Project Manual

for:

Oak Valley ES- Roof Repair & Coating

595 2nd St., Buellton, CA 93427

for the

Buellton Union School District

301 2nd St., Buellton, CA 93427

Date: March 7, 2024

BEAM Project No.: 230610.3

Consultants:

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PROJECT MANUAL COVER SHEET AND STAMP PAGE

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PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Furnishing all labor, materials, and equipment necessary for demolition, dismantling, cutting, and alterations as indicated, specified, and required for completion of the Contract, as applicable. Includes items such as the following:
   a. Protecting existing work to remain.
   b. Hazardous material identification and removal.
   c. Utility service and termination.
   d. Removing debris and equipment.
   e. Removal of items indicated on Drawings.
   f. Landscape and sprinkler demolition and reinstall.
   g. Disposal of material.

B. Related Sections:
1. Section 01 50 00: Temporary Facilities and Controls.
2. Section 01 57 13: Erosion control.
3. Section 01 74 19: Construction Waste Management and Disposal.
4. Section 02 21 00: Surveys.

C. Regulatory Requirements:
1. Conform to applicable jurisdictional authority regulations and codes for disposal of debris.
2. Coordinate clearing work with utility companies.
3. Maintain emergency access ways at all times.
4. Contractor shall comply with all applicable laws and ordinances regarding hazardous materials, including contaminated soils, hazardous material transformers, and similar materials or components.

1.3 SUBMITTALS:

A. Schedule: Submit a detailed sequence of demolition and removal work, including dates for shutoff, capping, and continuance of utility services.

B. Procedures: Submit written procedures documenting the proposed methods to be used to control dust and noise.

1.4 EXISTING CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

B. Conduct demolition to minimize interference with adjacent structures or items to remain.

B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during Work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

3.2 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.

B. In accordance with generally accepted construction practices, Contractor shall be solely and completely responsible for working conditions at the jobsite, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and shall not be limited to normal working hours.

C. Safety precautions prevent damage to existing elements identified to remain or to be salvaged and prevent injury to the public and workmen engaged onsite. Demolish roofs, walls, and other building elements in such a manner that demolished materials fall within foundation lines of building. Do not allow demolition debris to accumulate onsite. Pull down hazardous work at end of each day; do not leave standing or hanging overnight, or over weekends:
   1. Protect existing items that are not indicated to be altered. Protect utilities designated to remain from damage.
   2. Protect trees, plant growth, and features designated to remain as final landscaping as shown on Drawings.
   3. Protect bench marks from damage or displacement.

D. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

E. Fire Safety: Contractor shall conform to Chapter 33 of the California Fire Code (CFC), "Fire Safety During Construction and Demolition," at all times during the construction process. A copy of this chapter can be provided.

F. Any construction review of Contractor's performance conducted by the geotechnical Engineer is not intended to include review of the adequacy of Contractor's safety measures in, on, or near the construction site.

G. Surface Drainage: Provide for surface drainage during period of construction in a manner to

avoid creating nuisance to adjacent areas. Contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of Work, regardless of cause, source, or nature of water.

H. Adjacent streets and sidewalks shall be kept free of mud, dirt, or similar nuisances resulting from earthwork operations.

I. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

3.3 EXAMINATION

A. Examine conditions of work in place before beginning Work; report defects.

B. Report existence of hazardous materials or unsafe structural conditions.

3.4 PREPARATION

A. Scheduling:
   1. General: Coordinate and schedule demolition work as required by Owner and as necessary to facilitate construction progress.

B. Hazardous Materials:
   1. General: Identify chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations, and notify such jurisdictional agencies as may be required. Collect and legally dispose of such materials at official disposal locations away from the site.
   2. Asbestos: If asbestos or materials containing asbestos are encountered, stop work immediately and contact Owner. Do not proceed with demolition until directed by Owner.

C. Utility and Service Termination:
   1. Locate and identify existing utility, service, and irrigation system components affected by Work of this Contract. Review existing record Drawings, conduct site investigations, contact Underground Service Alert and other qualified cable/pipe/line locator services, and implement all other means necessary to define the location of underground systems.
   2. Prior to beginning any demolition, properly disconnect all water, gas, and electrical power supply at appropriate disconnect locations. Obtain all necessary releases and approvals from serving utility companies.
   3. Prior to demolition or disconnect, obtain Owner’s approval that such system does not impact facilities or systems beyond the extent of this Contract.
   4. Mark location of disconnected systems. Identify and indicate stub-out locations on Project record documents.

D. Verify that existing plant life and features designated to remain are tagged or identified.
   1. Architect will mark the features, trees, and shrubs to remain within the construction area. Contractor shall not commence clearing and grubbing operations until authorized by Owner and all protective measures are in place.

E. Coordinate the time and duration of all system disconnects with Owner.

3.5 DEMOLITION

A. General Requirements:

1. Clear areas required for access to site and execution of Work, including pavement, structures, foundations, vegetation, trash, and debris.
2. Coordinate with Owner the time of day and route to remove demolished materials from premises.
3. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
4. Remove all buried debris, rubble, trash, or other material not deemed suitable by the geotechnical Engineer.
5. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with specified fill material.

B. Fixture and Equipment Removal:
1. Remove existing fixtures and equipment as identified and shown on Drawings and required by Architect.
2. Verify all service connections to fixtures and equipment designated for removal have been properly disconnected.
3. Remove all conductors from conduit at all abandoned circuits.

3.6 UTILITY AND BUILDING SERVICES REMOVAL AND RE-INSTALLATION

A. Where crossing paths and potential points of interference with existing utility services are shown or can be reasonably inferred from surface conditions or evidence of subsurface systems, such as meter boxes, vaults, relief vents, cleanouts, and similar components:
1. Review all Contract Documents showing crossing paths and potential points of interference.
2. Pot-hole or determine by other means the accurate depth and location of such utilities.
3. Incorporate all costs required to complete work under this Contract, including additional trenching, re-routing of existing and new utilities, and all means necessary to construct work under this Contract.
4. No additional cost to Owner will be allowed for work necessary to accommodate utility conflicts where such crossing paths are shown on Contract Drawings or can be reasonably inferred from surface conditions or components.

B. Remove all conductors from conduit at all abandoned electrical circuits.

C. Seal off ends of all piping, drains, and other components as directed by Architect and serving utility.

D. Where necessary to maintain service to existing utility and building systems, relocate or redirect all conduit and conductors, piping, drains, and associated system components:
1. Re-circuit all electrical as required.
2. Re-circuit all landscape irrigation valving and control systems as required.
3. Temporarily terminate landscape system components in approved boxes or with approved caps, suitable for re-connection or extension.
4. Extend or otherwise modify all site drainage systems, including catch basins, drain inlets, and piping. Fine grade to maintain proper drainage flow pattern to drains.

E. Demolish structure in an orderly and careful manner:
1. Use of explosives prohibited.

3.7 SITE PAVEMENT REMOVAL

A. Remove sidewalk and curb where required for new construction as specified and as indicated on the Drawings:
1. Remove all paving by saw-cutting.

2. Remove concrete paving and curbing at locations shown on Drawings. Locate closest adjacent expansion or weakened plane joint to define start of removal or saw-cutting.

B. Remove asphalt concrete paving areas where required for new construction as specified and as indicated on the Drawings:
   1. Remove all paving by saw-cutting.
   2. Remove paving assembly as required to expose subgrade.

3.8 LANDSCAPE AND IRRIGATION SYSTEMS DEMOLITION AND RENOVATION

A. Clearing, Grubbing, and Planting Demolition:
   1. Remove grass and grass roots to a minimum depth of two inches (2”) below existing grade.
   2. Remove all shrubs, plants, and other vegetation within the area of the work unless designated to remain. Grub and remove all roots of all vegetation to a depth of 24 inches below existing grade.
   3. Remove only those trees that are specifically designated for removal, or as shown on the Drawings, within the construction area. Remove all stumps. Remove root ball and root systems larger than one inch (1”) in diameter to a depth of two feet (2’) below existing or finished grades, whichever is lower, and a minimum of five feet (5’) beyond the edge of paving, structure, wall, or walkway.
   4. Hand cut existing tree roots over one inch (1”) in diameter as necessary for trenching or other new construction. Apply multiple coats of emulsified asphalt sealant especially made for horticultural use on cut or damaged plant tissues to cut faces and adjacent surfaces. Cover exposed roots with wet burlap to prevent roots from dying out until backfilling is complete.
   5. Disking and mixing of vegetation, trash, debris, and other deleterious materials with surface soils prior to grading is not permitted.
   6. Remove all buried debris, organic material, rubble, trash, or other material not deemed suitable by the geotechnical Engineer.
   7. Fill all voids or excavations resulting from clearing, demolition, or removal of vegetation with fill material in compliance with Section 31 00 00: Earthwork.
   8. Selected equipment of such sizes and capacities that the existing environment is disturbed as little as possible, and to afford ease of mobility within limited and relatively confined work areas. Make every effort to preserve the topography in its natural state.
   9. Keep drains, catch basins, surface drainage courses, and related drainage system components clear of debris and construction materials.
   10. Remove irrigation piping and appurtenances as necessary within area of work, unless noted otherwise to remain. Replace irrigation piping and appurtenances to irrigate new and/or existing landscaping. Contractor shall be responsible for temporary landscape irrigation until such time that irrigation system is restored and operational.

3.9 DISPOSAL

A. Demolished materials become property of the Contractor and shall be removed from premises, except those items specifically listed to be retained by Owner.

B. Dispose of all demolished material, trash, debris, and other materials not used in the work in accordance with the regulations of jurisdictional authority.

C. It is required that all materials that are of a recyclable nature, be transported to a suitable legal recycling facility instead of a dump or refuse facility (unless they are one-in-the same).

D. Burning and Burying of Materials: **Not allowed**.

E. Haul Routes:
   1. Obtain permits as required by jurisdictional agencies. Establish haul routes in advance; post flagmen for the safety of the public and workmen.
   2. Keep streets free of mud, rubbish, etc. Assume responsibility for damage resulting from hauling operations; hold Owner free of liability in connection therewith.

F. Remove demolished materials and debris from site on a daily basis.

3.10 CLEANING

A. Upon completion of work of this Section, promptly remove from the working area all scraps and debris.

B. Clean excess material from the surface of all remaining paved surfaces and utility structures.

C. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END OF SECTION 02 41 00

SECTION 06 10 00 ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes rough carpentry, light hardware, and miscellaneous items of work not included in another Section. This Section also includes:
   1. Structural wood supports, grounds, backing, and blocking required for wood framed structures including but not limited to flooring, wall, roof and ceiling construction.
   2. Backing/blocking for millwork and casework items that are an integral part of wall, floor, and/or ceiling construction.
   3. Backing/Blocking for Mechanical-Plumbing-Electrical work and equipment.
   4. Plywood sheathing.

B. Related Sections:
   1. Section 07 52 00 – Modified Bitumen Membrane Roofing
   2. Section 07 72 00 – Roof Accessories

C. Reference Standards:
   1. The following references, codes, and standards are hereby made a part of this Section and carpentry work shall conform to applicable requirements therein except as otherwise specified herein or shown on the Drawings. Nothing contained in the Drawings or these Specifications shall be construed as permitting work that is contrary to code requirements:
      a. Standard Grading and Dressing Rule #16, of the West Coast Lumber Inspection Bureau.
      b. Grading Rules for Western Lumber of the Western Wood Products Association.
      c. Standard Specifications for Grades of California Redwood Lumber of the Redwood Inspection Service.
      d. American Wood Preservers Association (AWPA) Standard C 2-77 Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.
      e. American Wood Preservers Bureau (AWPB) Quality Control Standards.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building code: Comply with applicable requirements of CBC Chapter 23 for miscellaneous wood.
   2. Fire retardant treated lumber and plywood by pressure process: Provide products with a flame spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
   3. Level floor finishes to minimum requirement noted CBC Section 11B-302.1.

B. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

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C. Lumber and plywood shall be grade or quality marked by WWPA, WCLIB, APA, AWPB, or by other grading and inspection agencies acceptable to the Architect. Grade marks shall include the designation "S-DRY"(or "MC-15" as applies) where applicable. Grade and quality marks shall not be apparent on surfaces exposed in the finished work.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store kiln dried materials in enclosed areas, protected from moisture and separated from contact with concrete or soil.

PART 2 PRODUCTS

2.1 MATERIALS

A. Temporary Construction: Clean lumber at Contractor's option, rough or smooth, as usage requires.

B. Lumber Not Otherwise Specified or Noted:
1. Douglas fir or larch, graded and grade-marked, according to Reference Standard 1.02 A or B, #1 grade:
    a. Boards: Construction grade.

C. Sill Plates (On Concrete): Construction grade light framing, pressure treated as hereinafter specified; as noted on Plans.

D. Plywood for Walls and Roofs; As Noted On Plans:
1. Unless glue type is otherwise specified, exterior plywood, interior plywood exposed to continuing moisture, and pressure treated plywood shall be fabricated with exterior glue. Plywood with interior glue shall be fully protected from soaking or continuing moisture at all times.

E. Rough Hardware:
1. Nails, spikes, bolts, screws, tacks, and framing connectors of standard manufacture as required. Hot dip galvanize items exposed to moisture or to exterior and those items that are in contact with wood pressure treated with waterborne salts:
    a. Bolts and nuts: ASTM A307, Grade A.
    b. Lag bolts: Fed. Spec. FF-B-561. Pre-drill per CBC.
    c. Nails: Fed. Spec. FF-N-101, common unless otherwise noted or specified.
    d. Joist hangers and framing connectors: Simpson or approved equal, unless otherwise noted.
    e. Power driven fasteners: Hilti, Ramset, or approved equal, each use and fastener type subject to prior approval of Architect.

F. Pressure Treatment (Decay and Termite Prevention):
1. Pressure treat for decay and termite prevention, Douglas fir or larch wood materials that are embedded in or set against concrete.
2. Treat in accordance with Reference Standard 1.02 E and quality mark as per Reference Standard 1.02 F.
3. Treat with any of the following processes at Contractor option. Creosote type preservatives are not permitted:
    a. Penta in an LPG carrier (Cellon) or Penta in Hydrocarbon Solvent-Type D (Dow Process) AWPB LP-4 quality marked.

b. Ammoniacal copper arsenate (ACA) or chromated copper arsenate (CCA) in a water carrier (AWPB LP-2 quality marked).
c. Disodium Octaborate Tetrahydrate (DOT) such as Advance Guard/Hi-bor by Osmose, Inc.
d. Members treated with waterborne salts shall be dried to a moisture content not exceeding 19 percent after treatment.

4. Where possible, precut material before treatment.
5. Holes and cutoffs and handling and storage shall be in accordance with AWPA M-4.
6. Ensure that ferrous metal fastenings and items in contact with wood treated with waterborne salts are hot dip galvanized (1.25 oz. coating) where required by ICC reports.

G. Building Paper and Felt: Kraft waterproof building paper or 15# unperforated asphalt saturated rag felt per CBC Standard 14-1.

H. Framing Connectors: Simpson Strong Tie Corp., or equal.

2.2 MOISTURE CONTENT

A. 19 percent maximum for two times thickness and less; 19 percent maximum for thickness greater than two times and less than four times; and 22 percent maximum for thickness greater than four times.

2.3 SIZES

A. Surfaced to "DRY" sizes. Sizes noted are nominal unless shown as net.

2.4 SURFACING

A. All wood materials exposed in the finished work shall have re-sawn surfaces of clean natural color unless noted or specified otherwise. Concealed framing lumber shall be S4S.

PART 3 EXECUTION

3.1 ERECTION AND INSTALLATION

A. Framing: Conform to CBC where same covers points not indicated on Drawings. Properly lay out framing with pieces closely fitted, accurately plumbed, leveled and aligned, and rigidly secured in place.

B. Except as specifically shown on structural drawings, cutting of all wood, etc. is limited to those cuts permitted by 2022 California Building Code (CBC).

C. Bridging and Blocking: Conform to CBC. Provide two times blocking at intersections of finished surfaces for adequate bearing and at points where required to support fixtures, cabinets, hardware, and other equipment mounted on walls.

D. Plywood (General): Unless more stringent requirements are indicated on the Drawings or required by code, application of plywood shall be in accordance with recommendations of the American Plywood Association.

E. Connections and Fastenings: Conform to CBC. Unless otherwise specified or shown on the Drawings, conform to minimum nailing requirements of CBC. For bolted connections, provide washers under heads and nuts bearing on wood, and draw nuts tight. Retighten before closing in framing. Exercise care in nailing through exposed sheathing and siding

and ensure that fasteners penetrate into framing members

END OF SECTION 06 10 00

SECTION 07 52 00 MODIFIED BITUMEN MEMBRANE ROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes entire roofing assembly, but is not limited to:
1. Modified bitumen membrane roofing.
2. Tapered edge strips, cant strips, and wood nailers.
3. Flashings, including sheet metal perimeter edge (fascia) not specified elsewhere in specifications.

B. Related Sections:
1. Section 06 10 00: Rough Carpentry
2. Section 07 56 00: Fluid Applied Roof Coating
3. Section 07 62 00: Sheet Metal Flashing and Trim
4. Section 07 72 00: Roof Accessories

C. Reference Standards:
1. 2022 California Building Code (CBC) including Division of State Architect references.
2. American Society for Testing and Materials (ASTM):
   a. C920 Standard Specification for Elastomeric Joint Sealants.
   b. D41 Standard Specification for Asphalt Primer Used in Roofing, Damproofing, and Waterproofing.
   c. D312 Standard Specification for Asphalt Used in Roofing.
   d. D2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
   e. D4601 Standard Specification for Asphalt-Coated Glass Fiber Sheet Used in Roofing.
   f. D4897 Standard Specification for Asphalt-Coated Glass-Fiber Venting Base Sheet Used in Roofing.
   g. D6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
3. ASCE-7 Wind uplifts requirements for geographical area.
4. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual.
5. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s printed instructions, schedules, charts, literature, and illustrations to indicate the performance, fabrication procedures, product variations, fastener, fastener pattern layout, roof membrane, flashing membrane, adhesives, primers, sealants, and include ASCE-7 wind uplift calculations and accessories to be used in the Work.

B. Provide asphalt fume recovery plan, for equipment data and proposed loading and heating procedures to limit ground level asphalt fumes.

C. Certifications:

1. Manufacturer's written certification that installer is approved and licensed to install specified roofing system.
2. Manufacturer's affidavit that materials used in Project contain no asbestos.

D. Referenced Standards - Two (2) copies of each referenced standard and retain approved copies at site:
1. NRCA Roofing and Waterproofing Manual, current edition.

E. Shop Drawings:
1. Roof layout to confirm roofing as shown on Drawings.
2. Furnish proposed details that differ from those indicated on Drawings.
3. Furnish detailed Project sequencing, staging, material loading, manpower plans, and Project construction schedule. Refer to Section 01 31 00: Project Management and Coordination.
4. Furnish manufacturer's literature, including mock warranty.

F. Samples:
1. Submit roofing material samples.
2. Job specific warranty that is to be issued upon Project completion.
3. Submit mock-up of all fabricated sheet metal items.
4. Submit 12-inch by 12-inch sample of all types of roof membranes to be installed.

G. Temperature Charts: Bitumen heating devices 24-hour temperature charts.

H. Test Reports:
1. Bitumen manufacturer's test reports relative to the following for each batch of bitumen furnished:
   a. Acceptable bitumen temperature: As recommended by the bitumen manufacturer and EVT label on containers.
   b. Thermometers: Two (2) hand held, "8F" thermometers complying with related ASTM standard to Architect for his checking kettle temperature.

I. Provide site visit reports of manufacturer's visit to the Architect.

1.4 QUALITY ASSURANCE

A. General:
1. Unless otherwise indicated on the Drawings, the materials to be used on this Project are those specified.
2. A competent superintendent will be onsite at all times while roofing work is in progress. This superintendent is not to perform roofing work. Superintendent will have full authority to act on behalf of Contractor as Contractor's agent.
3. Install materials in accordance with Contract Documents and the manufacturer's current published application procedures and the general recommendations of NRCA.
4. It will be Contractor's responsibility to obtain and/or verify any necessary dimensions, and Contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.
5. Contractor shall plan and conduct the operations of the work so that each section started on one day is complete, details installed and thoroughly protected, and in watertight condition before the close of work for that day.
6. Materials will be securely fastened in place in a watertight, neat, and workmanlike manner. All workmen shall be thoroughly experienced in the particular class of work upon which employed. Work shall be performed in accordance with these specifications and shall meet the approval in the field of the Architect.
7. All waste materials, rubbish, etc., shall be removed from the premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust, and shall be deposited

at an approved disposal site. At completion, all work areas shall be left broom clean and all Contractor's equipment and materials removed from the site.

8. Work and materials hereinafter specified shall be best of kind described and, unless specified otherwise, shall be new and of best quality. All roofing materials utilized in performance of each type of work shall be the products of one manufacturer or supplier. Unless otherwise indicated, the materials to be used in this specification are those specified and denote the type, quality, performance, etc. required. All proposals shall be based upon the use of the specified material.
9. All materials used on the Project shall be asbestos free.

B. Installer:
   1. Installer shall submit résumé and list of project experience for the proposed system, to be reviewed by Project Manager and jobsite superintendent.
   2. Installer shall submit list of all subcontractors with evidence of subcontractors' insurance coverage, in compliance with contract requirements.
   3. Installer shall have approval by manufacturer of accepted roofing system for installation, and issuance of specified warranty for a minimum of three (3) years. Proof of license agreement dated at least three (3) years prior to date of bid opening shall also be provided.
   4. Installer shall be an experienced single firm specializing in the type of roofing and sheet metal work specified, with a minimum of five (5) years of previous successful experience on projects similar in size and scope.
   5. No subcontracting of sheet metal fabrication or installation will be allowed. Roofing contractor must have a sheet metal shop on the company premises.

C. Regulatory Requirements:
   1. All work shall conform to those requirements identified by the Division of the State Architect for public schools and the 2022 edition of the California Building Code:
      a. This roof is identified as a Class A Roof.

D. Laboratory Testing and Samples:
   1. Architect may require tests and inspections as necessary to verify quality of roofing materials and workmanship. Laboratory tests will be performed in accordance with ASTM procedures.
   2. Owner will select testing laboratory and will pay for work required by testing laboratory. Contractor shall assume all costs for extraction and patch of all samples.
   3. Contractor shall pay for inspections and retesting of work that fails.
   4. Contractor shall correct all deficiencies identified by the Architect in accordance with manufacturer's recommended procedures at no cost to Owner.

E. Inspections/Tests:
   1. The Architect's and manufacturer's representative shall at all times have access to the jobsite and work areas. Contractor will provide proper and safe facilities for such access and inspection:
      a. Architect inspections: The Architect will be providing periodic inspections throughout the duration of the Project. Architect's representative shall be required to inspect after completion of each major phase of roof construction for approval.
      b. Manufacturer inspections:
         1) An inspection shall be made by a representative of the material manufacturer to ensure that said Project is installed in accordance with the manufacturer's specifications and illustrated details. Written reports by the manufacturer shall be turned over to the Architect.
         2) The authorized material manufacturer's field representative shall be responsible for:
            a) Keeping the Architect informed after periodic inspections as to the progress and quality of the work observed.

b) Calling to the attention of Contractor those matters observed that are considered to be in violation of the contract requirements.
c) Reporting to the Architect, in writing, any failure or refusal of Contractor to correct unacceptable practices called to his attention.
d) Confirming, after completion of the work, and based on his observation and test, that he has observed no application procedures in conflict with these specifications.

F. Pre-Installation Conference: Pre-installation meeting shall be conducted onsite.

1.5 WARRANTY

A. All materials shall be manufactured, specified, or accepted in writing by membrane manufacturer issuing the warranty.

B. Make arrangements with the materials manufacturer to provide required inspections for issuance of warranty. Final warranty shall be submitted to Architect at time of Substantial Completion.

C. Roofing Manufacturer:
1. Warrant the roofing and associated work for minimum 20 years from date of Substantial Completion as follows:
   a. The warranty shall be a no dollar limit (NDL) with no penal sum type, with total replacement cost.
   b. The warranty shall guarantee the entire roof system and associated work against defective materials and workmanship of installation, with no exclusion for ponding water.
   c. The roof system, including roof insulation, flashing, metal work, labor, and material shall be guaranteed against failure of workmanship and materials. Repair of the system, including materials and labor, shall be done at no cost to the Owner.

D. The roofing contractor shall jointly, with any subcontractors employed by him, guarantee the work required and performed under this contract is free from defects in workmanship and materials, and that the building will be and remain waterproof for a five (5) year warranty period, after the Architect accepts the work as substantially complete. The warranty shall be in approved notarized written form to obligate Contractor and subcontractors to make good the requirements of the warranty. The warranty will be held jointly with the bonding company for the first two (2) years and the manufacturer for the remaining three (3) years.

E. Substantial Completion of Work:
1. Manufacturer’s warranty: Manufacturer’s written warranty as specified.
2. Maintenance procedures: Three (3) copies of manufacturer’s printed instructions for Owner’s use regarding care and maintenance of roof.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original unopened packaging with all tags and labels intact and legible. Carton and can labels shall indicate appropriate warnings, storage conditions, lot numbers, and usage instructions. Handle and store materials and equipment in such a manner as to avoid damage. Coordinate material storage with District.

B. Manufacturer's packaging and/or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be the minimum acceptable for exterior coverings. All materials stored as above shall be a minimum of four inches (4”) off the substrate, and the tarpaulin tied off with rope.

C. Products liable to degrade as a result of being frozen shall be maintained above 40 degrees F in heated storage.

D. Moisture sensitive products shall be maintained in dry storage areas or properly covered. Roofing insulation and felts must always be covered or stored in a dry area when not being used.

E. The proper storage of materials is the sole responsibility of Contractor. Materials damaged in shipping or storage shall not be used. Wet or damaged roofing materials shall be discarded, removed from jobsite, and replaced with new materials prior to application.

F. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day. Any exception must be in written form. Do not place materials or equipment in such a manner as to overload structure.

PART 2 PRODUCTS

2.1 APPROVED PRODUCTS AND MANUFACTURERS

A. Unless noted otherwise, specifications are based on products of manufacturers listed below. Manufacturers whose products meet or exceed the specifications, who have manufactured and installed roof materials and systems of the type specified for a minimum of ten (10) years, and who maintains a single source responsibility for the total roofing system, as described herein, may apply for approval as a substitution in accordance with Division 01 requirements regarding substitutions. It is recommended that all procured products are from the same manufacturer for compatibility considerations. The following are approved manufacturers:
   1. Carlisle, Phoenix, AZ; (800) 479-6832.
   2. Soprema, Wadsworth, OH; (800) 356-3521.
   3. GAF Wayne, NJ (800) 766-3411.
   4. Siplast, Inc., Irving, TX; (800) 922-8800.

2.2 ROOFING SYSTEM ASSEMBLY UNDERLAYMENT DESCRIPTION

A. Base Sheet:
   1. Shall be a heavy duty (plus) base sheet or venting base as approved by proposed manufacturer needed for roofing deck

B. Dry Sheathing Paper (for Use as a Slip Sheet): Rosin coated,five (5) pounds per 100 square feet.

2.3 ROOF MEMBRANE ASSEMBLY/SYSTEM DESCRIPTION

A. A roof membrane assembly consisting of two (2) plies of a prefabricated, reinforced, homogeneous polymer modified asphalt membrane, secured to specified insulation or substrate, described herein. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system. Contractor to install hot asphalt “mopped,” cold adhesive, torched, or any combination – confirm special membrane types with manufacturer. Provide components of the roof membrane assembly meeting the following physical and mechanical requirements:
   1. Modified bitumen base ply:
      a. A high performance modified bitumen base ply consisting of a reinforcing mat impregnated and coated with high quality modified bitumen.
   2. Modified bitumen finish ply:

a. A high performance modified bitumen finish ply consisting of a reinforcing mat impregnated and coated with high quality modified bitumen, and surfaced with white ceramic granules.
3. Stripping ply: Same as modified bitumen base ply.

2.4 FLASHING MEMBRANE ASSEMBLY

A. A flashing membrane assembly consisting of two (2) plies of reinforced, polymer modified asphalt membrane with a foil face for protection from ultraviolet degradation:
1. Modified bitumen flashing sheet.
2. Reinforcing ply: Same as roof system base ply.

2.5 ROOF INSULATION

A. Roofing Insulation:
1. All insulation shall be approved in writing by the membrane manufacturer as to thickness, type, and manufacturer. All insulation must be approved for the specific application for Class A roof with UL and FM Global listed ratings.
2. Polyisocyanurate roof insulation: Shall comply with ASTM C1289 and Federal Specification (FS) HH-I-1972/Gen and HH-I-1972/2, with a 20 psi minimum compressive strength. Insulation shall be surfaced on both sides with non-asphaltic fiberglass facers. Thickness shall be as indicated on Drawings over all conditioned air space. Approved product shall be Enrgy 3 as manufactured by Johns Manville, or pre-approved equal.
3. Recover board (unless noted otherwise): Glass-faced gypsum roof board, Type X Dens Deck Prime as produced by Georgia-Pacific. Board sizes shall be 48 inches by 96 inches by 1/2 inch or as indicated on Drawings for roof assembly.
a. Approved substitute: Securock by USG.
4. Tapered edge strip: 1-1/2 inches to zero inch (0”) or as required, field verify, 18 inches by 48 inches. Install at all expansion joints, curbs, projections, crickets, saddles, and base flashings. Approved material shall be as manufactured by Cant Products or pre-approved equal.

2.6 ROOFING ACCESSORIES

A. Roofing Adhesives:
1. Mopping asphalt:
a. Asphalt that has been certified for full compliance with the requirements for Low Fume Type IV asphalt listed in Table I, ASTM D312. Each container or bulk shipping ticket shall indicate the equiviscous temperature (EVT) the finished blowing temperature (FBT) and the flash point (FP):
1) Approved product: Trumbull Low Fume asphalt.
2) Or approved equal
2. Cold adhesive (if applicable):
a. An asphalt-based adhesive formulated especially for adhering polymer modified asphalt roofing membranes and base plies. Adhere shall be UL and FM listed and approved.

B. Bituminous Cutback Materials:
1. Primer: A high flash, quick drying, asphalt solvent blend that meets or exceeds ASTM D41 requirements.
2. Flashing cement: A heavy-bodied all-weather trowel grade mastic, used as a base for laying-up cold process flashing membrane where fast setting adhesives are required.

C. Liquid Applied Modified Bitumen Flashing System:
1. New flashings with new bituminous flashing system. Three-course flashing installation

at penetrations and protrusions.
2. Fast cure liquid membrane flashing system.
3. Flashing drains, penetrations, protrusions, electrical penetrations, low curb details, I-beams, and other similar or unconventional conditions.
4. Warrantable with roofing system. Include in roof system warranty.
5. Approved manufacturers:
   a. Carlisle Companies
   b. Soprema
   c. GAF
   d. Siplast.
   e. Or approved equal.

D. Sealants:
1. A single component, high performance, elastomeric sealant conforming to ASTM D232 or ASTM C920 requirements. Acceptable types are as follows:
   a. Sonolastic NP 1 manufactured by Sonneborn LLC; Minneapolis, MN (612) 835-3434.
   b. Or approved equal.

E. Heat-Resistant, High-Temperature Sealant:
1. Dowsil 736 Heat Resistant Sealant by Dow.
2. RTV 382 by Intek Sealants & Adhesives.
3. High Temp RTV Silicon #26C by Permatex.
4. Superflex Red High Temp RTV by Loctite.
5. #1300 Rubber and Gasket Adhesive by Scotch Grip.
6. Sikasil GP HT (High Temperature) by Sika (up to 500-degrees, long-time lead item).

F. Ceramic Granules: No. 11 Grade ceramic roofing granules of color scheme matching the granule surfacing of the finish ply.

G. Walkpads/Protection Pads:
1. Provide cut sections of granule surfaced polyester reinforced modified bitumen sheet:
   a. Walk pads shall have contrasting granule color from roofing surfacing.
   b. Provided walk pads shall be installed at point of roof access, and at service points of all roof mounted equipment.
   c. Protection pads shall have rounded corners and extend minimum four inches (4”) beyond edge of equipment.
   d. Provide new protection pads under all pipe supports, at HVAC and mechanical access points, raised electrical conduit, and in front of all roof top doors and openings.

H. Fasteners:
1. Shall be Factory Mutual approved and as recommended by the manufacturer for the specific application.
2. Nails: Stainless steel ring shank, size as required to suit application, minimum 11-gauge with 3/8-inch diameter head.
3. Iron-lok toggle: Shall be a toggle bolt with minimum 0.215-inch diameter shank and minimum 20 threads per inch, with a 2-1/2-inch wingspan, with wing activated adhesive and pressure plate, as manufactured by OMG Roofing.
4. Fastener for brick/masonry: Shall be 1/4-inch by two inches (2”), stainless steel nail, one-piece unit, flat head, as manufactured by Rawl Zamac Nailin, or approved equal.
5. Fastener for wood and insulation (over steel decks): Shall be a minimum #14 Factory Mutual approved fastener, fluorocarbon coated, with CR-10 coating. A minimum 0.200-inch diameter shank and 0.250-inch diameter thread. To be used with Factory Mutual approved, round pressure plates or bar, and having a fluorocarbon CR-10 coating, when subjected to 30 Kesternich cycles (DIN 50018) shows less than ten percent

(10%) red rust, which surpasses Factory Mutual Approval Standard 4470 as manufactured by Olympic Manufacturing Group, Inc., or pre-approved equal. Stainless Steel 304 when used with ACQ treated lumber.

2.7 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Other materials shall be as shown, specified, or required and be of the best grade for the proposed use as recommended by the manufacturer:
   1. Expansion joint: As detailed on Drawings and outlined in NRCA and SMACNA manuals.
   2. Low level expansion joints, as noted on the Drawings. Install as per manufacturer's recommendations:
      a. Situra Inc. RedLINE low level expansion joint details.
      b. Approved substitute: Soprema's Sopra Joint.
   3. Sealant backer rod:
      a. Provide compressible rod stack of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam, or other flexible, permanent, durable, non-absorptive material as recommended by sealant manufacturer for back-up of, and compatibility with, sealant.
      b. Where used with hot-applied sealant, provide heat-resistant type that will not be deteriorated by sealant application temperature as indicated.
   4. Pipe hangers and supports: Provide and install all necessary supports for gas lines, conduit, chilled water lines, duct work, condensate lines, etc.
   5. Cant strips: Shall be perlite where used for non-structural purposes, or treated solid wood where used for structural purposes meeting NRCA, Factory Mutual, and Underwriters Laboratory guidelines. If solid wood cant is used where insulation exists, cant is to be toe nailed into a treated solid wood nailer the same height as insulation.
   6. Termination bar:
      a. Material: Extruded aluminum bar with lip profile.
      b. Size: 0.090-inch thick by 3/4-inch wide with 3/16-inch lip width and a 45-degree lip angle, factory punched 1/4-inch by 3/8-inch oval holes spaced six inches (6") on center.
      c. Approved manufacturer: OMG Roofing Products or approved equal.
   7. Liquid applied roof flashing material:
      a. Flashing pipe penetrations, low curb details, I-beams, and other similar or unconventional conditions.
      b. Approved manufacturers:
         1) Carlisle Companies
         2) Soprema
         3) GAF
         4) Siplast

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Weather Condition Limitations:
   1. Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer's recommendations and warranty requirements:
      a. Roofing application with moisture present will not be accepted; apply roofing in dry weather.
      b. Do not attempt construction of the roofing system when the reported or calculated dew point are within three (3) degrees of each other.
      c. Do not apply roofing when ambient temperature is below 45 degrees F.

B. Contractor to monitor and record readings every two (2) hours or when conditions change. Contractor will have records available for review when required by Architect and/or District.

C. Do not allow waste products, petroleum, grease, oil solvents, mineral oil, and other contaminants to come into contact with the roofing system before or during installation.

3.2 FIELD QUALITY CONTROL AND INSPECTIONS

A. Some of the indicated materials are extremely flammable and/or toxic. Use precautions indicated on can and/or carton labels.

B. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck.

C. If torches are used, Contractor shall maintain a three (3) hour fire watch after completion of torching of each day's work. Provide a 20-pound fire extinguisher near torch at all times. Use a thermal infrared thermometer to monitor all roof areas.

D. Contractor is to verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. Contractor is to perform all work in such a manner as to avoid contact with the above-mentioned items.

E. Roof cuts shall be performed and repaired at Contractor's expense. Cuts shall be made in the areas indicated by the Architect's representative. Send required roof cuts to roof membrane manufacturer for laboratory examination. Roof cuts required by the Architect's representative shall be furnished to the Architect's representative for testing.

F. Remove not more than one (1) 12-inch by 12-inch cut per 5,000 square feet of roof area or fraction thereof.

G. Field audit will follow criteria outlined in current roof membrane manufacturer's reference manual.

H. Repair sampled areas with feathered-in patch consisting of same number of plies as in the roof specification.

I. Correct deficiencies in roof as prescribed in current roof membrane manufacturer's reference manual and as approved by Architect's representative.

3.3 CLEANING AND PROTECTION

A. Contractor shall keep the jobsite clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.

B. Leave all areas around jobsite free of trash, debris, roofing materials, equipment, and related items after completion of work.

C. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.

D. Remove bitumen stains from walls, walkways, and driveways.

END OF SECTION 07 52 00

SECTION 07 56 00 FLUID APPLIED ROOF COATING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The new roof coating system shall consist of a liquid applied waterproofing membrane, flashings, and finish layers as specified herein as roof repair and maintenance.

B. Work shall include, but is not limited to, the following:
1. Preparation of existing (new), built-up roof, and all flashing substrates to be repaired.
2. Liquid applied acrylic roof coating.
3. All related materials and labor required to complete specified waterproofing necessary to receive specified manufacturer's warranty.

C. Related Sections:
1. Section 01 10 00: Summary
2. Section 07 52 00: Modified Bitumen Membrane Roofing
3. Section 07 62 00: Sheet Meal Flashing and Trim
4. Section 07 72 00: Roof Accessories
5. Section 07 62 00: Sheet Metal Flashing and Trim

D. Reference Standards:
1. American Society of Civil Engineers:
   a. ASCE 7 Minimum Design Loads for Buildings and Other Structures.
2. American Standard of Testing Methods (ASTM):
   a. ASTM C836 Standard Specification for High Solids Content, Cold Liquid applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
   b. ASTM C920 Standard Specification for Elastomeric Joint Sealants
   c. ASTM D1079 Standard Terminology Relating to Roofing and Waterproofing.
3. American National Standards Institute (ANSI):
   a. ANSI/SPRI FX-1 Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.
   b. ANSI/SPRI IA-1 Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.
4. Factory Mutual (FM):
   a. FM 4435 Edge Systems Used With Low Slope Roofing Systems.
   b. FM 4450 Class I Insulated Steel Roof Decks.
   c. FM 4470 Single-Ply, Polymer-Modified Bitumen Sheet, Built-up Roof (BUR), and liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof deck Construction.
   d. FM 4474 Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures.
5. National Roofing Contractors Association (NRCA):
   a. The National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual (Current Edition) Glossary.
6. Underwriter's Laboratories Inc. (UL):
   a. UL 790 Standard for Safety Standard Test Methods for Fire Tests of Roof

Coverings.
b. UL 1256 Standard for Safety Fire Test of Roof Deck Constructions.

1.3 SUBMITTALS

A. Product Data Sheets: Submit manufacturer's product data sheets, installation instructions, and/or general requirements for each component.

B. Safety Data Sheets: Submit manufacturer's safety data sheets (SDS) for each component.

C. Sample warranty from the manufacturer and Contractor.

D. Provide roof plan and representative detail drawings.

E. Submit a letter from the roofing manufacturer indicating the Contractor is an authorized applicator.

F. Warranty: Provide manufacturer's and Contractor's warranties upon Project completion.

1.4 PERFORMANCE REQUIREMENTS

A. Wind Uplift Resistance:
1. Performance testing shall be in accordance with FM 4474, FM 4450, FM 4470, UL 580 or UL 1897:
   a. Roof system design pressures: Calculated in accordance with ASCE 7, or applicable standard, for the specified roof system attachment requirements.

B. Roof Slope: Finished roof slope for liquid applied membrane surfaces shall be 1/4 inch per foot (2%) minimum for roof drainage or as allowed under current existing conditions for this patch and repair roof or by applicable building and jurisdictional codes for roof assembly.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
1. Manufacturer shall have 20 years of manufacturing experience.
2. Manufacturer shall have trained technical service representatives employed by the manufacturer, independent of sales.
3. Manufacturer shall provide site visit reports in a timely manner.

B. Contractor Qualifications:
1. Contractor shall be authorized by the manufacturer to install specified materials prior to the bidding period through satisfactory Project completion.
2. Applicators shall have completed projects of similar scope using same or similar materials specified.
3. Contractor shall provide full time, onsite foreman experienced with the specified roofing from beginning through satisfactory Project completion.
4. Applicators shall be skilled in the application methods for all materials.
5. Contractor shall maintain a daily record onsite, documenting material installation and related Project conditions.
6. Contractor shall maintain a copy of all submittal documents onsite, available at all times for reference.

C. Substrate Evaluation:

1. Contractor shall evaluate substrate moisture content and adhesion of materials to substrate throughout the work and record with daily inspection reports or other form of reporting acceptable to the Owner or his designated representative:
   a. Moisture content: Evaluate substrate moisture content to determine acceptability for application of the specified liquid applied materials. Moisture testing shall be performed by means suitable to the Project application, or by testing substrate relative humidity (RH) in accordance with ASTM F2170 when needed, required, or if substrate moisture content is in question.
   b. Adhesion: Evaluate soundness and surface preparation of existing material substrates. Prepare representative areas using specified methods complete with applied primer and coating membrane. Test for minimum acceptable tensile bond strength values as required in accordance with ASTM D4541. Evaluate all areas where existing roofing appears to differ in appearance or consistency, if multiple areas are involved in the scope of work, evaluate each area with a minimum of three (3) tests for every 1,000 square feet or as required by Project conditions.

1.6 WARRANTY

A. The Contractor shall guarantee the workmanship and shall provide the Owner with the Contractor's warranty covering workmanship for a period of two (2) years from completion date.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Refer to each product data sheet or other published literature for specific requirements.

B. Deliver materials and store them in their unopened, original packaging, bearing the manufacturer's name, related standards, and any other specification or reference accepted as standard.

C. Protect and store materials in a dry, well-vented, and weatherproof location. Only materials to be used the same day shall be removed from this location. During cold weather, store materials in a heated location, removed only as needed for immediate use.

D. Properly dispose of all product wrappers, pallets, cardboard tubes, scrap, waste, and debris. All damaged materials shall be removed from jobsite and replaced with new, suitable materials.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Single Source Manufacturer:
   1. All coating materials shall be manufactured by a single supplier with 20 years or more roofing and waterproofing manufacturing history in the US.
   2. Comply with the manufacturer's requirements as necessary to provide the specified warranty.

B. Acceptable Manufacturer:
   1. CARLISLE COMPANIES, located in Phoenix, AZ; Tel: 800-479-6832; Website: www.carlislesyntec.com.
   2. Acceptable alternate manufacturers must be reviewed by the Design Project Manager.

2.2 ACRYLIC COATINGS

A. X-Trenda Coat Classic Coating is a 100% acrylic, single-component, water-based, premium quality elastomeric coating for spray, brush, or roller application. This product is designed to provide protection for a wide range of building surfaces such as roofs, vertical walls, and masonry. It is excellent for waterproofing and restoring existing roof systems. X-Tenda Coat Classic Acrylic coating is applied in multiple coats, with a minimum base coat (BC) and a topcoat (TC) for finishing. X-Tenda Coat Classic TC can be used as a top or base coat. X-Tenda Coat Classic BC can be used as a base coat but is not recommended as the top finish coat.

2.3 ACCESSORIES

A. Primers:
   1. X-Tenda Coat Epoxy Primer, X-Tenda Coat Acrylic General Purpose Primer (Blac), X-Tenda Coat Bleed Block Primer (Red) and X-Tenda Coat TPO Primer are all acceptable for use with this restoration coating system.

B. Other Carlisle Products and Related Products:
   1. X-Tenda Coat Classic Acrylic Mastic, X-Tenda Coat Classic Acrylic, X-Tenda Coat Micro Fiber, X-Tenda Coat Reinforcing Fabric and X-Tenda Coat Membrane Cleaner are used with this restoration coating.
   2. Granules, Rollers with 1/2” Nap, Brushes, 2,000 psi rated power washer, Detergent

PART 3 EXECUTION

3.1 EXAMINATION

A. General:
   1. Safety Data Sheets (SDS) must always be on location during transportation, storage, and application of materials. The applicator shall follow all safety regulations as recommended by OSHA, and/or other agencies having jurisdiction.
   2. Comply with building owner requirement for onsite material storage and campus regulations. Place dumpster and other equipment in areas which have been designated by the building owner.
   3. The worksite must be kept in an organized and in orderly fashion. All waste products must be removed and disposed of in accordance with local ordinances.

3.2 SURFACE INSPECTION

A. The assessment and examination of the existing roof system to be restored shall be performed by the Carlisle authorized roofing applicator or Carlisle technical representative. The assessment and examinations shall focus on the condition of the roof surface applicator or Carlisle technical representative. The assessment and examinations shall focus on the condition of the roof surface applicator or Carlisle technical representative. The assessment and examinations shall focus on the condition of the roof surface and the components to be restored.

B. When in-depth investigation is needed to assess the entire existing roof assembly. A roof consultant shall be obtained by the building owner to conduct such investigation. Investigation shall identify all necessary system repairs prior to commencing restoration work.

3.3 SUBSTRATE PREPARATION

A. Do not commence with surface repairs unless all system related issues and imperfections have been addressed by the building owner and their design representative.

B. Clean and prepare surface to receive the restoration coating. Remove all dirt, loose and flaking particles, grease, oil, laitance, pollution fallout, and other contaminants that may interfere with proper adhesion.

3.4 SURFACE REPAIR AND DETAIL WORK

A. Refer to Carlisle Technical Manual for Restoration Coating Surface repairs and detail work.

3.5 COATING APPLICATION

A. Do not apply coating if weather conditions will not permit complete cure (24-hour period) before rain, dew, fog or freezing temperatures occur.

B. Using a high-pressure compressed air or an air blower, blow all dust, dirt, and other contaminants off the treated roof surfaces.

3.6 CLEAN UP

A. Allow coating to dry before subjecting the surface to traffic. Drying conditions will vary depending on temperature and humidity levels. Consult the specific Product Data Sheets for estimated cure time.

B. When applicable, provide owner representative with instructions on accessing the roof following the coating application.

3.7 ROOF WALKWAYS

A. Refer to Carlisle Technical Manual for Restoration Coating Roof Walkways.

END OF SECTION 07 56 20

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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. It is the intent of this Section that the work shall:
   1. Conform to all applicable DSA and building code requirements.
   2. Include all shop and field formed sheet metal work shown on Drawings, specified, or required, including, but not limited to:
      a. Roof penetration sleeves, collars, hood, and umbrella counterflashing.
      b. Metal counterflashing.
      c. Expansion joint.
      d. Metal perimeter edge.
      e. Gutters, downspouts, splash blocks and splash pans.
      f. One-way roof moisture relief vents.
      g. Metal gravity vents.
      h. Metal heat exhaust vents.
      i. Sanitary vent pipes.
      j. Pipe box.
      k. Copings, trim, and miscellaneous sheet metal accessories.

B. Related Sections:
   1. Section 06 10 00: Rough Carpentry.
   2. Section 07 52 00: Modified Bitumen Membrane Roofing.
   3. Section 07 56 00: Fluid Applied Roofing Coating.
   4. Section 07 72 00: Roof Accessories.
   5. Section 07 92 00: Joint Sealants.

C. Reference Standards:
   1. ASTM International (ASTM):
      a. A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
      b. B32 Standard Specification for Solder Metal.
      c. C1107 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
   2. National Association of Architectural Metal Manufacturers (NAAMM).
   3. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual.
   4. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Product Data:
   1. Manufacturer’s specifications and other data needed to prove compliance with specified requirements.
   2. Manufacturer’s installation instructions.

B. Shop Drawings: Indicating sizes, configurations, and details of attachment to related and

adjacent work, materials, and finishes.

C. Samples:
1. Full range of finish colors for Architect's selection.
2. 12-inch long sample of each specified item with approved finish.
3. Provide full size mockup of all shop built assemblies.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Fabricator and installer of roof related flashing and accessories shall be the same as the membrane roof installer.

B. Comply with governing codes and regulations of authorities having jurisdiction.

C. Installation Conference:
1. Refer to Section 01 31 00: Project Management and Coordination.

1.5 WARRANTY

A. Manufacturer's Product Warranty:
1. Manufacturer's standard 20-year Kynar 500 or Hylar 5000 finish warranty signed by the manufacturer, with guarantee covering any failure of the fluoropolymer finish during the warranty period.
2. Failure is defined to include, but is not limited to, deterioration of finish, such as fading, discoloring, peeling, cracking, corroding, etc.
3. Correction may include repair or replacement of failed product.

B. Roofing Contractor’s Warranty:
1. Contractor shall warrant the sheet metal work and related work to be free from defects in workmanship and materials, and that the metal flashings will be and remain watertight, for a period of five (5) years from date of Substantial Completion.
2. Defects shall include, but not be limited to:
a. Leaking water or bitumen within building or construction.
b. Becoming loose from substrate.
c. Loose or missing parts.
d. Finish failure as defined above.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Handle and store materials and equipment in such a manner as to avoid damage.

C. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day. Any exception must be in written form. Do not place materials or equipment in such a manner as to overload structure.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Manufacturers named within specification are approved for use on the Project providing:
1. Their products meet or exceed the specifications.
2. Company has a minimum of five (5) years’ experience manufacturing products of the type specified.

3. Products have been tested in conjunction with roofing membrane system as an assembly and as such has obtained the same approval and rating as the roofing membrane system.
4. Products are approved for use by the roofing membrane manufacturer.

B. Substitutions shall be in accordance with Division 01 requirements regarding substitutions.

2.2 SHEET METAL MATERIALS

A. General Requirements: Roofing sheet metal system shall have been tested in conjunction with roofing membrane system as an assembly and have the same approval and rating as the roofing membrane system.

B. Prefinished Aluminum Sheet:
1. Precoated type, aluminum conforming to Fed. Spec. QQ-A-250, ASTM B209.
2. Finish: Kynar 500, color as selected by Architect from manufacturer's standard colors.
3. Thickness: Minimum 0.040 inch, except as otherwise indicated.

C. Sheet Lead: Four (4) pound minimum for use at roof drains and soil stacks.

D. Stainless Steel: Type 302/304 Soft Temper, No. 2D finish. Minimum thickness 24 gauge, except as otherwise noted.

2.3 FASTENERS

A. Same metal as flashing/sheet metal or other noncorrosive metal or as noted below.

B. Exposed fasteners shall be self-sealing and gasketed for weathertight installation (ZAC type).

C. Match finish of exposed heads with material being fastened.

D. Mechanical Fasteners:
1. Nails: Stainless steel ring shank, minimum 1-1/2 inch in length with 1/2-inch diameter head.
2. Washers: Steel washers with bonded rubber sealing gasket.
3. Screws: Self-tapping sheet metal type of stainless steel or compatible with material being fastened, with hooded integral EPDM washers (ZAC type).
4. Rivets: Stainless steel and cadmium plated material, closed end type of sizes recommended by sheet metal manufacturer to suit application.

E. Clips: Continuous cleat (coping/fascia). Minimum 20-gauge, G-90 galvanized, stainless steel, or aluminum. Match material of coping/fascia and provide one (1) gauge heavier.

2.4 RELATED MATERIALS

A. Solder: ASTM B32, alloy grade 58, 50 percent tin, 50 percent lead.

B. Flux:
1. Phosphoric acid type, manufacturer’s standard:
   a. For use with steel or copper: Rosin flux.
   b. For use with stainless steel: Acid-chloride type flux, except use rosin flux over tinned surfaces.

C. Underlayment:

1. 48 mil minimum, non-reinforced, homogeneous, waterproof, impermeable elastomeric sheeting manufactured by Nervastral, Inc. or Lexus Co.

D. Adhesives: Type recommended by flashing sheet manufacturer seaming and adhesive application of flashing sheet to ensure adhesion and watertightness.

E. Metal Accessories: Sheet metal clips, straps, anchoring devices, clamps, and similar accessories required for the complete installation of work, matching or compatible with material being installed, non-corrosive, and size and gauge recommended by installer to suit application and performance.

F. Sealant:
1. Type A:
   a. Type: One-part, non-sag, moisture-curing polyurethane sealant.
   b. Approved products/manufacturers:
      1) Chem-Calk 900, manufactured by Bostik Construction Products Division.
      2) Vulkem 921, manufactured by Mameco International, Inc.
      3) Dynatrol I, manufactured by Pecora Corporation.
      4) NP 1, manufactured by Sonneborn Building Products.
      5) Approved equal.
2. Type B:
   a. Type: One-part, neutral-curing, medium-modulus silicone sealant for sealing metal to metal surfaces, i.e. metal edge, cover plates, etc.
   b. Approved products/manufacturers:
      1) Chem-Calk 1200, manufactured by Bostik Construction Products Division.
      2) 795 Silicone Building Sealant, manufactured by Dow Corning Corporation.
      3) 895 Silicone, manufactured by Pecora Corporation.
      4) Omniseal, manufactured by Sonneborn Building Products
      5) Spectrem 2, manufactured by Tremco Incorporated.
      6) Approved equal.

G. Grout - Pitch Pans:
1. Type: Quick-setting, non-shrink, non-metallic, high strength formula complying with ASTM C1107.
2. Approved products/manufacturers:
   a. Sure Grip High Performance Grout, manufactured by Dayton Superior Corporation.
   b. Premier Quick-Trim, manufactured by L & M Construction Chemicals, Inc.
   c. Masterflow, manufactured by Master Builders, Inc.
   d. Sonnogrout 10K, manufactured by Sonneborn Building Products.
   e. Approved equal.

H. Pitch Pan Filler:
1. Type: Pourable polyurethane sealer, approved by roofing system manufacturer.
2. Approved products/manufacturers:
   a. Quick Pitch Sealer, manufactured by U.S. Intec.
   b. SPM Pourable Sealer, manufactured by Johns Manville.
   c. Approved equal.

I. Termination Bar:
1. Material: Extruded aluminum bar with flat profile.
2. Size: 1/8-inch thick by one-inch (1”) wide with factory punched 1/4-inch by 3/8-inch oval holes spaced six inches (6”) on center.
3. Approved product/manufacturer:
   a. TB 125, manufactured by TruFast Corp.
   b. Approved equal.

J. Pipe Hangers and Supports: Refer to Section 07 72 00: Roof Accessories.

K. Splash Blocks: Concrete type, of size and profiles indicated; minimum 3,000 psi compressive strength at 28 days, with minimum five percent (5%) air entrainment. Use at locations where roof drainage dumps on ground.

L. Splash Pans: 22-gauge stainless steel, of size and profiles indicated. Use at locations where roof drainage discharges over adjoining, lower roof level(s).

M. One-Way Moisture Relief Vents: Shall be fabricated from spun aluminum as recommended by roofing manufacturer.

2.5 FABRICATION

A. Except as otherwise indicated, fabricate work in accordance with SMACNA Architectural Sheet Metal Manual and other recognized industry practices and reviewed shop drawings. Form all flashings, receivers, and counterflashings in accordance with standards set forth in the NRCA roofing manual and SMACNA.

B. Comply with manufacturer's installation instructions and recommendations.

C. Unless noted otherwise, fabricate perimeter edge/fascia, scuppers, gutters, downspouts, copings, counterflashings, wind clips, and trim from pre-finished aluminum sheet steel.

D. Shop fabricate work to greatest extent possible. Fabricate inside and outside corners for metal edges, counterflashing, and coping caps of equal length – minimum two-foot (2’) lengths.

E. Fabricate items to size and dimensions as indicated on the Drawings. Limit single-piece lengths to ten feet (10’).

F. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work sufficient to permanently prevent leakage, damage, or deterioration of the work.

G. Integrate flashing in a manner consistent with detailing. Form work to fit substrates.

H. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling or fullness in metal after installation.

I. Fabricate items with straight lines, sharp angles, smooth curves, and true levels. Avoid tool marks, buckling, and oil canning.

J. Fold back edges on concealed side of exposed edge to form hem.

K. Unless noted otherwise, lap joints minimum one inch (1”). Rivet and solder joints on parts that are to be permanently and rigidly assembled.

L. Seams:
1. Wherever possible, fabricate non-moving seams in sheet metal with flat-lock seams and end joints.
2. Pre-finished galvanized steel: Seal pre-finished metal seams with rivets and silicone sealant.
3. Metal other than aluminum: Tin edges to be seamed, form seams, and solder.

M. On Kynar 500 or Hylar 5000 pre-finished metal, surface sand metal flanges prior to applying any primers. Prime all metal in contact with bituminous material.

N. Back-paint all concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals.

O. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used or would not be sufficiently waterproof or weatherproof, form expansion joints of intermeshing hooked flanges, not less than one-inch (1") deep filled with mastic sealant concealed within joints.

2.6 FABRICATED ITEMS

A. Metal Flashings (Minimum ten-foot [10'] lengths):
   1. Through wall receiver tray: Minimum 24-gauge stainless steel, through wall receivers shall not extend past the face of the exterior veneer more than 3/4 inch.
   2. Counterflashing: Minimum 24-gauge stainless steel.

B. Wind Clips: Minimum 24-gauge stainless steel (or match material of counterflashing), one-inch (1") wide by length to engage counterflashing a minimum of 1/2 inch. To be installed at all wall flashings and at curb flashing lengths longer than five feet (5').

C. Roof Penetrations:
   1. Umbrella counterflashing: Two-piece construction of minimum 24-gauge stainless steel, fabricated in accordance with Drawings or Project requirements.
   2. Pitch pans:
      a. 24-gauge stainless steel.
      b. Fabricate to provide installed minimum clear inside perimeter dimension of two inches (2") on each side of penetrating element.
      c. Fabricate pans to at least six inches (6") above the finished roof membrane and with 1/4-inch hem at top edge and with four-inch (4") flanges. Round all corners of flange.
      d. Fabricate metal bonnets for all pans, no exceptions. Fabricate bonnets with metal compatible with metal to which bonnet is to be attached. On beams and other steel, weld in place bonnets fabricated from 1/4-inch steel plate. Draw band bonnets fabricated from 22-gauge stainless steel may be used on circular projections.

D. Metal Edge:
   1. Minimum 0.040-inch thick pre-finished aluminum formed in maximum ten-foot (10') lengths, with six-inch (6") wide cover plates of same profile, four-inch (4") flange, maximum seven-inch (7") fascia, 3/4-inch gravel stop.
   2. Provide expansion slip joints at maximum 20 feet on center.
   3. Shop fabricate all interior and exterior corners. Fabricate exterior corners with 18-inch minimum to four-foot (4') maximum legs. Lap, rivet, and seal prior to delivery to jobsite.
   4. Fabricate to sizes and dimensions as indicated on Drawings with a minimum one-inch (1") coverage past top of wall. Refer to SMACNA Fig. 2-5A.
   5. Provide mock-up for Architect's approval prior to fabrication.

E. Continuous Cleats: Continuous strips, same material and profile, minimum one (1) gauge heavier of item to which cleats attach.

F. Vent Hoods, Sleeves, Penetration Flashings, and Accessories: Minimum 24-gauge stainless steel, or as shown or directed otherwise.

G. Angle Termination Bar: Aluminum pressure bar 1/8 inch by one inch (1”).

H. Vent Pipe Flashing: Four (4) pound lead. Provide proper size to fold down inside of pipe a minimum of one inch (1”).

I. Roof Drain Flashing: Four (4) pound lead, minimum 30 inches by 30 inches.

J. Coping:
1. Minimum 0.040-inch thick pre-finished aluminum, with six-inch (6”) wide cover plates of same profile.
2. Fabricate as outlined in SMACNA; Refer to Figure 3-4 A.
3. Provide tapered substrate to slope to one (1) side, and cover with waterproof membrane.
4. Install with continuous cleat one (1) side and fasten other side.

K. Gutters/Downspouts/Collector Heads:
1. Gutters and downspouts: Minimum 0.040-inch thick pre-finished aluminum formed in maximum ten-foot (10’) lengths, with six-inch (6”) wide cover plates. Minimum five-inch by six-inch (5” x 6”) box gutter (verify size meets rainfall data per SMACNA).
2. Gutter/downspout straps: Minimum 0.040-inch thick pre-finished (match color) aluminum. Hem both sides.
3. Gutter supports: Minimum 0.040-inch thick pre-finished (match color) aluminum hemmed around 1/8-inch galvanized bent steel bracket.
4. Gutter screen: Stainless steel 1/4-inch diamond wire screen enclosed in a pre-finished frame.
5. Collector heads: Minimum 0.040-inch thick pre-finished (match color) aluminum. As outlined in SMACNA; Refer to Figure 1-25F and Figure 1-28 with alternate Section A-A.

L. Pipe Box Cover: 24-gauge stainless steel.

M. Heat Exhaust Curbs and Hoods: 22-gauge stainless steel.

N. Expansion Joint Cover: Minimum 24-gauge stainless steel (provide pre-finished metal at perimeter edge end termination.)

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrates are smooth and clean to extent required to perform sheet metal work.

B. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set in place.

C. Verify that reglets, nailers, cants, and blocking to receive sheet metal are in place and free of concrete and soil.

D. Do not start work until conditions are satisfactory.

3.2 PREPARATION

A. Field measure site conditions prior to fabrication work.

B. Install starter and edge strips and cleats before starting installation.

3.3 INSTALLATION

A. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form 1/4-inch hem on concealed side from view. Finished work shall be free from water retention and leakage under all weather conditions. Pre-fabricated corners or transitions are required at changes in direction, elevation, or plane and at intersections. Locate field joints not less than 12 inches, nor more than three feet (3') from actual corner. Laps shall be one inch (1"), riveted and soldered at following locations:
   1. Pre-fabricated corners.
   2. Transitions.
   3. Changes in direction, elevation, and plane.
   4. At intersections.

B. Anchor units of work securely in place to prevent damage or distortion from wind or buckling. Provide for thermal expansion of metal units; conceal fasteners wherever possible; and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight and weatherproof.

C. Install fabricated sheet metal items in accordance with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.

D. Separations: Provide for separation of metal from dissimilar metal or corrosive substrates by coating concealed surfaces with zinc chromate, bituminous coating, or other permanent separation at locations of contact as recommended by manufacturer or fabricator. Do not use materials that are incompatible with roofing system.

E. Continuous Cleat: At exposed edges of perimeter edge, fascias, cap flashings, and where required, attach continuous cleat at six inches (6") on center with appropriate fasteners.

F. Gravel Guard/Fascia:
   1. Install with expansion joints ten feet (10') o.c., 1/2-inch expansion leeway, with cover plate.
   2. Set in asphalt mastic and fasten into nailer at three inches (3") o.c. staggered.
   3. Buff sand Kynar surface of flange and prime.
   4. Strip in flange with specified stripping plies set in hot bitumen extending three inches (3") from outer edge of flange to at least three inches (3") inward towards gravel stop. Provide finish stripping ply of modified bitumen base ply in hot bitumen extending six inches (6") from the outer edge of the flange and butt base of gravel stop.

G. Counterflashing:
   1. Do not use surface mount counterflashing except as noted in Drawings.
   2. Set in through wall with receiver and spring lock counterflashing, as detailed in Drawings and to NRCA roofing manual, SMACNA standards.
   3. Coordinate installation of through-wall flashing with the masonry contractor.
   4. Seal through-wall in conjunction with masonry wall waterproofing.
   5. Install wind clips 30 inches o.c. at all counterflashing over five feet (5') in length.

H. Pitch Pans, Metal Flanges:
   1. Apply mastic under pitch pan or metal flashing flange at least 1/2 pound per linear foot.
   2. Prime all metal flanges with asphalt primer prior to flashing installation.
   3. Clean all projections enclosed in pitch pans in any manner suitable and coated with a rust inhibitive coating as approved by the Architect. Coating shall be allowed to dry prior to pitch pan fill.
   4. Fill base of pitch pans with grout or cementitious binder and allow to cure.
   5. Top Finish Fill: Self-leveling, one-part urethane; at least two inches (2") to top of pitch

pan sides.

6. Strip in pitch pan flanges with two (2) strips of specified stripping plies set in hot bitumen extending three inches (3”) from the outer edge of the flange to at least three inches (3”) inward toward base of pitch pan. Provide finish stripping ply of SBS modified bitumen membrane in hot bitumen extending six inches (6”) from the outer edge of the flange and butt to base of pitch pan.

I. Sanitary Vent Stacks:
   1. Prime top and bottom flanges of lead flashing sleeve. Set flange in uniform troweling of plastic roof cement. Prime top side of flange to receive strip-in membrane.
   2. Fold lead sleeve down inside of pipe a minimum of one inch (1”). Apply a continuous bead of sealant on inside of pipe prior to folding lead sleeve.

J. Roof Drains:
   1. After membrane installation, prime bottom of lead flashing sheet and set in uniform bed of plastic roof cement at specified locations.
   2. Extend lead flashing into drain bowl or pipe a minimum of two inches (2”) and over top of piping/bowl connection, if possible. Apply a continuous bead of specified Type A sealant, at intersection of pipe and drain bowl.
   3. If drain bowl and pipe connection is contaminated with bituminous material, strip-in area with three-coursing of plastic roof cement and fabric.
   4. Prime top of lead flashing sheet to receive strip-in membrane.

K. Gutters/Downspouts:
   1. Install gutters as detailed.
   2. Install downspouts plumb and level and attached to columns or wall with straps located at top and bottom of downspout and maximum ten feet (10’) on center.
   3. Install splash pad or block under discharge port of downspouts. Install splash pan over a protection (walkway) pad for downspouts located at roof level.
   4. End caps, downspout outlets, gutter and downspout straps, support brackets, and joint fasteners to be manufactured to suit profile and dimension of gutter and downspout.
   5. Install all anchoring devices as outlined in SMACNA.
   6. Expansion joints: Lap or butt type per SMACNA, locate every 50 linear feet.

L. Expansion Joint:
   1. Construct wood curbs as shown on Drawings and as outlined in the NRCA and SMACNA manuals.
   2. Install underlayment, form envelope, and secure underlayment to curb. Fill envelope with compressible insulation.
   3. Securely fasten expansion joint cover to curb with grommetted fasteners spaced six inches (6”) on center.
   4. Taper expansion joint down at the metal edge.

M. Coping:
   1. Install wood nailers as shown on Drawings.
   2. Install metal cleats with appropriate fasteners spaced six inches (6”) on center.
   3. Install underlayment over the wood substrate. Lap ends minimum of six inches (6”) and secure membrane in place. Seal laps with appropriate adhesive.
   4. Install metal coping allowing 1/2-inch spaces between segments. Lock coping onto cleat and install appropriate fasteners through the interior fascia spaced 24 inches on center in enlarged holes.
   5. Install cover plate centered over coping joint in continuous beads of specified Type B sealant, placed approximately one inch (1”) from cover edges. Refer to SMACNA for alternate joints as required by length.
   6. Install appropriate fastener through neoprene washer and cover plate between coping segments.

7. Accommodate building wall expansion joints by terminating coping joints and cleats either side of expansion joint. Do not run coping or cleats continuous across joints. Install coping cover plate to span across joint and lap coping on each side of joint a minimum of four inches (4”). Fasten cover plate on one (1) side of joint only (provide wall flashing membrane up and over parapet wall in accordance with manufacturer’s detail).

3.4 CLEANING AND PROTECTION

A. Remove flux and residual acid immediately by neutralizing with baking soda and washing with clean water. Leave work clean of stains.

B. Remove scraps and debris and leave work area clean.

C. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes. Paint areas where finish is damaged on pre-finished metal by painting with a compatible paint in color to match undamaged finish.

D. Prime soldered area of phosphatized metal after cleaning to prevent rusting.

E. Paint metal flashings that have been soiled with bitumen with aluminized paint.

F. Clean other work damaged or soiled by work of this Section.

G. Protect finished work from damage.

END OF SECTION 07 62 00

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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Roof curbs.
2. Equipment supports.

B. Related Sections:
1. Section 06 10 00: Rough Carpentry.
2. Section 07 52 00: Modified Bitumen Membrane Roofing.
3. Section 07 56 00: Fluid Applied Roof Coating.
4. Section 07 62 00: Sheet Metal Flashing and Trim.
5. Section 07 92 00: Joint Sealants

1.3 SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.

C. Coordination Drawings:
1. Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
a. Size and location of roof accessories specified in this Section.
b. Method of attaching roof accessories to roof or building structure.
c. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

D. Warranty: Provide manufacturer’s standard warranty.

1.4 QUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's Architectural Sheet Metal Manual details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

B. Mockups: Refer to Section 07 62 00: Sheet Metal Flashing and Trim.

C. All work must conform to California Building Code.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Specifications are based on products of named manufacturers. Other manufacturers must have a minimum of five (5) years experience manufacturing products meeting or exceeding the specifications and comply with Division 1 requirements regarding substitutions to be considered.

2.2 METAL MATERIALS

A. Galvanized Steel Sheet: ASTM A653/A653M, G90 (Z275) coated.

B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, AZ50 (AZM150) coated.

C. Aluminum Sheet: ASTM B209, alloy and temper recommended by manufacturer for type of use and mill finish.

D. Aluminum Extrusions and Tubes: ASTM B221, alloy and temper recommended by manufacturer for type of use, mill finished.

E. Stainless-Steel Shapes or Sheet: ASTM A240/A240M or ASTM A666, Type 304 or Type 316, No. 2D finish.

F. Steel Shapes: ASTM A36/A36M, hot-dip galvanized to comply with ASTM A123/A123M, unless otherwise indicated.

G. Steel Tube: ASTM A500, round tube, baked-enamel finished.

H. Galvanized Steel Tube: ASTM A500, round tube, hot-dip galvanized to comply with ASTM A123/A123M.

I. Galvanized Steel Pipe: ASTM A53/A53M.

2.3 MISCELLANEOUS MATERIALS

A. Glass-Fiber Board Insulation: ASTM C726, one inch (25 mm) thick.

B. Polyisocyanurate Board Insulation: ASTM C1289, one inch (25 mm) thick.

C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, not less than 1-1/2 inch (38 mm) thick.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15 mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

E. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

G. Elastomeric Sealant: ASTM C920, polyurethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

H. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, and heavy bodied for hooked-type expansion joints with limited movement.

I. Roofing Cement: ASTM D4586, non-asbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.4 ROOF SAFETY LADDER

A. Furnish and install where indicated on plans the LAD503 Roof Safety Ladder. Refer to the Manufacturer for additional information. See approved manufacturer below:

1. O'keefe's Incorporated, https://okeeffes.com/

B. Performance Characteristics:

1. O'Keefe's Incorporated Ladder Type 503
2. High parapet access with platform and return.
3. Ladder to be fastened on wall and on opposite side of parapet.
4. Ladder to be min 4" offset from grade/finish floor
5. Ladder shall satisfy the requirements of OSHA 29 CFR 1910.29 and shall meet OSHA strength requirements with a factor of safety of two.
6. Corrosion resistant construction with a five-year warranty.

C. Posts and Rails: Tubular Schedule 40 Aluminum Pipe/Rail, minimum 1-1/4" (32mm). Refer to manufacturer for specifications.

D. Hardware: Mounting brackets shall be minimum 3/8" (9mm) thick extruded aluminum. Refer to manufacturer for specifications.

2.5 ROOF SKYLIGHTS

A. Furnish and install where indicated on plans the Fixed Double Dome Acrylic Skylight. Refer to the Manufacturer for additional information. See approved manufacturer below:

1. Velux USA, https://veluxusa.com/
2. Or approved equal

B. Performance Characteristics:

1. Double Domed Acrylic Pane.
2. Glazing to be clear over white acrylic.
3. Exterior color to be neutral gray.
4. Encapsulated inner frame to be thermally broken.
5. Corrosion resistant construction with a five-year warranty.

C. Curb Flashing: 24 Gauge Aluminum. Refer to manufacturer for specifications.

D. Fasteners: Neoprene washered fasteners. Refer to manufacturer for specifications.

2.6 PREFABRICATED ROOF CURBS

A. Frames:
   1. Material: ASTM A 653 G90 hot-dipped galvanized steel.
      d. Minimum 18 gauge, and as engineered by manufacturer.
      e. Minimum 18 gauge for curbs supporting HVAC units
      f. Minimum 20 gauge for expansion joint curbs.
   2. Corners: Mitered and welded (welds are micro sealed and prime painted after fabrication). Bolted connections not accepted.
   3. Base Plates: Integral to frame and welded.
   4. Internally reinforced with galvanized 1 inch by 1 inch by 12 gauge angles for curbs exceeding 3 foot length. Reinforce internal bulkhead at equipment curbs to support lateral loads.
   5. Wood Nailers: Factory installed, pressure treated. Size and width as suitable for support of items installed on curbs.

B. Insulation: Factory installed 1-1/2 inch thick three-pound density fiberglass insulation.

C. Curb Height: Minimum 8 inch above finished roof.

D. Construct curbs to match roof slope with plumb and level top surface for mounting mechanical equipment.

E. Gasketing: 1/4 inch thick, one (1) inch wide at roof top units.

F. Counterflashing: 24 gauge stainless steel

G. Counterflashing Cap: Stainless steel.

H. Cants:
   1. Non-canted curb style installs either under or on top of metal decks with insulation.
   2. Unless specified otherwise, cants are not required on single ply roofs. Refer to Plans and Section 07 54 20 – PVC Thermoplastic Roof Membrane for proper detailing.

I. All insulated roof curbs shall be structural and shall include calculations signed and sealed by a registered Structural Engineer. Refer to installation drawings for any additional structural requirements. If curbs do not span a minimum of two bar joists, only two angles will be required. Coordination mechanical equipment weight loading on the roof with Structural Engineer.

J. Approved Manufacturers:
   1. Custom Curb, Inc.
   2. Roof Products, Inc.

2.7 PIPE SUPPORTS

A. Gas Pipe Supports:
   1. Lines less than 3” OD: (non-penetrating)
      a. Provide strut and hanger type support with recycled plastics and carbon black for UV protection bases (10 inches x 16 inches x 3 inches; 6 lbs. each); Model Type 10-RAH-8 with strut, roller hanger and hold down clips for lines 2-1/2 inches and smaller
   2. Lines 3” OD or larger: (non-penetrating)
      b. Provide strut and hanger type support with recycled plastics and carbon black for UV protection bases (18 inches x 16 inches x 3 inches; 10 inches x 16

inches x 3 inches; minimum 6 lbs. each); Model Type Model 8H-CP (Miro) with hanger and roller chair

3. Approved Manufacturers:
   c. Miro Industries, Inc.
   d. Portable Pipe Hanger, Inc.
   e. MAPA Products
   f. Architectural approved equal

B. Electrical Conduit / Condensate Lines:
1. Lines less than 3” OD: (non-penetrating)
   g. Provide strut type support with recycled plastics and carbon black for UV protection bases (10 inches x 16 inches x 3 inches; 6 lbs. each), Model Type 16-Base Strut-8
2. Lines 3” OD or larger: (non-penetrating)
   h. Provide strut and hanger type support with recycled plastics and carbon black for UV protection bases (18 inches x 16 inches x 3 inches; 10 inches x 16 inches x 3 inches; minimum 6 lbs. each); Model Type Model 8H-CP (Miro) with hanger
3. Approved Manufacturers:
   i. Miro Industries, Inc.
   j. Portable Pipe Hanger, Inc.
   k. MAPA Products
   l. Architectural approved equal

C. Chill Water Lines/Freon line sets:
1. Lines less than 3” OD: (non-penetrating)
   m. Provide strut and hanger type support with recycled plastics and carbon black for UV protection bases (10 inches x 16 inches x 3 inches; 6 lbs. each); Model Type 10-RAH-8 with strut, roller hanger and hold down clips for lines 2-1/2 inches and smaller,
2. Lines 3” OD or larger: (non-penetrating)
   n. Provide strut and hanger type support with recycled plastics and carbon black for UV protection bases (18 inches x 16 inches x 3 inches; 10 inches x 16 inches x 3 inches; minimum 6 lbs. each); Model Type Model 8H-CP (Miro) with hanger and roller chair
3. Approved Manufacturers:
   o. Miro Industries, Inc.
   p. Portable Pipe Hanger, Inc.
   q. MAPA Products
   r. Architectural approved equal

2.8 SEISMIC SUPPORT CURB

A. Equipment / Gas lines / Electrical Conduit / Condensate Lines / Etc. positive connection to structure. Unistrut welded to two (2) 10 gauge bent plates equally spaced across 4x6 wood blocking/support curb. Plates set on neoprene isolationpad over galvanized metal cap of flashed into roof system as detailed on drawings and similar to outline of equipment support curb of NRCA guidelines.

2.9 ROOF TO ROOF EXPANSION JOINT

A. Stainless Steel expansion joint covers on new wood curbs, as detailed on drawings and outlined the NRCA and SMACNA manual.

2.10 RETROFIT ROOF DRAINS

A. Retrofit Roof Drains: “Hercules RetroDrain” as manufactured by OMG, Inc. or Architect approved equal.
   1. Size: To match existing roof drain sizes.
   2. Compliance:
      s. ANSI / SPRI RD-1.
      t. ULC / ORD-C790.4.
   3. Drain Body:
      u. Material: 1-piece, 11-gauge (0.125-inch) spun aluminum.
      v. Flange: 17-1/2-inch diameter.
   4. Drain Stem Length: 12 inches
   5. Flange Includes: Six 2-1/2-inch-long aluminum studs.
   6. Sump Area: Depressed.

B. Strainer Dome:
   1. Material: Cast aluminum.
   2. Height: 7.25 inches.
   3. Outside Base Diameter: 9.77 inches.

C. Clamping Ring:
   1. Material: Cast aluminum.
   2. Gravel Stop Height: 1.2 inches.
   3. Drainage Slots: 18 V-shaped.
   4. Bosses: 6, to accept studs on flange.

D. Backflow Seal:
   1. Compression Seal: Watertight, “U-Flow” mechanical seal.
   2. Material: Polyamide and EPDM rubber.
   3. Required for Activation: “U-Flow” screwdriver.

E. Hardware:
   1. Locknuts: 6, stainless steel, for studs.
   2. Screws: 3, stainless steel, to attach strainer to clamping ring.

F. Overflows:
   1. At overflow locations; provide overflow collar extension
   2. Constructed of spun aluminum

PART 3 EXECUTION

3.1 INSTALLATION

A. Seismic Support Curbs: Install support line for positive connection to structure of each (new and existing) gas line, electrical conduit, condensate line, mechanical ductwork, freon line sets, etc running across new roof system.
   1. Spacing: Shall not exceed twenty (20) feet on center. Curb not to exceed twelve (12) inches from any change in direction or elevation. Along with any additional locations indicated on drawings.
   2. Piping containing liquid to be supported on roller accessories similar to specified for gasline pipe support. Install hold down clips or guides to ensure piping to stay in contact with roller support or Unistrut.

B. Non-Penetrating pipe supports: Install roof accessory in accordance with manufacturer’s printed instructions and approved shop drawings.

1. Spacing not to exceed six (6) feet on center between seismic support curbs. With in twelve (12) inches from any change in direction or elevation not supported by seismic curb.
2. Provide roof manufacture protection pad below each support, tacked in place with approved mastic or adhesive.
3. Install hold down clips or guides to ensure piping to stay in contact with roller support or Unistrut.

3.2 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07 72 00

SECTION 07 92 00 JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements including but not limited to:
1. Control and expansion joints on exposed interior and exterior surfaces.
2. Perimeter joints between wall surfaces and frames of interior and exterior doors and openings.
3. Joints between plumbing fixtures and adjoining walls, floors, and counters.
4. Joints indicated or as necessary.
5. Accessories necessary for a complete installation.

B. Related Sections:
1. Section 07 52 00 – Modified Bitumen Membrane Roofing
2. Section 07 62 00 – Sheet Metal Flashing and Trim
3. Section 07 72 00 – Roof Accessories

1.3 SUBMITTALS

A. Product Data:
1. Technical data for each joint sealant product. Data to indicate elasticity and durability of each joint sealant product. Submit written certification from manufacturers of sealants attesting products are suitable for use indicated, verified through in-house testing laboratory:
   a. Written certification from manufacturers of joint sealants attesting that products comply with specification requirements and suitable for use indicated verified through manufacturers testing laboratory within the past 36 months or since most recent reformulation, whichever is most recent:
      1) Complete instructions for handling, storage, mixing, priming, installation, curing, and protection of each type of sealant.
      2) Manufacturer's letter, clearly indicating proposed lot numbers of each sealant supplied and expiration date sequence.
2. Recycled Content:
   a. Indicate recycled content; indicate percentage of pre-consumer and postconsumer recycled content per unit of product.
   b. Indicate relative dollar value of recycled content product to total dollar value of product included in Project.
   c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
   d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
3. Local/regional materials:
   a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the Project site.
   b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the Project site.
   c. Product value: Indicate dollar value of product containing local/regional materials;

include materials cost only.
   d. Product component(s) value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
4. VOC data: Submit manufacturer's product data for sealants. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
5. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

B. Samples:
1. Provide color samples from full manufacturer's full range for each type of sealant specified for Architect's review.

C. Certificates and Reports:
1. Product Certificates: Manufacturer's product certificate for each kind of joint sealant and accessory.
2. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
3. Product test reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
4. Preconstruction compatibility and adhesion test reports:
   a. From sealant manufacturer, indicating the following:
      1) Materials forming joint substrates and sealant backings have been tested for compatibility and adhesion with sealants.
      2) Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
5. Preconstruction field adhesion test reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified.
6. Field adhesion test reports: For each sealant application tested.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:
1. Firm having minimum five (5) years' documented experience and specializes in the installation of sealants:
   a. Exposed sealant work (sealants used for air and weatherseals external at perimeter, metal panel to panel joints) shall be performed by a single (i.e. one) firm specializing in the installation of sealants who has successfully produced work comparable to Project.
   b. Concealed sealant work (sealants that are internal to skylights and providing an air seal) shall be the responsibility of the subcontractor providing erection of the respective system.

B. Source Limitations: Obtain each type of joint sealant from a single manufacturer.

C. Product Testing:
1. Test joint sealants using a qualified testing agency:
   a. Testing agency qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.
   b. Test according to SWRI Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion in peel, and indentation hardness.

D. Environmental Requirements:

1. Toxicity/IEQ:
   a. Comply with applicable regulations regarding toxic and hazardous materials:
      1) VOC content of interior sealants - sealants and sealant primers complying with limits for VOC content for SCAQMD when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
         a) Sealants: 250 g/L.
         b) Sealant primers for nonporous substrates: 250 g/L.
         c) Sealant primers for porous substrates: 775 g/L.
   b. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.

1.5 WARRANTY

A. Written warranty, signed by installer agreeing to repair or replace elastomeric joint sealant work that has failed to provide a weathertight system within specified warranty period:
   1. Warranty period: Five (5) years from date of Substantial Completion.

B. Written warranties (weatherseal and stain resistance), signed by sealant manufacturer agreeing to furnish joint sealants to repair or replace those that fail to provide airtight and watertight joints, or fail in adhesion, cohesion, abrasion resistance, stain resistance, weather resistance, durability, or appear to deteriorate in manner not specified in the manufacturer's data as an inherent quality of the material within specified warranty period:
   1. Warranty period: Five (5) years from date of Substantial Completion.

C. Warranties specified exclude deterioration or failure of sealants from:
   1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from natural causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer’s written instructions to prevent deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

PART 2 PRODUCTS

2.1 MATERIALS

A. Compatibility: Provide joint sealants, backings, and related materials compatible with one another and with joint substrates under conditions of service and application, as stated by sealant manufacturer’s published data, and as substantiated by the manufacturer for each application through testing.

B. Liquid Applied Sealants: Comply with ASTM C920 and requirements indicated for each liquid applied sealant specified, including those referencing ASTM C920 classifications for

type, grade, class, and uses related to exposure and joint substrates.

C. Stain Test Response Characteristics: For sealants in contact with porous substrates, provide nonstaining products that have undergone testing according to ASTM C1248 and do not stain porous joint substrates.

D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

E. Colors: For fully concealed joints, provide standard color of sealant that has the best overall performance characteristics for the application shown. For exposed joints, submit color samples to Architect for approval, from manufacturer's full line of standard colors.

F. Manufacturer's Representative: Use sealant produced by manufacturer who agrees to send a qualified technical representative to site upon request for the purpose of rendering advice concerning the recommended installation of manufacturer's materials.

G. Sealants: Self-leveling compounds for horizontal joints in pavements and non-sag compounds elsewhere except as shown or specified.

H. Silicone Sealant:
1. Comply with ASTM C920, Type M, Grade NS, Class 25; use NT, M, A and O:
    a. Use: Typical joints between masonry, metals, glass, and plastics (two-part silicone sealants).
    b. Properties:
        1) Performance: Non-stain, non-bleed, non-streaking to sealed and adjacent substrates. The minimum pli value after seven (7) day immersion shall not be less than 13 when tested in strict accordance with ASTM C794 Adhesion and Peel.
        2) Cure system and oil content: Neutral cure system specifically manufactured with controlled oil content to eliminate oil migration into sealed substrates and residue rundown over and onto adjacent substrates.
    c. Product and manufacturer: Dow Corning; 756 Silicone Building Sealant - HP with Additive.

I. Silicone Sealant:
1. ASTM C920, Type S, Grade NS, Class 50, for Use NT:
    a. Use: Typical joints between masonry, metals, glass, and plastics (single component sealants).
    b. Properties:
        1) Performance: Non-stain, non-bleed, non-streaking to sealed and adjacent substrates.
        2) Cure system and oil content: Neutral cure system specifically manufactured with controlled oil content to eliminate oil migration into sealed substrates and residue rundown over and onto adjacent substrates.
    c. Product and manufacturer:
        1) BASF Building Systems; Omniseal 50.
        2) Dow Corning Corporation; 756 SMS, 791, 795, 995 as applicable.
        3) GE Advanced Materials, Silicones; SilGlaze II SCS2800, SilPruf NB SCS9000, SilPruf SCS2000, or UltraPruf II SCS2900 as applicable.
        4) Pecora Corporation, as applicable.
        5) Sika Corporation, Construction Products Division; SikaSil-C995.
        6) Tremco, as applicable.
        7) Comparable product.

J. Polyurethane Sealants:
   1. ASTM C920, Type M, Grade NS, Class 25; use NT, M, A and O:
      a. Use: Typical Wall and floor joints (two-part polyurethane sealants). Use at concrete joints.
      b. Properties:
         1) Performance: Non-stain, non-bleed, non-streaking to sealed and adjacent substrates.
      c. Products and manufacturers:
         1) BASF Building Systems; Sonolastic NP-2.
         2) Pecora Corporation; Dynatred.
         3) Sika Corporation, Construction Products Division; Sikaflex 2c NS or Sikaflex 2c NS TG as applicable.
         4) Tremco, as applicable.
         5) Comparable product.

K. Two-Part Polyurethane Sealants:
   1. ASTM C920, Type M, Grade NS, Class 50; use NT, M, A and O:
      a. Use: Typical Wall and floor joints (two-part polyurethane sealants).
      b. Properties:
         1) Performance: Non-stain, non-bleed, non-streaking to sealed and adjacent substrates. The minimum pli value after seven (7) day immersion shall not be less than 13 when tested in strict accordance with ASTM C794 Adhesion in Peel.
      c. Products and manufacturers:
         1) BASF Construction Chemicals; NP 2.
         2) Pecora Corporation, as applicable.
         3) Schnee-Morehead, Inc.; Permathane SM 7200.
         4) Sika Corporation, Inc.; Sikaflex - 2c NS TG.
         5) Tremco, as applicable.
         6) Comparable product.

L. Mildew Resistant Silicone Sealant:
   1. ASTM C920, Type S, Grade NS, Class 25, Use NT, Substrate uses G, A, and O; and containing fungicide for mildew resistance; acid curing:
      a. Use: One-part mildew-resistant silicone, formulated with fungicide for sealing interior joints of nonporous substrates around ceramic tile, plumbing fixtures, and showers.
      b. Products - provide one of the following:
         1) BASF Building Systems; Omniplus.
         2) Dow Corning; 786 Mildew Resistant Silicone Sealant.
         3) GE Silicones; Sanitary SCS 1700.
         4) Pecora Corporation, as applicable.
         5) Sika Corporation, Inc., as applicable.
         6) Tremco, as applicable.
         7) Comparable product.

M. Latex Sealant:
   1. Non-elastomeric, one-part, non-sag, paintable latex sealant that is recommended for exposed applications on the interior. Complying with ASTM C834, Type OP (opaque sealants):
      a. Products are subject to compliance with requirements; provide one of the following:
         1) BASF; Sonolastic Sonolac.
         2) Pecora Corporation; AC-20 + Silicone.
         3) Sika Corporation, Inc., as applicable.
         4) Tremco, as applicable.
         5) Comparable product.

N. Acoustical Joint Sealant:
   1. Non-sag, paintable, non-staining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90:
      a. Products are subject to compliance with requirements; provide one of the following:
         1) BASF, as applicable.
         2) Pecora Corporation; AC-20 FTR or AIS-919.
         3) Sika Corporation, Inc., as applicable.
         4) Tremco, as applicable.
         5) USG Corporation; SHEETROCK Acoustical Sealant.
         6) Comparable product.

O. Sealant Backing:
   1. Provide sealant backings that are non-staining, compatible with joint substrates, sealants, primers, and joint fillers, and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing:
      a. Cylindrical sealant backings: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding backings of flexible plastic foam complying with ASTM C1330, and of type indicated below. Select shape and density of cylindrical sealant backings in consultation with the manufacturer for proper performance in specific condition of use in each case.
      b. Type C - closed cell polyethylene foam material with surface skin, nonabsorbent to liquid water and gas, non-outgassing in unruptured state; provide one of the following:
         1) BASF, as applicable.
         2) HBR Closed Cell Backer Rod; Nomaco, Inc.
         3) Pecora Corporation, as applicable.
         4) Sonolastic Closed-Cell Backer-Rod; BASF Construction Chemicals.
         5) Tremco, as applicable.
         6) Comparable product.

P. Window Glazing:
   1. Product Description: Ready to use glazing compound that may be used for face glazing wood or metal sash on existing windows. It is a knife-grade consistency allows for smooth, easy applications. Stick tightly to glass and sash and resists sagging, shrinking and cracking. Follow manufacturers suggested uses.
   2. This product is NOT to be used on plastic windowpanes, porcelainized steel insulating panels or any insulated glass units with organic seals, stained or leaded glass. Any window pain over 48 inches in any direction.
   3. Listed manufacturer:
      a. Dap 33 Glazing compound.
      b. Approved equal.

Q. Miscellaneous Materials:
   1. Primer: Material recommended, as verified through compatibility and adhesion testing, by joint sealant manufacturer for the substrates indicated to be sealed.
   2. Cleaners for nonporous surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants with joint substrates.
   3. Masking tape: Non-staining, non-absorbent material compatible with joint sealants and that will not stain nor mar the finish of surface adjacent to joints to which it is applied.
   4. Cork joint filler: Resilient and non-extruding, ASTM D1752, Type II.
   5. Bond breaker tape: Polyethylene, TFE fluorocarbon, or plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler

materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Environmental Limitations:
   1. Do not proceed with installation of joint sealants under the following conditions:
      a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 degrees F (4.4 degrees C).
      b. When joint substrates are wet. Should joints or backing materials become wet, remove and replace backing material with new.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

3.2 EXAMINATION

A. Examine joints indicated to receive joint sealants for compliance with requirements for joint configuration, installation tolerances, and conditions affecting sealant performance. Proceed with installation after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Surface Cleaning of Joints:
   1. Clean out joints immediately before installing joint sealants to comply with the recommendations of joint sealant manufacturer and requirements:
      a. Remove foreign material from joint substrates interfering with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), existing joint sealants, oil, grease, water, surface dirt, and frost.
      b. Clean concrete, masonry, unglazed surfaces of tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil free compressed air.
      c. Remove laitance and form-release agents from concrete.
      d. Clean metal, glass, porcelain enamel, glazed surfaces of tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming (Elastomeric Sealants Only): Prime joint substrates where recommended in writing by joint sealant manufacturer, based on prior testing and experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.4 INSTALLATION

A. Silicone Glazing Sealants: Refer to Section 08 80 00: Glazing.

B. Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

C. Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants applicable to materials, applications, and conditions indicated.

D. Sealant Backings:
   1. Install sealant backings to support sealants during application and at position necessary to produce cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability:
      a. Do not leave gaps between ends of sealant backings. Trim for tight fit around obstructions or elements penetrating the joint.
      b. Do not stretch, twist, puncture, or tear sealant backings.
      c. Remove absorbent sealant backings that become wet before sealant application and replace with dry sealant backings.
      d. Install bond breaker tape behind sealants where backings are not used between sealants and back of joints.

E. Weeps and Vents: Install weeps and vents into joints at the same time sealants are being installed. Locate weeps and vents spaced recommended by sealant manufacturer and the window and curtain wall fabricator and erector. Do not install weeps and vents at outside building corners. Do not install vents at horizontal joints immediately below shelf angles, sills, and through wall flashings.

F. Sealants:
   1. Install sealants by proven techniques resulting in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at same time sealant backings are installed:
      a. Apply sealants in depth in accordance with manufacturer's recommendations and recommended general proportions and limitations.
      b. Apply elastomeric sealants, in joints not subject to traffic or abrasion, to a depth equal to 50 percent of the joint width, but not less than 1/4 inch (6 mm) and not more than 1/2 inch (13 mm).
      c. Apply non-elastomeric sealants to a depth approximately equal to the joint width.

G. Tooling of Non-Sag Sealants:
   1. Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform, beads to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces. Tool exposed surfaces of sealants to the profile shown, or if none is shown, tool slightly concave:
      a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
      b. Provide a slight wash on horizontal joints where horizontal and vertical surfaces meet.
      c. Against rough surfaces or in joints of uneven widths avoid the appearance of excess sealant or compound by locating the compound or sealant well back into joint wherever possible.

H. Installation of Preformed Silicone Sealant System:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch (6 mm) inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

I. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

J. Acoustical Sealant Installation: At sound rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer written recommendations.

3.5 FIELD QUALITY CONTROL

A. Field Adhesion Testing:
1. Field test exterior wall joint sealant adhesion to joint substrates:
   a. Extent of testing - test completed and cured sealant joints:
      1) Perform ten (10) tests for the first 1,000 feet (300 m) of joint length for each kind of sealant and joint substrate.
      2) Perform one (1) test for each 1,000 feet (300 m) of joint length thereafter or one (1) test per each floor per elevation.
2. Test method: Test joint sealants according to Method A, Field Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.
   c. Whether sealants in joints connected to pulled out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer field adhesion hand pull test criteria.
4. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure original sealant surfaces are clean and new sealant contacts original sealant.

B. Evaluation of Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with indicated requirements will be considered satisfactory.

Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.6 SITE ENVIRONMENTAL PROCEDURES

A. Indoor Air Quality: Provide temporary ventilation during work. Coordinate interior application of sealants with interior finishes schedule.

3.7 CLEANING AND PROTECTION

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

B. Protect joint sealants during and after curing from contact with contaminating substances and from damage so sealants are without deterioration or damage at time of Substantial Completion. If, despite protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 07 92 00