitary condition at all times.

2.4 STORAGE AND STAGING AREAS

A. Owner will allocate limited space on property for storage of materials and equipment.

B. Locate construction equipment, material storage and temporary facilities within the permitted areas.

C. When storing materials, do not exceed live load capacity of supporting framing.

2.5 ENCLOSURES

A. Provide and maintain for duration of the Work all scaffolds, tarpaulins, dust and debris enclosures, canopies, warning signs, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

B. Maintain open or relocate public sidewalks in a condition accessible to foot traffic and in conformance with applicable codes and ordinances.

C. Provide protective overhead canopies as required by authorities having jurisdiction, when work is occurring overhead or adjacent to those areas. Provide overhead protection in compliance with applicable codes and ordinances with respect to installation and maintenance of sidewalk protection and public safety. Overhead canopies shall include, at a minimum, a 4-ft high protective screen fence along the outside edge of the top of the canopy to prevent debris from bouncing off of the top of the canopy. Canopies shall be constructed of standard heavy-duty pipe scaffolding members. All elements of the canopy shall be secured to prevent damage or uplift during high wind conditions.

D. The Contractor shall be fully responsible for any and all injuries and property damage that occurs due to objects or debris falling from the building or elevated work platforms during the entire course of the project.

E. Maintain means of egress required by governing building codes for continual use of affected buildings.

F. Construction Warning Signs: Provide and maintain suitable signs and barricades to warn public and building occupants of Work in progress.

2.6 SCAFFOLDS AND LADDERS

A. Scaffolds and Ladders: Furnish, erect, maintain, and move scaffolds and ladders required for the Work. Construct and maintain scaffolds in accordance with applicable federal, state, and local laws, regulations and ordinances.

2.7 CLEANING MATERIALS

A. Limit materials and equipment to those that are compatible with surfaces being cleaned.

B. Limit materials and equipment to those that are approved by manufacturer of material to be cleaned.

C. Verify compatibility of cleaning materials at a small area prior to widespread use.

2.8 PROJECT SIGNS

A. Signs, bills, posters and other advertisements for any goods, services, or organizations will not be allowed on or about the site, unless specifically approved by the Owner’s Representative in writing.

PART 3 EXECUTION

3.1 GENERAL

A. Maintain temporary facilities and controls as long as necessary for safe and proper completion of the Work.

B. Maintain drains and sewers clean and free of construction debris during all phases of Work.

C. Remove temporary facilities and controls as rapidly as progress of the Work will safely permit.

3.2 PROTECTION

A. Site Security: Provide daily inspection of project site and adjacent building areas while the Work is in progress and take necessary measures to secure these areas from theft, vandalism, and unlawful entry related to Contractor's activities on site.

B. Provide protection barricades, fencing, etc., required by applicable federal, state, and local laws, regulations and ordinances.

C. Protect building components, walks, drives, parking areas, vehicles, utilities, fire protection systems, landscaping, automatic sprinklers, and property, etc. adjacent to Work areas from damage. Remediate damage to above items as Work progresses in a manner satisfactory to Owner and at no cost to Owner.

D. The Contractor shall provide temporary first-aid facilities on the site.

E. The Contractor shall post emergency first aid, ambulance and fire department information at the Project site in an unobstructed location.

3.3 HAZARD, NOISE, DUST, ODOR AND VAPOR CONTROL

A. Hazards Control:
   1. Store propane, fuel oil, kerosene and other volatile or flammable materials or waste in covered metal containers and at locations as required by Federal, state, county and city legal requirements, and as approved by the Owner’s Representative.
   2. Prevent the accumulation of wastes that create hazardous conditions.
   3. Provide adequate ventilation during the use of volatile or noxious substances.

B. Noise control: The Contractor shall confine its hours of operations to those required by state, county, and city laws and ordinances. Noise levels shall be held to a minimum considering the nature of the work.

C. Dust control: The Contractor shall take the necessary steps to keep dust within the levels established by the city and the Environmental Protection Agency.

D. Odor control: Take necessary precautions to prevent offensive odors related to primers, coatings, and other construction materials from entering the office space.

E. Vapor control: The Contractor shall restrict use of and vent all objectionable or noxious vapors produced during the work such that normal building operations are not disrupted. The Contractor shall assume full responsibility for any and all health damage claims caused by noxious vapors produced during work operations.

3.4 CLEANING

A. Remove demolition material, debris, construction water, and related rubbish on a daily basis.

B. Legally dispose of waste, debris, and rubbish at dump areas off Owner's property.

C. Properly dissipate construction water so that water does not accumulate or pond on drives, sidewalks, parking areas, or landscaped areas adjacent to or on property.

D. Maintain paved areas, including walks and parking areas in a broom-clean condition during the Work.

E. Maintain grass and landscaped areas in a rake-clean condition during the Work.

F. Do not allow items to be dropped or thrown from work areas above grade.

G. Schedule cleaning operations so that newly placed work is not damaged.

H. Remove and clean material spills as the Work progresses.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial completion and final completion procedures.
   2. Closeout submittals.
   3. Final cleaning.

1.2 SUBMITTALS

A. Punch List: List of items to be completed or corrected.

B. Product List: Provide list of all propriety products used in the Work including product name, where used, and Manufacturer's product literature, if such was not previously submitted.

C. Provide Extra Materials for items so listed in pertinent Sections of these Specifications. Deliver and place in on-site interior storage location designated by Owner's Representative.

D. Warranties:
   1. Organize warranty documents into orderly sequence based on table of contents of Project Manual.
      a. Bind warranties in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
      b. Provide heavy, paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify product or installation. Provide a typed description of product or installation, including product name and names, addresses, and telephone numbers of manufacturer and Installer.
      c. Identify each binder on the front and spine with typed or printed title "WARRANTIES," Project name, and name of Contractor.
      d. Scan warranties and assemble the complete warranty submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide a table of contents at the beginning of the document.
   2. Submit one set of binders and one scanned copy of warranty package.
   3. Provide additional copies of each warranty to include in maintenance manual.

E. Project Record Documents:
   1. Submit one set of marked-up prints. Organize Record Drawings into bound sets of prints. Revise and resubmit if Architect/Engineer determines information recorded or quality of drafting is unacceptable.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of 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: Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Return adjacent surfaces and areas to condition existing before Work began.

B. In areas disturbed by construction activities, complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or for a portion of the Project. Clean each surface or unit to the condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions. Employ experienced workers or professional cleaners.
   1. Remove tools, construction equipment, machinery, and surplus material from Site.
   2. Clean Site, yard, and grounds, including landscaped areas, of rubbish, waste materials, litter, and other foreign substances.
      a. Broom clean paved areas. Remove petrochemical spills, stains, and other foreign deposits.
      b. Rake grounds that are neither planted nor paved to smooth, even-textured surface.
   3. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of stains, films, and similar foreign substances. Polish surfaces to achieve specified finish. Avoid disturbing natural weathering of exterior surfaces.
      a. Touchup and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that show evidence of repair or restoration.
         1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
   4. Clean and restore transparent and reflective surfaces, such as mirrors and glass in doors and windows, to their original condition. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
   5. Remove labels that are not permanent.
   6. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
   7. Sweep floors broom clean. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
   8. Leave Project clean and ready for occupancy.

3.2 SUBSTANTIAL COMPLETION

A. Before requesting inspection for determining date of Substantial Completion, complete the following.
   1. Prepare punch list, value of items on list, and reasons why Work is not complete.

2. Deliver tools, spare parts, extra materials, and similar items to location designated by the Owner's Representative. Label with manufacturer's name and model number where applicable.
3. Terminate and remove temporary facilities from Site, along with construction tools and similar elements.
4. Complete final cleaning requirements, including touchup painting.
5. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Request inspection for Substantial Completion. On receipt of request, Architect/Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect/Engineer will prepare Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect/Engineer, that must be completed or corrected before certificate will be issued.
1. Request re-inspection when 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.

3.3 FINAL COMPLETION

A. Before requesting final inspection for determining final completion, complete the following:
1. Submit final Application for Payment.
2. Submit copy of Architect/Engineer's Substantial Completion inspection punch list, endorsed and dated by Architect/Engineer, with statement that items on punch list have been completed or otherwise acceptably resolved.
3. Submit executed warranties, maintenance service agreements, and similar documents.
4. Prepare and submit Project Record Documents.
5. Instruct Owner's personnel in maintenance of products installed.

B. Request final inspection. On receipt of request, Architect/Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect/Engineer will prepare final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request re-inspection when Work identified in previous inspections as incomplete is completed or corrected.

3.4 PROJECT RECORD DOCUMENTS

A. During Work, maintain one set of prints of Drawings, Specifications, and product data for recording deviations of as-built construction from design information. Include addenda and Contract modifications.
1. Accurately document and record changes and modifications as soon as possible after they occur, in understandable manner.
2. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Record and check markup before enclosing concealed installations.
3. Include:
    a. Dimensional changes.
    b. Revisions to Drawing details and details not on Drawings.
    c. Changes made by Change Order or Architect/Engineer's written orders. Note Change Order numbers or similar identification.

d. Field records for variable and concealed conditions.
e. Record information on Work that is shown only schematically or omitted from Drawings.
f. Actual products and materials used.

4. Mark record document most capable of showing actual physical conditions completely and accurately. Cross-reference on other record documents.

B. Store Record Documents and samples in field office apart from Contract Documents used for construction. Do not use Record Documents for construction purposes. Maintain Record Documents in good order and in clean, dry, legible condition, protected from deterioration and loss. Provide access to Record Documents for Architect/Engineer's reference during normal working hours.

C. Immediately before inspection for Substantial Completion, review marked-up Record Drawings with Architect/Engineer. When authorized, prepare full set of corrected drawings and submit as part of project's Final Completion process.

END OF SECTION

SECTION 07 57 00

COATED FOAMED IN-PLACE INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Spray polyurethane foam (SPF) roofing insulation.

B. Surface preparation and application of urethane coating on existing sprayed polyurethane foam insulation and polyurethane coating.

C. Localized repair of existing SPF roofing system.

1.2 DESCRIPTION

A. Existing SPF roofing system to remain in-place for application of new three-coat urethane coating consisting of; base coat, top coat and finish coat with ceramic-coated granules. Localized repair and scarification of the existing SPF roofing system is required to portions of the roof area prior to the application of the new three-coat urethane coating system. Localized replacement of the existing SPF roofing system is required at portions of the roof area prior to the application of the new three-coat urethane coating system due to the presence of moisture.

B. Work Included: Work consists of furnishing all labor, materials and equipment necessary to effectively install a new two-coat urethane coating over the existing SPF roofing system.

C. Related Work Specified Elsewhere
   1. Sheet Metal Flashing and Trim: Section 07 62 00.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install watertight, two-coat urethane coating, assembly arrangements as indicated, with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermal induced movement, and exposure to weather without failure.

B. Performance Responsibility: This is a performance specification and the Contractor shall be responsible for complete design and engineering required, provided by the coating and SPF manufacturer, to meet specified performance requirements within physical and aesthetic requirements established by the Contract Documents.

C. Contract Documents:
   1. Drawings and Specifications are an outline of criteria and performance requirements for coating and SPF and shall not be construed as engineered design. Requirements specified or indicated by details are intended to establish basic aspects of the system, dimensions of module and components, and profiles of members.
   2. Drawings and Specifications do not necessarily indicate or describe total work required for completion of Work and may not cover some conditions which may be required.
   3. The Drawings indicate profiles, details and dimensional requirements of the coated SPF roofing system by acceptable manufacturers having equivalent performance characteristics

will be considered provided deviations are minor and do not change the specified aesthetic effects or specified performance requirements as judged by the Consultant.

D. Wind Design: Provide coated SPF roofing system that withstands wind loading acting upward on the roof and is compliance with the following;
   1. Wind Speed: 150 miles per hour, Exposure 'B'.

E. Insulation Fire Performance Characteristics: Provide insulation materials whose fire performance characteristics have been determined by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.4 QUALITY CONTROL

A. Spray Polyurethane Foam Installation: Spray polyurethane foam installer shall be certified by spray foam manufacturer.
   1. Engage an installer who participates in and who has fulfilled requirements of the SPFA program for company accreditation as "SPFA PCP Accredited Company Roofing," with individual applicator certification for personnel assigned to work on Project.

B. Roof Coating Installation: Coating applicator shall be approved by specified coating manufacturer. Manufacturer's written verification of applicator approval is required.

C. Applicator Qualifications: Experienced firm that has successfully completed coating work with similar materials, design, and extent to that indicated for Project. Must have successful applications of specified materials in local area in use for minimum of five years. Employ foreman with minimum five years experience as foreman on similar projects, who is fluent in English, to be on site at all times during the Work. Do not change foreman during the course of the Project except for reasons beyond the control of the Applicator; inform Owner in advance of any changes.

D. Comply with recommendations in SPFA AY-104.

E. Pre-installation Meeting: Prior to commencement of application of spray polyurethane foam review and document methods and procedures related to installation, including the following:
   1. Participants: Authorized representatives of the Contractor, Architect/Engineer, and Applicator.
   2. Review existing construction and detailing for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
   3. Review spray polyurethane foam methods and procedures related to application, including manufacturer's installation guidelines.
   4. Review construction schedule and confirm availability of products, applicator personnel, equipment and facilities.
   5. Review governing regulatory requirements, and requirements for insurance and certificates as applicable.
   6. Review field quality control procedures.

1.5 REFERENCES

A. ASTM International (ASTM):
   1. ASTM D412 - Tests for Rubber Properties in Tension.
   2. ASTM D2240 - Standard Test Method for Rubber Property Durometer Hardness.
   3. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings.

4. ASTM D6083 - Standard Guide for Repair and Recoat of Sprayed Polyurethane Foam Roofing Systems.
5. ASTM E96 - Water Vapor Transmission of Materials.
6. ASTM E108 - Test for Fire Test of Roof Coverings.
7. ASTM D903 - Standard Test Method for Peel or Stripping of Adhesive Bonds.
8. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

B. National Roofing Contractors Association: NRCA Metal Panel and SPF Manual, 2020 edition and, "Guidelines for the Application of Roof Coatings", 2020 edition.

C. SPFA Spray Polyurethane Foam Alliance
1. SPFA-104 *Spray Polyurethane Foam Systems for New and Remedial Roofing*
2. SPFA-102 *A Guide for Selection of Elastomeric Protective Coatings, Over Sprayed Polyurethane Foam Systems*
3. AP1-1/89 *Accreditation Program Handbook and Enrollment Guide*

1.6 SUBMITTALS

A. Product Data: For each coating, manufacturer's literature including written instructions for evaluating, preparing, and treating substrate; technical data including tested physical and performance properties; mixing and application instructions; safety precautions for handling, storing, applying, and disposing of materials; and instructions for protecting surrounding areas from overspray. Include:
1. Surfaces to which materials will be applied.
2. Materials List: Inclusive list of required materials for each coating system, including crack fillers, block fillers, and primers. Cross-reference coating system and application. Identify each material by manufacturer's catalog number and general classification.
3. Coating manufacturer's color chart showing full range of colors available.
4. Material Safety Data Sheets for information only.

B. Applicator Qualifications: Evidence that Applicator's existing company has minimum five years of continuous experience in similar coating work and SPF related repair/replacement work; list of at least three representative, successfully-completed projects of similar scope and size, including:
1. Project name.
2. Owner's name.
3. Owner's Representative name, address, and telephone number.
4. Description of work.
5. Urethane coating used.
6. Project supervisor.
7. Total cost of coating work and total cost of project.
8. Completion date.

C. Sample Warranties: Copies of coating manufacturer's warranty and Contractor's warranty, both stating obligations, remedies, limitations, and exclusions. Submitted with bid.

1.7 MOCK-UP

A. Urethane Coating Mock-up: Contractor shall prepare surface and apply coating system to representative locations designated by Owner and/or manufacturer's representative to

demonstrate aesthetic affects and quality of materials and execution. Leave portion of prepared surface and each coating layer exposed to view.

1. Coating manufacturer's representative shall observe mock-up and approve in writing surface preparation and coating application.
2. Coating manufacturer's representative shall perform field adhesion tests of coatings as part of acceptance.
    a. Adhesion tests shall be performed according to ASTM D903 or ASTM D4541.
3. If Owner determines mock-up does not comply with requirements, modify mock-up or construct new mock-up until mock-up is approved. Do not proceed with work until mock-up is approved.
4. Approved mock-up will be acceptance of standard for remainder of work.
5. Approved mock-up may become part of completed work if undisturbed at time of substantial completion.

1.8 DELIVERY STORAGE AND HANDLING

A. Deliver, store, and handle materials according to manufacturer's recommendations and in such a manner as to prevent damage to materials or structure.

B. Deliver materials to Site in original containers and packaging with seals unbroken, labeled with:
1. Manufacturer's name.
2. Product brand name and type
3. Contents by volume for pigment and vehicle constituents.
4. VOC content.
5. Color name and number.
6. Date of manufacture and batch number.
7. Directions for storing, handling, mixing with other components, and application, including precautions.
8. Thinning instructions (if permitted).

C. Store materials in original, undamaged containers and, if permitted, partially-used materials in tightly-covered containers in clean, dry, well-ventilated, protected location on raised platforms with weather-protective coverings, within temperature range required by manufacturer. Protect stored materials from direct sunlight, heat, sparks, and flames.

D. Limit stored materials on structures to safe loading capacity of structure at time materials are stored, and to avoid permanent deck deflection.

E. Conspicuously mark damaged or opened containers or containers with contaminated materials, and remove from Site as soon as possible.

F. Remove and replace materials that cannot be applied within stated shelf life.

1.9 PROJECT AND ENVIRONMENTAL CONDITIONS

A. Comply with Owner's limitations and restrictions for Site use and accessibility.

B. Environmental Limitations: Apply coating when existing and forecast weather conditions permit coating to be applied according to coating manufacturer's written instructions and warranty requirements.
1. Apply only when substrate and ambient temperatures are between 50 and 90 degrees Fahrenheit, or within range recommended by coating manufacturer. Maintain minimum

substrate and ambient temperatures for at least 24 hours before and after coating application.

2. Do not apply in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above dew point; or when such conditions are imminent during the drying period. Do not apply when wind velocity is above 15 miles per hour.
3. Do not apply to damp or wet substrate.
4. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

C. Handle and apply materials in strict accordance with safety requirements required by coating manufacturer; Material Safety Data Sheets; and local, state, and federal rules and regulations. Maintain Material Safety Data Sheets with materials in storage area and available for ready reference on Site.

D. Maintain adequate ventilation during preparation and application of coating materials. Precautions shall be taken when using potent roofing materials at or near rooftop vents or air intakes. Coordinate the operation of vents and air intakes with Owner and building operations.

E. Dispose of waste foam daily in location designated by consultant and decontaminate empty drums in accordance with foam manufacturer's instructions.

F. Prepare all surfaces in accordance to manufacturer’s recommendations.

1.10 WARRANTY

A. Manufacturer’s Warranty:
1. Written warranty, signed by coating manufacturer, including:
   a. Materials to replace coating that does not comply with requirements; that fails in adhesion, cohesion, or general durability; that cracks, checks, fades, or chalks; or that deteriorates in a manner not clearly specified by submitted coating manufacturer’s data as an inherent quality of the material for the application indicated.
   b. New coating shall closely match color of existing coating. Extend new coating to reveals, surface edges, or other natural termination points to minimize differences in appearance between new and existing coating.
   c. Warranty does not include de-bonding of existing coatings from substrate or from each other.
2. Warranty Period: 10 years after Substantial Completion date.

B. Contractor’s Warranty:
1. Written warranty, signed by Contractor, including:
   a. Repair or remove and replace coating that does not comply with requirements; that fails in adhesion, cohesion, or general durability; that cracks, checks, fades or chalks; or that deteriorates in a manner not clearly specified by submitted coating manufacturer’s data as an inherent quality of the material for the application indicated.
2. New coating shall closely match color of existing coating. Extend new coating to reveals, surface edges, or other natural termination points to minimize differences in appearance between new and existing coating.
3. Warranty includes:
   a. Providing access to warranty Work.

b. Necessary surface preparation work.

4. Warranty does not include de-bonding of existing coatings from substrate or from each other.
5. Warranty Period: 3 years after Substantial Completion date.

1.11 CHANGES IN WORK

A. During the recoating work, the contractor may encounter existing conditions which are not now known or are at variance with the drawings or specifications (discovery). Such conditions may interfere with the recoating work and may consist of damage or deteriorate to the deck or surrounding materials, moisture laden roofing system components, which could jeopardize the performance and/or integrity of the roofing system.

B. The contractor shall notify the Owner of all discoveries he/she believes may interfere with proper execution of the work or jeopardize the integrity of the coating and/or roofing system prior to proceeding with work related to such discoveries.

C. In the event of discrepancies within the Drawings, within the Specifications, or between the Drawings and Specifications, the more stringent of the two items shown or described shall be considered to be shown or specified at all locations where the discrepancies occur. The Owner shall be notified of such discrepancies.

D. In the event of discrepancies within the Drawings, within the Specifications, within the manufacturer's installation requirements, or between the Drawings, Specifications, and/or manufacturer's installation requirements, the contractor shall notify the Owner prior to proceeding with work for proper direction.

E. When a substitute or alternate is requested by the Contractor, and such substitute or alternate is accepted by the Owner, the contractor shall bear all additional costs which may arie directly or indirectly from the use of the substitute or alternate.

1.12 PROTECTION

A. Avoid heavy traffic on completed work. Schedule and execute work to prevent excessive traffic on completed roof sections.

B. Restore to original condition or replace all work and materials damaged by roofing operations.

C. Protect paving and building surfaces adjacent to hoists and other roofing equipment.

D. Do not disrupt activities in occupied spaces.

E. Remove protection upon completion of roofing work unless otherwise directed by Owner.

F. Protect finished work from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage and repair or replace accordingly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers of sprayed polyurethane foam insulation having product considered acceptable for use:
   1. Bayer Material Science, Pittsburgh, PA.
   2. Approved equal.

B. Manufacturers of urethane coating:
   1. Neogard, Dallas, TX
   2. Approved equal.

C. Substitutions: Poudre School District shall be the final authority for acceptance of any changes in materials.

2.2 MATERIALS

A. Spray Polyurethane Foam: Two-component spray polyurethane foam, complying with the following methods and meeting the following physical properties:
   1. Core Density (ASTM D1622): Minimum 3 pcf.
   2. Thermal Resistance (ASTM C518): K Factor Initial 0.012 and K Factor Aged 0.158.
   3. Flame Spread (ASTM E84, Class A): 55-percent maximum.
   4. Compressive Strength minimum (ASTM D1621): core parallel to rise 55 psi and core perpendicular to rise 35 psi.
   5. Closed Cell Content (ASTM D1940 (D2856)): minimum 90 percent.
   6. Water Absorption by Volume maximum. (ASTM D2842): 0.01 to 0.03 psf.
   7. Tensile Strength (ASTM D1623): 80 psi.
   8. Shear Strength (ASTM D273): 30-50 psi.
   9. Dimensional Stability by percentage of volume change (ASTM D2126): +3-percent maximum.

B. Spray polyurethane foam insulation shall be two-component, rigid-class, sprayed-in-place, polyurethane foam having a minimum core density of 3.0 lbs. per cubic foot (ASTM D1622), as supplied by Bayer Material Science and shall provide a minimum of 50 psi compressive strength (ASTM D1621) upon application. The foam system shall be a ratio of 1:1 formulated for roofing application where smooth surface profiles are required.

C. Sealants used in conjunction with spray polyurethane foam roofing system shall be compatible and approved by the spray foam and urethane coating manufacturer.
   1. Neogard 70991 single component polyurethane.
   2. Neogard 70995 two component polyurethane.

D. Urethane Coating: Neogard Permathane Aliphatic II shall be used as the basis of design. The coating system shall consist of a urethane base coat, urethane top coat and urethane finish coat with ceramic-coated granules.
   1. Base Coat: Single-component, moisture-cured urethane coating specifically designed as a base coating for improved adhesion to spray polyurethane foam (SPF) surfaces.
      a. Neogard 70620-CA
   2. Top Coat: Single-component aliphatic polyurethane roof coating.
      a. Neogard 7490-CA
      b. Color selected by Owner.

3. Finish Coat: Single-component aliphatic polyurethane roof coating with ceramic-coated granules.
   a. Neogard 7490-CA
   b. Screen size no. 11 ceramic-coated roofing granules, off-white in color.
      1) 3M Company, Minneapolis, MN.
      2) Approved equal.
4. Physical Properties:
   a. Solar Reflectance: Three year, aged solar reflectance of not less than 0.77 and emissivity of not less than 0.90.
   b. Service Temperature: -15 to 180 degrees Fahrenheit.
   c. Tensile Strength:
      1) Base Coat: 1000 psi minimum according to ASTM D412.
      2) Finish Coat: 2300 psi minimum according to ASTM D412.
   d. Elongation:
      1) Base Coat: 375-percent minimum according to ASTM D412.
      2) Finish Coat: 230-percent minimum according to ASTM D412.
   e. Water Resistance:
      1) Base Coat: 3-percent maximum by weight according to ASTM D471.
      2) Finish Coat: 2-percent maximum by weight according to ASTM D471.
   f. Fungal Resistance: Zero rating according to ASTM G21.
   g. Tear Resistance:
      1) Base Coat: 100 lbf/inch minimum according to ASTM D1004.
      2) Finish Coat: 200 lbf/inch minimum according to ASTM D1004.
   h. Low-Temperature Flexibility: Pass 0.5-inch mandrel at minus 15 degrees Fahrenheit according to ASTM D522.
   i. Vapor Permeance: Minimum 0.9 perms at 20 mils thick according to ASTM E96, Desiccant Method, Procedure A.

2.3 EQUIPMENT

A. Equipment shall be maintained and in good operating conditions and approved by the foam manufacturer for type of application.

B. Spray screens shall be used as necessary during operations to protect adjacent building surfaces.

2.4 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended in writing by roofing manufacturer for intended use.
   1. Liquid-type auxiliar materials shall comply with VOC limits of authorities having jurisdiction.
   2. Follow manufacturer’s written instructions for storage of auxiliar materials.
   3. Before and during use of auxiliar materials, observe all safety labels on packaging and containers and follow manufacturer’s Safety Data Sheets and all local or national safety regulations.

B. Foam Substrate Primer: Polyurethane-foam manufacturer’s standard factory-formulated primer.
   1. Neogard 7005

C. Flashing Tape:
   1. Neogard 86218

D. Urethane Mastic: Single-component, moisture-cured, aromatic polyurethane mastic.

1. Neogard 70690

E. Sealant: ASTM C920, Class 25, Use NT, Grade NS - Type M, multicomponent urethane, and as recommended in writing by coated foamed roofing manufacturer for substrate and joint conditions and for compatibility with roofing materials.

F. 3-Coursing: Reinforcing fabric embedded with manufacturer's compatible liquid urethane at time of application. Used to reinforce liquid applied urethane coating over smooth or irregular surfaces, and as recommended in writing by coating manufacturer for transitions from urethane coated surfaces to existing wall and metal conditions.
   1. Reinforcing Fabric
      a. Neogard 86220 reinforcing fabric (Tietex T-272).
   2. Liquid Flashing
      a. Neogard 70620 moisture cured polyurethane
   3. Kynar Surface Prep
      a. Ureprime HS4

G. Wash and Preparation: Manufacturer's approved cleaner specifically designed to clean roof surface prior to application of new coating. Use to properly prepare metal, concrete, and SPF.
   1. Neogard 7055 Odorless Reducer
      a. Composed of a 50/50 by weight blend of odorless mineral spritis and DB acetate.
   2. Neogard 8500 BioDegradable Cleaner
      a. Water-soluble cleaning concentrate for cleaning of substrates materials as approved by the manufacturer.

PART 3 EXECUTION

3.1 COORDINATION

A. Coordinate coating work with new sheet metal installations specified in Section 07 62 00 - Sheet Metal Flashing and Trim.

B. Do not install roofing materials when rain is imminent. Do not remove excessive quantity of existing coating and/or SPF roofing ahead of recoating.

3.2 EXAMINATION

A. Verify existing conditions are ready to receive work.

B. Ensure surfaces are sound, clean, dry and free of oil, grease, oxidation, dirt, loose paint, loose scale, loose foam or other deleterious material that would impair bond.

C. Ensure that items required to penetrate sprayed insulation are installed prior to installation of sprayed insulation. Existing penetrations, roof top mechanical units, and adjacent components shall be examined to ensure proper adhesion of new coating and/or SPF.

D. A moisture survey should be conducted prior to work, to ensure existing conditions are acceptable to the coating manufacturer.

E. Contractor shall test existing primary drains and secondary overflow scuppers to ensure each drain is in working order, free-flowing, and does not cause water leakage to the interior of the

building. Water test shall be performed prior to the start of work and at the time of substantial completion. Contractor to provide documentation of water tests and shall coordinate test with owner.

F. Contractor shall be responsible for replacement of broken drain assemblies and coordinate all drain and/or plumbing work with Owner.

G. Notify Owner in writing of any defects before work is started.

H. Beginning of application implies acceptance of existing conditions.

3.3 PREPARATION

A. Mask and cover adjacent areas to protect from overspray. Use screens as necessary for additional protection.

B. Apply any required primers for special conditions as recommended by manufacturer.

C. Remove moisture laden roofing system components and replace with materials to match existing prior to coating application. Where required, removal of the roofing assembly to the existing steel deck may be required prior to coating application.

D. Areas of deteriorated, damaged, or blistered coating shall be removed and repaired according to the spray foam and coating manufacturer's requirements.

E. Clean area of work according to the manufacturer's requirements. Repairs are to be completed prior to cleaning and preparation to prevent moisture intrusion.

F. Seal and repair all voids and cracks in the foam, where new foam joins existing foam, as well as seal all base flashings, roof penetrations and drains with manufacturer's approved sealers and 3-coursing materials.

G. Post all required warning signs.

H. Take appropriate measures to ensure that fumes from solvents are not drawn into building through air intakes.

3.4 APPLICATION

A. Prevent materials from entering and clogging drains and from spilling or migrating onto surfaces of other work.

B. Application of roofing system shall be performed by manufacturer approved applicator/installer.

C. Apply SPF in accordance manufacturer's installation guidelines: complying with preparation methods outlined in specifications.

D. Apply urethane coating in accordance with manufacturer's written instructions.

E. Urethane Coating: The coating system shall consist of an urethane base coat, urethane top coat and urethane finish coat with ceramic-coated granules.
   1. Application of each coating shall take place when temperatures are 40 to 100 degrees Fahrenheit and humidity levels are 85-percent or less.

2. Thoroughly mix coatings to a homogeneous consistency.
3. Apply coatings at the manufacturer's required wet mil and dry mil thicknesses and according to the written installation instructions.
4. Apply coatings evenly, working in same direction. Do not overwork coating or perform touch-ups while coating is wet. Allow base coating to dry 6 - 12 hours prior to coating over.
5. Do not install coatings if rain is imminent or within 24-hours of application.

F. Base Coat: Single-component, moisture-cured urethane coating specifically designed as a base coating for improved adhesion to spray polyurethane foam (SPF) surfaces.
   a. Thoroughly mix and apply coating at approximately 66 sf/gal to yield 18 dry mils and allow to cure.
   b. Allow base coat to dry 6 to 12 hours prior to installing top coat.

G. Top Coat: Single-component aliphatic polyurethane roof coating.
   a. Thoroughly mix and apply coating at approximately 66 sf/gal to yield 18 dry mils and allow to cure.

H. Finish Coat: Single-component aliphatic polyurethane roof coating with ceramic-coated granules.
   a. Thoroughly mix and apply coating at approximately 100 sf/gal (16 wet mils) and immediately broadcast granules.
   b. Broadcast granules at the rate of 30 lbs/100 sf. After cure, remove loose granules from surface.

I. Coating Thickness Requirements: Total coating system thickness shall average 36 dry mils, exclusive of granule coat and granules. Minimum dry fil thickness (DFT) at any point on the roof shall not be less than 24 dry mils of which 16 dry mils must be above the base coat material and 8 dry mils must be 7490-CA series material. Apply additional coats to achieve uniform film coverage and minimum dry film thickness requirements as needed.

J. After completion of coating application, do not allow traffic on coated surfaces for a period of at least 48 hours at a temperature of 75 degrees Fahrenheit and 50-percent relative humidity, or completely cured.

K. Polyurethane Foam Application (At repair locations):
   1. General: Mix and apply polyurethane foam according to ASTM D5469 and coated foamed roofing manufacturer's written instructions.
      a. Fill irregularities and depressions to prevent ponding water.
      b. Apply the required full thickness of polyurethane foam in any specific area on same day.
      c. Apply only the area of polyurethane foam that can be covered with required base coating on same day or within 24 hours.
      d. Apply polyurethane foam to avoid overspray beyond immediate area of work.
   2. Apply polyurethane foam in lift thicknesses of not less than 1/2-inch and not more than 1-1/2 inches.
   3. Uniformly apply total thickness of polyurethane foam indicated, but not less than 1-inch, to a surface tolerance of plus 1/4-inch and no minus.
      a. Slope to Drain: Vary thickness uniformly and fill low spots to achieve minimum 1/2-inch-per-foot slope to drain unless otherwise indicated.

4. Apply polyurethane foam to roof penetrations, terminations, and vertical surfaces as indicated. Unless otherwise indicated, extend polyurethane foam at least 4-inches above elevation of adjacent roof field.
5. Surface Finish: Provide finished surface of polyurethane foam within the following range of surface textures as defined by ASTM D5469:
   a. Texture: Smooth to Coarse Orange Peel.
   b. Texture: Verge of Popcorn to Treebark are not acceptable.
6. Remove and replace polyurethane foam not complying with surface-texture limitations. Remove defective thickness and prepare and reapply polyurethane foam with acceptable, uniform results.
7. Allow polyurethane foam substrate to cure for a minimum of two hours before coating, and apply coating system to polyurethane foam no later than 24 hours after applying the foam. Remove dust, dirt, water, and other contaminants before applying coating system.

L. Coating Height at Terminations: Apply coating system at wall terminations and other vertical surfaces to extend vertically beyond polyurethane foam by a minimum of 4 inches.

M. Sealant: Apply sealant to perimeter and other terminations where indicated on Drawings or required by coated foam roofing manufacturer and/or coating manufacturer.

3.5 FIELD QUALITY CONTROL

A. Inspection by Manufacturer: Provide final inspection of the coating system by a Technical Representative employed by coating system manufacturer specifically to inspect installation for warranty purposes (i.e., not a sales person).

B. Perform all corrections necessary for issuance of warranty.

C. Testing Agency: Owner may engage a qualified testing agency or manufacturer's representative in the presence of the contractor to perform tests and inspections of SPF repair locations.
   1. Testing agency will identify, seal, and certify samples of materials taken from Project site, with contractor present.
   2. Testing agency will perform tests for product characteristics specified or cited in manufacturer's product data.
      a. Two core samples will be required for roof areas of up to 10,000 square feet, and one core sample will be required for each additional 10,000 square feet or part thereof.
      b. Six slit-test samples will be required for each 10,000 square feet of roof area to determine, as a minimum, the number of coats applied and dry film thickness of coating.
      c. Testing agency will verify that surfaces slope to drain.

D. Coated foamed roofing will be considered defective if it does not pass tests and inspections.
   1. Refill cores, repair slits, and re-coat test areas.
   2. Prepare test and inspection reports.

E. Patching of sample cuts and retesting of materials failing to meet specified requirements shall be at contractor's expense.

3.6 CLEANUP

A. Remove overspray from non-prescribed surfaces without causing damage to surfaces.

B. Remove protective covers from adjacent surfaces.

C. Remove trash, debris, and equipment from jobsite.

D. Repair damage and remove stains caused by the Work.

END OF SECTION

SECTION 07 62 00

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 work of this section.

1.2 DESCRIPTION

A. Work Included: Work consists of furnishing all labor, materials and equipment necessary to effectively install the flashing as shown on the drawings, including, but not necessarily limited to, the following:
   1. New counterflashing as necessary.
   2. New perimeter flashings, including scuppers as necessary.
   3. New roof area divider curb coping as necessary.
   4. New miscellaneous flashings as necessary.
   5. New miscellaneous accessories as necessary.
   6. New parapet coping as necessary (Alternate No. 1).
   7. New expansion joint flashing as necessary (Alternate No. 2).

1.3 REFERENCES

A. Reference Standards: Except as modified by the Drawings and Specifications, the following documents or applicable portions thereof, govern the work.
   1. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) "Architectural Sheet Metal Manual -Sixth Edition."
   2. SSPC: The Society for Protective Coatings.
   3. National Roofing Contractors Association (NRCA) "Roofing and Waterproofing Manual-Fifth Edition."

1.4 QUALITY CONTROL

A. Requirements of Regulatory Agencies: The Work under this section shall be subject to all applicable provisions of the state and local building and safety codes.

B. Mockups: Build mockups per Section 01 43 00 to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical roof edge condition(s), approximately 48-inches long, including supporting construction cleats, seams, attachments and accessories.
   2. Approved mockups may become part of completed Work if undisturbed at time of Substantial Completion.

1.5 SUBMITTALS

A. Product Data: For each product specified.
   1. Include Safety Data Sheets (SDS) for information only; safety restrictions are sole responsibility of Contractor.

B. Shop Drawings: Show project specific layouts, profiles, shapes, seams, dimensions, and details for fastening, joining, supporting, interface conditions with other materials, and anchoring sheet-metal flashing and trim.

C. Installer Qualifications: Evidence that Installer's existing company has minimum five years of continuous experience in similar sheet-metal work; list of at least five representative, successfully-completed projects of similar scope and size; including:
   1. Project name.
   2. Owner's name.
   3. Owner's Representative name, address, and telephone number.
   4. Description of work.
   5. Sheet-metal members installed.
   6. Project supervisor.
   7. Total cost of sheet-metal work and total cost of project.
   8. Completion date.

D. Required After Completion of Work
   1. Contractor's warranty per Section 01 78 36.

1.6 JOB CONDITIONS

A. All dimensions, and existing details shall be field-verified by contractor prior to bidding and acquisition or installation of materials. Contractor shall notify the Consultant of any existing condition found to be different than that indicated in the contract documents. Consultant shall review the situation and inform contractor of necessary changes, if any.

1.7 CHANGES IN THE WORK

A. During reroofing work, the contractor may encounter existing conditions which are not now known or are at variance with the drawings or specifications (discovery). Such conditions may interfere with reroofing work and may consist of damage or deterioration to the deck or surrounding materials or components which could jeopardize the integrity of the new roof.
   1. The contractor shall notify the Consultant of all discoveries he believes may interfere with proper execution of the work or jeopardize the integrity of the new roof prior to proceeding with work related to such discoveries.

B. In the event of discrepancies within the Drawings, within the Specifications, or between the Drawings and Specification, the more stringent of the two items shown or described shall be considered to be shown or specified at all locations where the discrepancies occur. The Consultant shall be notified of such discrepancies.

C. When a substitute or alternate is requested by the Contractor, and such substitute or alternate is accepted by the Architect, the Contractor shall bear all additional costs which may arise directly or indirectly from the use of the substitute or alternate.

1.8 CONTRACTOR'S WARRANTY

A. Contractor's Warranty:
   1. Written warranty, signed by Contractor, including:
      a. Replace sheet-metal Work that does not comply with requirements; that has corroded surface, coating that fails cohesively or adhesively, or other surface defects or

imperfections; or that deteriorates in a manner not clearly specified by material supplier's data as an inherent quality of the material for the application indicated.

b. Remove and replace sealant that has failed cohesively or adhesively; or that deteriorates in a manner not clearly specified by sealant manufacturer's data as an inherent quality of the material for the application indicated.

c. Repair or replacement, to satisfaction of Owner, of other work or items which may have been displaced or damaged as consequence of defective Work.

d. Warranty does not include deterioration or damage from changes in sheet-metal environment from that reasonably anticipated at Substantial Completion, or physical damage from adjacent activities.

2. Warranty Period: Two years after Substantial Completion date.

B. Manufacturer's Warranty:

1. Written Warranty, signed by sheet-metal manufacturer, including:

a. Replace sheet-metal Work that does not comply with requirements; that has corroded surface, coating that fails cohesively or adhesively, or other surface defects or imperfections; or that deteriorates in a manner not clearly specified by material supplier's data as an inherent quality of the material for the application indicated.

b. Warranty does not include deterioration or damage from changes in sheet-metal environment from that reasonably anticipated at Substantial Completion, or physical damage from adjacent activities.

2. Written warranty, signed by manufacturer against defects to the metal panels including color, fade, chalking, and film integrity.

3. Warranty Period: 20 years after Substantial Completion date.

PART 2 PRODUCTS

2.1 SHEET METAL

A. For Copings and Counterflashings:

1. Prefinished Galvanized Steel: Commercial quality (AISI Class G90), 24 gauge, hot-dipped, galvanized steel primed and coated with a full strength fluoropolymer system of 1.0 mil (minimum) dry-film thickness on the exposed side and a white wash coat of 0.3 mil (minimum) dry-film thickness on the unexposed side.

2. Color shall be chosen by Owner.

B. Expansion Joint Flashing:

1. Johns Manville Expand-O-Flash (CF Style) with elastomeric bellows, closed cell foam backer and integral 2-inch by 2-inch curb form metal flanges.

a. Bellow width based on clear joint width. Reference Johns Manville Detail CF-CC.

b. Provide batt insulation retained in poly sleeve with integral vapor barrier.

C. Manufactured Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated. From one of the following manufacturers or approved equal:

1. Cheney Flashing Company.
2. Fry Reglet Corporation.
3. Heckmann Building Products Inc.
4. W.P. Hickman Company.
5. Keystone Flashing Company, Inc.

6. Sandell Manufacturing Company, Inc.

D. Fasteners
   1. Metal to Wood (concealed conditions): Nails, 8d minimum or as called for on drawings.
   2. Metal to Wood (exposed conditions): Pan head screw, #8 minimum or as called for on the drawings.
   3. Metal to Metal: "Teks" fasteners, 10 - 16 x 3/4 in. HWH Teks/1 with an EPDM sealing washer, as manufactured by ITW Buildex, Itasca, Illinois or Consultant approved equal.

2.2 AUXILIARY MATERIALS

A. Miscellaneous Materials:
   1. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items required for installation.
   2. Fasteners: Wood screws, annular-threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads. Size fasteners to provide penetration into substrate of at least 1 1/4 inches for nails and 3/4 inches for wood screws.
      a. Exposed Fasteners: Heads match color of sheet metal by means of plastic caps or factory applied coating.
      b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
         1) Blind Fasteners: High-strength aluminum or stainless-steel rivets.
   3. Elastomeric Sealant: ASTM C920, elastomeric silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet-metal flashing and trim and remain watertight.
   4. Butyl Sealant: ASTM C1311, single-component, solvent-release, butyl-rubber sealant; polyisobutylene-plasticized; heavy-bodied for hooked-type expansion joints with limited movement.
   5. Solder: ASTM B32.

2.3 FABRICATION

A. Custom fabricate to comply with recommendations in SMACNA's Architectural Sheet Metal Manual, that apply to design, dimensions, metal, and other characteristics of item indicated. Conform to dimensions and profiles shown in SMACNA's Architectural Sheet Metal Manual, unless requirements that are more stringent are indicated.
   1. Obtain field measurements for accurate fit before fabrication.
   2. Shop fabricate items where practicable.

B. Fabricate without excessive oil canning, buckling, or tool marks that are visually objectionable in opinion of Architect/Engineer, and true to line and levels indicated, with exposed edges folded back to form hems.
   1. Fabricate nonmoving seams in accessories with flat-lock seams. Form seams and seal with elastomeric sealant. Rivet joints for additional strength.

C. Shop fabricate new sheet metal shapes in 10-ft-long sections, or as long as practical.

D. Form sections square, true and accurate to shape and size, free from distortion and other defects detrimental to appearance or performance.

E. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant and in compliance with recommendations in SMACNA's Architectural Sheet Metal Manual.

F. Expansion Provisions: Use lapped or bayonet-type expansion provisions where possible; otherwise, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Conceal fasteners and expansion provisions, where possible, on exposed-to-view sheet-metal flashing and trim, unless otherwise indicated.

H. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, non-corrosive metal, but not less than twice the thickness of the metal being secured or as indicated on Drawings.

I. Low-Slope Roof Fabrications:
   1. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches into field of roof.
   2. Copings: Fabricate in minimum 8-foot-long, but not exceeding 10-foot-long, sections.
      a. Fabricate joint plates of same thickness as copings.
      b. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg.
      c. Miter corners, seal, and solder or weld watertight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Installer for compliance with requirements and other conditions affecting performance of sheet-metal flashings and trim.
   1. Ensure that work done by other trades is complete and ready for sheet-metal Work.
   2. Verify that areas and conditions under which sheet-metal Work is to be performed permit proper and timely completion of Work.
   3. Notify Architect/Engineer in writing of conditions which may adversely affect installation or performance of sheet-metal Work and recommend corrections.
   4. Do not proceed with installation of sheet-metal flashings and trim until adverse conditions have been corrected and reviewed by Architect/Engineer.
   5. Commencing sheet-metal Work constitutes acceptance of Work surfaces and conditions.

3.2 PROTECTION

A. Take precautions to ensure safety of people, including building users, passers-by, and workmen, and animals, and protection of property, including adjacent building elements, landscaping, and motor vehicles.

B. Prevent construction debris and other materials from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

C. Protect paving and sidewalks, and adjacent building areas from mechanical damage due to scaffolding and other equipment.

D. Limit access to Work areas.

E. Erect temporary protective canopies, as necessary, over walkways and at points of pedestrian and vehicular access that must remain in service during Work.

F. Assume responsibility for injury to persons or damage to property due to Work, and remedy at no cost to Owner.

3.3 SHEET METAL INSTALLATION

A. General: Install new sheet-metal flashings and trim according to recommendations in SMACNA's Architectural Sheet Metal Manual, recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual." and as shown on the Drawings.

B. Install sheet-metal flashing and trim to fit substrates and to result in watertight performance.
   1. Install true to line and levels indicated.
   2. Where exposed, install without excessive oil canning, buckling, or tool marks.
   3. Provide uniform, neat seams with minimum exposure of solder, welds, or sealant.
   4. Do not torch cut sheet metal.

C. Where materials or construction systems are specified with reference to a particular manufacturer (such as caulking and sealants), make installations in strict accord with the approved manufacturer's installation instructions.

D. Accurately reproduce profiles and bends; make intersections sharp, even and true. Make plain surfaces free from buckles and waves with as few joints as possible. Reinforce work as required for strength and appearance.

E. Bend metals to minimum radius recommended by manufacturer for thickness used (in general, the radius shall be not less than the thickness of metal).

F. Provide for thermal expansion of exposed flashing and trim.
   1. Space movement joints no more than 10 feet apart, with no joint within 24 inches of corner or intersection.
   2. 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 deep, filled with elastomeric sealant concealed within joints.

G. Make seams in direction of flow.

H. Hem exposed edges of sheet metal work ½ in.

I. 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.

J. Anchor sheet-metal flashing and trim and other components of 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.
   1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners

K. Seal joints with elastomeric sealant as required for watertight construction.

L. Soldering: Roughen smooth surfaces with clean emery cloth or sandpaper; do not use steel wool. Use torch or well heated irons. Solder slowly, thoroughly heating seams and completely sweating solder through full width with at least 1 in. of solder evenly flowed along seams. Wherever possible, solder in a flat position. Solder seams on slopes greater than 45° a second time. Solder immediately after application of flux; after soldering, immediately neutralize any corrosive flux with 5% soda solution and flush with clean water. Soldering of exposed surfaces shall be neatly done. Exposed solder shall be dressed and finished. Soldering shall be employed only to seal or fill seams. Where structural strength is required, do not rely on solder alone but use supplementary mechanical fasteners.

M. Roof Drainage System Installation:
   1. Parapet Scuppers: Install scuppers where indicated, through parapet.
      a. Set to correct elevation, continuously support scupper, and seal flanges to interior wall face, and under roofing membrane.

3.4 PROTECTION

A. Protect sheet-metal flashings and trim from damage and wear during remainder of construction period.

3.5 CLEANING

A. At the end of each workday, clean Site and Work areas and place rubbish, empty cans, rags, and other discarded materials in appropriate containers.

B. After completing sheet-metal Work:
   1. Clean spillage and soiling from adjacent surfaces using cleaning agents and procedures recommended by manufacturer of affected surface. Exercise care to avoid scratching or damage to surfaces.
   2. Repair surfaces stained, marred, or otherwise damaged during roofing Work.
   3. Clean up debris and surplus materials and remove from Site.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

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 work of this section.

1.2 DESCRIPTION

A. Utility Line Supports

Work Included: Work consists of furnishing all labor, materials and equipment necessary to effectively install new pre-manufactured utility supports and to seal dissimilar materials at critical junctions, but not necessarily limited to the following:

1. Utility supports.
2. Miscellaneous accessories.

1.3 QUALITY CONTROL

A. Requirements of Regulatory Agencies: The Work under this section shall be subject to all applicable provisions of the state and local building and safety codes.

B. Qualifications

1. Prior to the Notice of Award, the Contractor shall submit evidence that his existing company has five (5) years continuous successful experience in applying specified material(s), and is currently an approved applicator for the specific material manufacturer(s).

C. Reference Standards: Except as modified by the Drawings and Specifications, the following documents or applicable portions thereof, govern the work.

1. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) “Architectural Sheet Metal Manual - Fourth Edition.”
2. National Roofing Contractors Association (NRCA) “Roofing and Waterproofing Manual-Fifth Edition.”

1.4 SUBMITTALS

A. Required Prior to Commencement of Work

1. Manufacturer’s literature, Material Safety Data Sheets and application instructions. All submittals shall be made in triplicate. When submitting manufacturer’s literature, highlight all items pertaining to this project.
2. Shop drawing of new roof accessory.

B. Required After Completion of Work

1. Contractor’s Warranty.

1.5 PRODUCT DELIVERY AND STORAGE

A. Delivery of Materials: Deliver material to jobsite in sealed, undamaged containers. Identify each container with material name, date of manufacturer, and lot number.

1.6 JOB CONDITIONS

A. All dimensions and existing details shall be field-verified by Contractor prior to bidding and acquisition or installation of materials. Contractor shall notify the Consultant of any existing condition found to be different than that indicated in the Contract Documents. Consultant shall review the situation and inform Contractor of necessary changes, if any.

B. Install materials in strict accordance with all safety and weather conditions required by manufacturer, product literature, Material Safety Data Sheets, or of local, state, federal rules and regulations, and standard practice.

1.7 WORK SEQUENCE

A. Do not install roof specialties and accessories materials when rain is imminent. Do not remove excessive quantity of existing materials ahead of re-installing new.

B. Installation of new roof specialties and accessories shall be coordinated with roof removal operations.

1.8 CHANGES IN THE WORK

A. During reroofing work, the Contractor may encounter existing conditions which are not now known or are at variance with the Drawings or Specifications (discovery). Such conditions may interfere with reroofing work and may consist of damage or deterioration to the deck or surrounding materials or components which could jeopardize the integrity of the new roof.

B. The Contractor shall notify the Consultant of all discoveries he believes may interfere with proper execution of the work or jeopardize the integrity of the new roof prior to proceeding with work related to such discoveries.

C. In the event of discrepancies within the Drawings, within the Specifications, or between the Drawings and Specifications, the more stringent of the two items shown shall be considered to be shown or specified at all locations where the discrepancies occur. The Consultant shall be notified of such discrepancies.

D. When a substitute or alternate is requested by the Contractor, and such substitute or alternate is accepted by the Consultant, the Contractor shall bear all additional costs which may arise directly or indirectly from the use of the substitute or alternate.

1.9 WARRANTY

A. Contractor’s Warranty: (by Contractor to Owner). Applies to all installed roof specialties and accessories.

PART 2 PRODUCTS

2.1 MATERIALS

A. Utility Supports
   1. Utility Supports: Type suitable for height and size of pipe over utility line as manufactured by Cooper B-Line of Highland, Illinois, or Consultant-approved equal.
   2. Modify existing supports to accommodate slope of new roof system.

PART 3 EXECUTION

3.1 PREPARATION OF SUBSTRATE

A. Examine the surface condition of the substrate under which support is to be installed. Do not proceed with the new installation until unsatisfactory conditions have been corrected in a manner approved by the Architect/Consultant.

B. Clean the substrate of obstructions and substances detrimental to the work.

C. Proceeding with the work shall signify the Contractor's acceptance of the substrate being used under supports.

3.2 UTILITY SUPPORT INSTALLATION

A. Install protection over roofing and under support.

B. Install new supports as needed; adjust to slope of roof.

C. Install at intervals not to exceed 10-feet and one foot away in both directions from bends.

D. Utility lines must be properly supported and will not require raising or lowering for installation of supports.

3.3 CLEANUP

A. Remove trash, debris, and equipment from the jobsite.

B. Repair damage and remove stains caused by the Work.

END OF SECTION

SECTION 22 14 23

REMOVAL AND REPLACEMENT OF ROOF DRAINS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the replacement of existing roof drains if cracked or broken, installation of new piping associated with new roof drains, work called for by the Drawings and other work necessitated by these operations.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data, installation instructions, use limitations, and recommendations for each product and material used.

B. REFERENCE STANDARDS

C. ASTM International
1. ASTM A74 - Standard Specification for Cast Iron Soil Piping and Fittings
2. ASTM A888 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
3. ASTM C547 - Standard Specification for mineral fiber pipe insulation,
4. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing
5. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

D. Cast Iron Soil Pipe Institute
1. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

1.3 QUALITY ASSURANCE

A. Drainage piping and specialties shall bear label, stamp, or other markings of specified testing agency.

B. All work shall be performed by journeymen skilled in the particular task being performed. Where licensing is required such journeymen shall hold valid licenses.

1.4 DELIVERY, HANDLING AND STORAGE

A. Handle products carefully to avoid damage to ends or roof drain components.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS

A. Pipe and fittings shall be Service Class, gray cast iron.

1. Pipe for replacement of existing pipe shall match size of existing.
2. Pipe ends shall match existing.
3. Jointings to match existing.

B. Lead/oakum caulked joints shall comply with governing regulations for use in the service required.

C. Hubless jointing, complying with CISPI 310: No-Hub Coupling Assembly and ASTM C1277.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ANACO-Husky.
   b. Fernco Inc.
   c. Tyler Pipe.
2. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

D. Threaded jointing shall comply with ANSI/ASME B1.20.1.

2.2 METAL ROOF DRAINS

A. Cast iron, deck drain with flashing clamp and square hole, heavy duty deck drain.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Smith, Jay R. Mfg. Co.: 1010 Roof Drain
   b. Josam Company: 21500 Series
   c. Zurn: Z-100 Roof Drain
2. Standard: ASME A112.6.4, for general-purpose roof drains.
3. Drain outlet at replacement roof drains to match existing drain outlets.
4. Provide under deck clamp as required to secure drain in place.
5. Provide with cast iron strainers.

2.3 ACCESSORIES

A. Piping at all new drain installation locations:
1. Reducers, connections and other plumbing fittings to produce an installation that is secure and watertight and to isolate dissimilar materials.
2. Piping supports as required.
3. Pipe size reducers as required.
4. Traps as required.

2.4 PIPE INSULATION

A. Insulation shall be molded, heavy-density, one-piece insulation made from inorganic glass fibers bonded with a thermosetting resin with jackets of polymer facing or white kraft paper bonded to aluminum foil, and it is reinforced with a fiberglass scrim.

B. Manufacturers:
1. Owens Corning
2. Knauf
3. Johns Manville

PART 3 EXECUTION

3.1 REMOVALS AND PATCHING

A. Perform removal of existing and installation of drains from above and below the roof deck.

B. Coordinate with Owner when interior access for drain work is necessary. Notify the Owner 72 hours prior to such work.

C. Extreme care shall be taken not to damage ceilings, interior finishes, or furnishings below in any way. If damaged, the Contractor shall make repairs or replace to the acceptance of the Owner at no expense to the Owner.

D. Cut and/or patch deck to accommodate new drain.

E. Provide smooth finish and neatly scribed area to properly fit and support the new drain.

3.2 INSTALLATION

A. Remove existing roof drain.

B. Where deck is required to be cut to receive the new drain, it shall be done in a method acceptable to the Owner.
   1. The cut area shall be neatly scribed to properly fit the new drain.

C. Set new drain in place at correct elevation and pack hole with patching material as required.

3.3 JOINT CONSTRUCTION

A. Lead Joints
   1. Tightly pack joint with Oakum. Do not permit packing to enter bore of finished joint. Clean joint after packing.
   2. Fill remaining joint space with one pouring of lead to a minimum one-inch depth measured from face of bell. Surface shall not be depressed more than 1/8-inch below the rim of the hub. After lead has cooled, caulk joint tightly with hammer and caulking iron.

B. Hubless, Cast-Iron Soil Piping Coupled Joints: Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

C. Threaded Joints
   1. Deburr all pipe cuts.
   2. Thread pipe to requirements of ANSI/ASME B1.20.1.
   3. Use Teflon tape on male thread prior to joining sections.

3.4 TESTING

A. Test storm drainage piping as follows:
   1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
   2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Test Procedure: Test storm drainage piping on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.5 CLEANING

A. Prior to acceptance of the work, “rod” or “snake out” all existing roof drain lines for the first 100 line ft. of the drain line.

3.6 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION