

SECTION 07500

BUILT-UP COLD PROCESS ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Cold process, UL Class-A fire rated three ply built up roofing system with Title-24 compliant roofing surfacing.
2. Hypalon CSPE base flashing membrane
3. If light weight deck: Mechanically attached venting base sheet.
If metal structural deck: Mechanically attached insulation, minimum R-19
If concrete structural deck: Adhered R-19 insulation using solvent free insulation adhesive.
4. Walk pads from roof entrance to any serviceable equipment
5. Include six (6) days of onsite inspection provided by roofing manufacturer.

B. General provisions of the Contract, including General and Supplementary General Conditions and Division 1 apply to work of this Section.

C. Related Sections:

1. Section 07920 – Joint Sealers: Provision of sealants
2. Section 07600 – Flashing and Sheetmetal
3. Division 15000 – Mechanical: Provision of mechanical work to be performed above and penetrating roof.
4. Division 16000 – Electrical: Provisions of electrical work to be performed above and penetrating roof.

1.2 REFERENCES:

A. ASTM – American Society for Testing and Materials

1. C1289 – Type II, polyisocyanurate board insulation, C208, asphalt coated fiberboard insulation.
2. D41 – Standard Specification for Asphalt Primer Used in Roofing, Damp proofing and Waterproofing.
3. C6511 – Cold applied adhesive for interplay and surfacing.
4. D2178 – Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
5. D3617 – Practice for Sampling and Analysis of New Built-up Roof Membranes

- B. CBC – California Building Code, latest edition
- C. FS – Federal Specification
 - 1. SS-C-153C – Cement, Bituminous, Plastic
- D. NRCA – National Roofing Contractors Association
- E. UL – Underwriters Laboratories, Inc.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements

- 1. Roofing System: Arrest water migration from entering building through roof membrane, and will withstand wind loads, thermally induced movement and exposure to weather without failure.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer’s product data, including technical product information, installation instructions, and recommendations for each type of roofing product required.

- 1. Include: Data substantiating that materials comply with requirements.
Material Safety Data Sheets.

B. Shop Drawings: Include plans, sections, details and attachments to other work, for the following

- 1. Base flashing, cants, and membrane terminations.
- 2. Tapered insulation, including slopes.
- 3. Crickets, saddles and tapered edge strips, including slopes.

1.5 QUALITY ASSURANCE

A. Qualifications

- 1. Installer: Engage manufacturer’s certified installer with a minimum of 10 years of experience with cold applied built-up installation under the same company name, and who is acceptable to the Owner.
 - a. Installer Certification: Obtain written certification from manufacturer of built-up roofing system certifying that installer is approved by manufacturer to install specified roofing system. Provide a copy of certification for the Architect/Owner prior to awarding roofing work.

- b. Installer's Field Supervision: Require installer to maintain a full-time supervisor or foreman who is on job site during times that built-up asphalt roofing work is in progress and who is experienced in installing roofing systems similar to type and scope required for this Project.

B. Regulatory Requirements

1. Conform to CBC Section 1507 for roof assembly fire hazard requirements.
2. Fire Hazard Classification: UL Class A.
3. Except as approved by the Architect and Owner, all asphalt roofing and built-up flashing materials shall be manufactured by or be acceptable to the roofing system manufacturer.
4. Wind Uplift: FM 4470 1-90 classification.

- C. Prep-Installation Conference: As soon as possible after award of built-up[roofing work, meet with Installer (Roofer), installers of substrate construction, such as decks, and other work adjoining roof system including penetration work and rooftop units, the Owner (Stanford's Project Manager), Architect and representatives of other entities directly concerned with roofing system performance, including Owner's insurers and test agencies.

1. Review requirements (Contract Documents), submittals, status of coordinating work, availability of materials, and installation facilities and establish preliminary installation schedule. Review requirements for inspections, tests, certifications, forecasted weather conditions, governing regulations, insurance requirements, and proposed installation procedures.
2. Discuss roofing system protection requirements for construction period extending beyond roofing installation. Discuss possible need for temporary roofing.
3. Record discussion, including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job-site in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
- B. Deliver materials in sufficient quantity to allow continuity of work.
- C. Coordinate delivery with Owner

- D. Store roll goods on ends only. Discard rolls which have been flattened, creased, or otherwise damaged. Place materials on pallets. Do not stack pallets.
- E. Stack insulation on pallets
- F. Store materials marked “keep from freezing” in areas where temperatures will remain above 40° F.
- G. Rooftop storage: Disperse material to avoid concentrated loading.
- H. Cover top and sides of all exterior stored materials with canvas tarpaulin (or polyethylene). Secure tarpaulin.
- I. No materials may be stored in open or in contact with ground or roof surface.
- J. Should Contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin (or polyethylene), top to bottom.
- K. Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.

1.7 PROJECT CONDITIONS

- A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed according to manufacturer’s recommendations and warranty requirements.
- B. Temporary Roofing: When adverse job conditions or weather conditions prevent permanent roofing and associated work from being installed according to requirements and the Contractor determines that roofing cannot be delayed because of need for job progress or protection of other work, install temporary roofing. Engage roofing Installer to provide temporary roofing, and to remove it prior to proceeding with permanent roofing work.
 - 1. Record as a Change Order the Owner’s agreement to proceed with temporary roofing along with any additional costs and other changes to Contract Documents.

1.8 WARRANTY

- A. Upon project completion, material manufacturer’s acceptance, and once complete payment has been received by both Contractor and material manufacturer, material manufacturer shall deliver to owner a twenty (20) year Roofing System and Service Warranty and Owner’s Manual.

- B. The Manufacturers Warranty must include labor & material coverage against leakage on all components; including those manufactured by others. Including:
1. Insulation materials, fasteners, and adhesives
 2. All roof membrane components and adhesives
 3. All drain assemblies, scuppers, expansion joints, pitch pans, lead jacks, excluding interior plumbing.
 4. Any leaks or other problems caused by substrate movement, excluding decks, shall not be excluded from the written warranty.
 5. Wind damage from speeds up to 74 mph.
- C. Guarantee:
1. Upon project completion and Owner acceptance, effective upon complete payment, Contractor shall issue Owner a guarantee against defective workmanship and materials for a period of two (2) years.
- D. This roofing system will be inspected on a regular basis by the local manufacturer's representative and a manufacturer's job site inspector for 6 days during installation. Before a warranty is granted, the entire system as specified will have undergone final inspection by a certified inspector from the manufacturer's Technical Services Department.
- E. All roofing drawings and flashing details as provided by this specification shall be bid accordingly. There shall be no substitutes allowed to the details.
- F. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Tremco, Inc., Cleveland, OH 216-292-5000

2.2 INSULATION

A. Metal, wood, or concrete deck:

1. Single Layer:
 - a. 4' x 8' x 1/2" @ six sided asphalt coated fiber board by Celotex or Temple-Inland.
2. Double Layer:
 - a. 2.5" x 4' x 8' polyisocyanurate with glass facer and approved by roofing materials manufacturer

B. Light Weight Concrete Deck:

1. Venting base sheet: Ventsulation sheet by Manville

2.3 ASSEMBLY FASTENERS

A. Insulation to structural metal or wood deck: (16 fasteners per 4' x 8' board)

1. Tremco/Olympic No. 12-11 Standard Roofing Fastener, with CR-10 fluorocarbon coating; three (3) inch diameter metal disc by Tremco.
2. Length: Sufficient to penetrate steel or wood deck 2 inches

B. Wood decking to wood purlins:

1. Type: Galvanized, common, annular ring nail. Length: Sufficient to penetrate underlay blocking 1-1/4 inches.
2. Acceptable manufacturers:
 - a. Independent Nail, Inc., Bridgewater, MA
 - b. W.H. Maze Co., Peru, IL
 - c. National Nail Co., Grand Rapids, MI.
 - d. Hillwood Manufacturing Co., Cleveland, OH

C. One (1) inch cap nails:

1. Type: Spiral or annular ring shank, twelve (12) gage minimum, with integral one (1) inch cap.
2. Acceptable Manufacturers:
 - a. Independent Nail, Inc., Bridgewater, MA
 - b. W.H. Maze Co., Peru, IL
 - c. National Nail Co., Grand Rapids, MI.
 - d. Hillwood Manufacturing Co., Cleveland, OH
 - e. Hoffler Wire Products Co., Inc., Nevada City, CA

D. Galvanized sheet steel to wood blocking:

1. FS FF-N-105B(3) Type II, Style 20, roofing nails; galvanized steel wire, flat head, diamond point, round, barbed shank.
2. Length: Sufficient to penetrate wood blocking 1-1/4 inches minimum.

- E. Drawband:
 - 1. Gold Seal stainless steel worm gear clamp by Murray Corporation, Cockeysville, MD.
 - 2. Power-Seal stainless steel worm drive clamps by Breeze Clamp Co. Saltsburg, PA
- F. Adhesives:
 - 1. Interply adhesive:
 - a. Cold process interplay mastic – Burmastic LV
- F. Cold Surfacing
 - 1. Crushed marble surface:
 - a. Cold process surfacing mastic – Rock-it-mastic
- G. Ply sheet:
 - 1. Fiberglass reinforced 28# ply sheet – Burmastic Glass Ply.
- H. Reinforcing membrane:
 - 1. Trilaminate reinforced ply sheet
 - 2. 28# field ply.

2.4 ROOFING SYSTEM:

- A. Cold Process BUR – Burmastic 100
- B. Related Materials:
 - 1. Asphalt mastic:
 - a. Asphalt mastic – ELS
 - 2. Asphalt primer:
 - a. Water based primer – Tremprime WB
 - 3. Elastomeric mastic:
 - a. Modified asphalt mastic – Polyroof LV
 - 4. Flashing adhesive:
 - a. Hypalon flashing adhesive for Hypalon – Sheeting Bond, white.
 - 5. Flashing Sheet:
 - a. Hypalon elastomeric sheeting – HP-4510.
 - b. Color: White
 - 6. Roofing aggregate:
 - a. Tremco/Lucas Fire White Marble Roofing aggregate.
 - 7. Sealants:
 - a. General purpose sealant: High performance, low modulus sealant – Tremseal-D
 - b. Silicone sealant for hypalon: Tremseal-S
 - 8. Walkway panels
 - a. Tremtred by Tremco

9. Flashing Coating
 - a. VOC compliant white reflective coating – Hi Build
10. Flashing Tape:
 - a. Butyl tape – TF Tape
11. Insulation Adhesive (for concrete decks): Fas N Free insulation adhesive.
12. Roofing fasteners for metal or light weight concrete decks: Tremco/Olympic

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Substrate: Free of foreign particles prior to laying roof membrane.
- B. Phased application: Not permitted. All plies shall be completed each day.
- C. Traffic and equipment: Kept off completed plies until adhesive has set.
- D. Wrapper and packaging materials: Not to be included in roofing system.
- E. Mechanical fasteners:
 1. Seated firmly in discs with fastener heads flush or below disc's top surface.
 2. Length: Sufficient to accommodate roof insulation thickness and engage wood deck ½ inch.
- F. Base flashing height:
 1. Not less than eight (8) inches above finished roof surface.
- G. Flashing adhesive:
 1. Allow solvent to flash prior to installation of flashing sheet.
- H. Elastomeric sheeting end laps:
 1. Heat weld on a flat surface after cleaning seams with xylene. Use silicone based sealant on seams after welding.

3.2 INSULATION INSTALLATION (If needed)

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installing roofing insulation.

- C. Install tapered insulation under area of roofing to conform to slopes indicated on the drawings.
- D. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- E. Install one or more layers of insulation under area of roofing to achieve required R-19 value or greater as required by the Architect/Code. Where overall insulation thickness is 2 inches or greater, install required thickness in 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush with ring of drain.
- G. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding $\frac{1}{4}$ inches with insulation.
 - 1. Cut and fit insulation within $\frac{1}{4}$ inch of nailers, projections, and penetrations.
- H. Adhered insulation to concrete decks: Prime surface of concrete deck with Tremprime WB at 250 sq ft per gallon. Ribbon apply insulation adhesive to each layer of insulation at an application rate of 1.5 gallons per 100 sq ft.
- I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten to roof deck according to roofing system manufacturer's written instructions. Tape joints of cover boards.
- J. Mechanically attached insulation: Use 16 fasteners per 4' x 8' board to all metal or wood decks.

3.3 ROOF MEMBRANE INSTALLATION

- A. Embed three (3) fiberglass plies in a uniform and continuous application of interply mastic. Interply application rate: 3 gallons per 100 sq ft
- B. Immediately after installation, broom and/or roll ply sheet. Ensure complete and continuous seal and contract between adhesive and felts, including ends, edges and laps without wrinkles, fish mouths, or blisters. Broom/roller width: Thirty-four (34) inches minimum.

- C. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion. Lap plies 12", 24", and 36".
- D. Avoid walking on plies until mastic adhesive has set.
- E. Overlap previous day's work twenty-four (24) inches.
- F. Lap ply membrane ends four (4) inches. Stagger end laps three (3) feet minimum.
- G. Ply shall never touch ply, even at roof edges, laps, tapered edge strips, and cants.
- H. Fit plies into roof drain rims; install lead flashing and finishing plies; secure clamping collars; install domes.
- I. Extend roofing membrane to top edge of cant at wall and projection bases.
- J. Cut out fish mouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

3.4 DAILY WATERSTOP/TIE-INS

- A. Envelope insulation with eighteen (18) inch wide No. 15 ply sheet. Adhere envelope to deck and insulation with a continuous 1/16 inch thick application of tie-off mastic. Glaze cut-off with surfacing mastic.

3.5 FLASHINGS

- A. General flashing requirements:

- 1. Elastomeric Flashing:

- a. Adhere elastomeric sheeting completely to flashing surface, cant, and roofing with Hypalon Flashing Adhesive. Let adhesive flash off, 15 minutes minimum.
- b. Ensure complete bond and continuity without wrinkles or voids. Lap sheeting ends 4 inches (100 mm). Adhere laps by heat welding. Clean laps before welding with xylene.
- c. Elastomeric sheeting width: Sufficient to extend at least 6 inches (150 mm) beyond toe of cant onto new roof.
- d. Seal horizontal edges of sheeting with reinforcing membrane embedded in a base course of Hypalon Flashing Adhesive and a top course of Asphalt Mastic.
- e. Apply silicone based sealant to all vertical seams.

- 2. Base flashing height:

- a. Not less than eight (8) inches, not higher than twelve (12) inches above finished roofing surface unless otherwise specified and approved by the Project Manager.
3. Two-Ply Stripping:
 - a. Set flange in asphalt mastic. Seal flange with two (2) stripping composite plies embedded between alternate applications of stripping adhesive/bitumen. Extend first ply four (4) inches beyond flange; second ply two (2) inches beyond first ply.
- B. Roof Top Units/curbs:
1. Install new roofing system as specified.
 2. Install hypalon sheeting to encapsulate the curbs
 3. Install new 24 ga. cap flashing before re-mounting equipment.
- C. Plumbing vents:
1. Remove existing stack flashing.
 2. Wedge plumbing vent tight against deck.
 3. Provide tapered edge at vent base. Firmly butt edge strip to blocking; miter corners. Mechanically attach edge strip to deck.
 4. Apply 1/16 inch uniformly thick layer of asphalt mastic to surface receiving metal flange.
 - a. Pipe outside diameter greater than two (2) inches: Bend lead inside pipe one (1) inch minimum with pliers or rubber/plastic mallet; replace cracked lead.
 - b. Pipe outside diameter two (2) inches or less: Cut lead at vent top; fabricate and install integral lead cap.
 5. Seal flange with two (2) strips of flashing ply flashing embedded between alternate applications of asphalt mastic. Extend first ply two (2) inches beyond flange; second ply two (2) inches beyond first ply.
- D. Counterflashing at walls:
1. Install new roofing system. Install hypalon base flashing system and secure top edge with fastener system per manufacturer's instructions.

3.6 SURFACING APPLICATION

A. Title-24 aggregate surfacing:

1. Remove all loose gravel, debris and dirt as approved by materials manufacturer. Do not surface until a complete inspection is made by manufacturer's representative.
2. Over the roof surface spray apply uniform and continuous flood coat of Rock-It surfacing mastic at five (5) gallons per 100 sq ft
3. Immediately broadcast new, clean marble at an application rate of 200 lbs per 100 sq ft. Cover flood coat material completely with marble for a solid coverage.

3.7 MISCELLANEOUS

A. Walkway Pads:

1. Install walk pads around serviceable units and at entryway or as indicated by Owner.
2. Set walk pads in asphalt mastic over surfacing.

B. Painting:

1. Paint all base flashing membrane, small metal pipes, and cast iron drain strainers

C. Cap metal:

1. Install new standing rib cap metal and counter flashings where designated.

D. Pipes and conduit:

1. Capture all pipes and projections with a lead jack and storm collar per detail drawing.

E. Pipe supports:

1. Most conduit will have unistrut and clamping and will remain secured to wood blocking riding on pieces of walk pad cut 2" in diameter larger than blocking. Clamping ring to be one size larger than OD of conduit.

F. Edge metal:

1. Install new Kynar coating edge metal. Fascia width to match existing. Install cover plates to manufacturer's requirements. Flange width: 4". Install nailer and tapered edge strip around perimeter for smooth transition of roofing membrane. Blocks and clamps by others.

3.8 ADJUSTING AND CLEANING

A. Clean-up:

1. Immediately upon job completion, roof membrane and metal surfaces shall be cleaned of debris.
2. Clean grounds around building of any debris from roofing project.
3. Ensure all drains are flowing freely by testing and witnessed by Owners Project Manager.

END OF SECTION