SECTION 07515

COLD PROCESS BUILT- UP ASPHALT ROOFING SYSTEM

PART I – GENERAL

1.1 RELATED DOCUMENTS

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

B. Site Specific Projects New construction.

1. Set up and staging areas will be decided upon at the job walk. Roofer will use enclosed chutes and dumpsters to help minimize debris. New Roofs: Clean deck thoroughly prior to roofing installation.
2. The roof decks will be inspected by a District representative and material manufacturer.

1.2 SUMMARY

A. This Section includes the following:

1. Cold Process Built-up asphalt roofing system.
2. Remove existing roof system and insulation down to the concrete decks on the Lower East and West Sides, and remove roof system down to the light weight concrete deck on the upper center section.
3. New metal coping and flashing as required.
4. Clean the concrete deck of all debris and excess asphalt or adhesives.
5. Prime the concrete deck with Tremprime WB at a rate of one gallon per square.
6. Install a layer of two (2”) Inch Polyisocyanurate Roof Insulation to concrete deck. Set into Low Rise Insulation Adhesive.
7. Install one layer of one half (1/2”) Tremco Blur Ridge coated fiberboard to the insulation, with Low Rise Insulation Adhesive.
8. Install one ply of Burmastic Glass (28lb.) to the heavy duty coated fiberboard with PowerPly Cold Adhesive LV. Apply adhesive to fiberboard at a rate of 3½ gallons per 100 square feet.
9. Install two plies of Burmastic Glass (28lb.) to the base layer, with PowerPly Cold Adhesive LV, at a rate of 2½ gallons per 100 square feet.
10. Add two to three plies of inverted capsheet, approximately one square each, in front of existing scupper areas on the Upper Middle Roof Section.

11. Install one layer of Foil Backed Rosin Sheet and Composite Ply HT to the Light Weight Concrete Deck, on the upper middle section, with Mechanical Fasteners for that type of deck.
12. Install two plies of Burmastic Glass (28lb.) to the base layer, with PowerPly Cold Adhesive LV, at a rate of 2½ gallons per 100 square feet.
13. Install. PowerPly Standard FR G24 Membrane to roof system on all elevations, set into PowerPly Adhesive, at a rate of 2½ gallons per 100 square feet.
14. All parapet, curbs, base, and walls are to be installed with Reinforced TPA Flashing Membrane to be applied up and over the parapet wall and turned down one inch past stucco joint. Membrane to be set into Sheeting Bond Adhesive.
15. Seal edge of flashing with Rock-it Adhesive and two layers of Burmesh Membrane. Embed into the Rock-it Adhesive a layer of # 11 White Granules.
16. Install new TPA Flashing to all drains and scuppers.
17. Install new wood nailers to match the height of the insulation. Wood Nailers to be level with roof insulation.
18 Termination Bars and sealant tape to be installed on walls greater than 15 inches in height.
19. Termination Bars and sealant tape to be installed at the top of all curbs and boxes.
20. Install new 24 gauge metal coping to perimeter parapet walls.
21, Reuse metal counter flashing on the lower roof sections.
22. Seal the outside of the scuppers with Tremseal D.

1.3 DEFINITIONS

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

B. Cold Process Built Up Roofing - An asbestos free formulation of asphalt, solvent, thixotrope, mineral stabilizer and reinforcing fibers used as an interply adhesive and flood coat.

C. Initial Emittance: Minimum initial emittance of roofing surface (system) threshold in compliance with Cool Roof Rating Council requirements.

D. Initial Reflectance: Minimum initial reflectance threshold of roofing surface (system) in compliance with Cool Roof Rating Council requirements.

E. Comply with Title 24, 2007 California Building Energy Standards, Section 118

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. U. L. Class A

1.5 SUBMITTALS FOR NONE PRE-APPROVED MATERIALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.

1. Base flashings, cants, and membrane terminations.
2. Crickets, saddles, and tapered edge strips, including slopes.
3. Insulation fastening patterns.

C. Samples for Verification: For the following products:

1. 4-by-12-inch square of base sheet.
2. 4-by-12-inch square of ply sheet.
3. 4-by-12-inch square of modified cap sheet.
4. 4-by-12-inch square of roof insulation and cover board.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of meeting performance requirements.

F. Qualification Data: For Installer, manufacturer and manufacturer's technical representative as specified in "Quality Assurance" Article.

G. Manufacturer Certificates: Indicating compliance of proposed products with requirements, including:

1. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing base and ply sheets, membrane backer and flashing sheets, reinforcement fabric felts and mats, adhesives, mastics, coatings, and sealants.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system and system components.

1. Include report showing compliance with ASTM 2523 load-strain properties requirements.

I. Maintenance Data: For roofing system to include in maintenance manuals.

J. Warranties: Special warranties specified in this Section.

K. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

L. Certificate of Insurance showing Products Liability in the amount of $ 10 million minimum and provide an affidavit signed by a corporate officer showing corporate net worth of $10 million minimum.

M. Provide certification listing on the current Energy Star® Roof Products Qualifying Products List.

N. Provide a list often (10) projects available for inspection employing same roof system. Provide location, contact name, and telephone number.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Installer Shall:

1. Submit an affidavit attesting that Contractor has in place and fully implemented a written Health, Safety and Environmental Plan and the plan is compliant with all applicable Federal, State and Local regulations. .
2. Be experienced in cold applied roofing applications for 10 years minimum.
3. Be acceptable to Owner.
4. Be a manufacturer Certified Contractor.
5. Not have been in Chapter 7 bankruptcy during the last ten (10) years.
6. Provide a list of ten (10) projects available for inspection employing same roof system.
7. Acquire inspection service days utilizing manufacturer's technical inspectors.

    a. The minimum number of full time Technical Consulting Service inspection days will be six (6) days for a project of 200 squares or less.
    b. The number of days will increase at a rate of two (2) day for each additional 100 squares.

C. Manufacturer Qualifications: A qualified manufacturer that has UL listing approval for roofing system identical to that used for this Project.

D. Manufacturer Shall:

1. Be Associate Member in good standing with National Roofing Contractors Association (NRCA) for at least five (5) years.
2. Be nationally recognized in the roofing, waterproofing and moisture survey industry.
3. Be approved by Owner.
4. Has not been in Chapter II bankruptcy during the last five (5) years.
5. Provide evidence of financial responsibility: Certificate of Insurance showing Products Liability in the amount of $ 10 million minimum and provide an affidavit signed by a corporate officer showing corporate net worth of $10 million minimum.
6. Provide a copy of Corporate Health, Safety and Welfare policy.
7. Manufacturer must manufacture a minimum of 70% of the materials that they supply, by dollar volume, in facilities owned or solely leased by said manufacturer, including equipment used in manufacturing operations.
8. Provide evidence of twenty (20) quarters of continuous plant inspections of roofing manufacturing sites over the previous five (5) years by an independent Nationally Recognized Testing Laboratory (NRTL) as defined in 29 CPR Ch. XVII (7-1-93 Edition) from the Occupational Safety and Health Administration (OSHA).
9. Be ISO 9001; 2000 registered for at least the prior five (5) years
10. Furnish a service agreement / warranty.
11. Provide Owner names of at least five (5) qualified applicators.

12. Employ full-time Field Technical Services Representatives for daily job-site monitoring and production of daily reports.
13. Require local Field Representatives to make periodic job-site visits and produce work quality and progress reports.
14. Provide a Project Closeout Report upon delivery of the project warranty. This report to include:

    a. Project Specifications.
    b. Project Summary.
    c. Progress reports as a result of roof inspections.
    d. Job-site progress photos.
    e. Warranty document.
    f. Owner's Manual describing maintenance and emergency repair.

E. Manufacturer's Technical Representative Qualifications: An authorized full-time employee representative of manufacturer experienced in the installation and maintenance of the specified roofing system and qualified to determine Installer's compliance with the requirements of this Project.

F. Source Limitations: Obtain components for roofing system from or approved in writing by roofing system manufacturer.

G. Pre-installation Conference: Conduct conference at Project site. Comply with requirements in Section 01 31 00 Project Management and Coordination. Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

A. Special Warranty: Tremco QA Plus 20 Year Manufacturer's Warranty and Service Agreement in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, all sheet metal-related details, and termination details.

2. Manufacturer will provide, at no cost to owner, the following services in Years 2, 5, 10 and 15:

   a. Inspection by a Technical Representative and delivery of a written inspection report documenting roof conditions.

   b. Preventative maintenance and necessary repairs, including splits, tears, or breaks in the roof membrane system and flashings that threaten the integrity of the roof system and are not exempt from coverage due to neglect, negligence, vandalism, or other exclusion.

   c. General rooftop housekeeping and clean-up, subject to limits, but generally including removal of incidental debris.

3. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: Three (3) years from date of Substantial Completion.

C. Technical Instruction and Inspections:

1. Manufacturer shall provide Technical Consulting Instruction and Inspection on the project for four (4) days at a cost of $ 750.00 per day.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. Built-up Asphalt Roofing;

   a. Tremco, Inc.
   Contact: Bill Calagna
   805-499-5663 or 818-429-2584

2.2 BASE-SHEET MATERIALS

A. Backer Sheet: Tremco Burmastic Composite Ply HT ASTM D 460 I-04, Type II, SBS-modified asphalt-coated Tri-laminate reinforced high-strength ply sheet, with polyester/glass-fiber/polyester-reinforcing coated with waterproofing asphalt. Burmastic Composite Ply Premium Green contains 14-per cent post-industrial recycled content.

1.	Weight	38 Ibs/100 sq. ft.	ASTM D 228-05
2.	Tensile Strength MD	190 lbf/in	ASTM D 5147-02
3.	Tensile Strength XMD	180 lbf/in	ASTM D 5147-02
4.	Tear Strength MD	260 lbf	ASTM D 5147-02
5.	Tear Strength XMD	230 lbf	ASTM D 5147-02

2.3 ROOF SURFACING

A. SBS Modified Bitumen Membrane: Tremco Power Standard FR GT24**,** glass-fiber-reinforced, SBS-modified asphalt sheet.

2.4 INTERPLY MEMBRANES

A. Burmastic Felt Membranes: 28 Pounds

2.5 FLASHING MATERIALS:

A. Metal Flashing Sheet: 24 gage galvanized sheet metal.

1. Metal counter flashing.
2. Metal gravel stop.
3. Metal coping.
4. Metal termination bar.

B. Metal edge stripping ply: 2 plies of composite ply.

C. TPA Flashing.

1. TPA Flashing Membrane – Reinforce 0.045 inches thick.
2. Flashing Adhesive – Sheeting Bond Adhesive.
3. Heat Seaming.
4. Termination Mastic – Rock-it Adhesive and Burmesh Membrane.
5. Surface with White # 11 Granules.

2.5 ASPHALT MATERIALS

A. Asphalt Primer: Tremco Tremprime WB ASTM D 41.

B. Cold-Applied Adhesive: Tremco PowerPly LV standard asphalt-based, I-part asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up roofing membranes and flashings. Each container labeled with UL and FM logos indicating material was manufactured under the specified UL and FM quality assurance programs.

1.	Asbestos Content	ASTM D 276	None
2.	Viscosity	ASTM D 2196	80,000-200,000 cP
3.	Density	ASTM D 1475	8.2 b/gal
4.	VOC	ASTM D 3960	Compliant with local building codes

2.6 AUXILIARY ROOFING MEMBRANE MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.

B. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion resistance provisions in FM 4470; designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.

D. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

Touch-up Paint: ICE Reflective Coating

Tremco PowerPly Adhesive is to be used to adhere the T-24 Modified Sheet to the newly installed roofing system.

2.7 ROOF INSULATION

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thickness indicated.

1. Two (2) Inch Polyisocyanurate Insulation.

B. Cover Board: ASTM C 208, Type II**,** Grade I, cellulosic-fiber insulation board, 1/2 inch thick with premium asphalt coating on all six sides.

1. Compressive Strength 20 psi ASTM C 165
2. Density, nominal 151blcf ASTM C 209
3. Blue Ridge Fiberboard Structodeck HD with Premed Red Coating.

C. Insulation-Board Adhesive: Tremco Low Rise Insulation Adhesive.

1. Tensile Strength 200 psi ASTM D 412
2. Elongation 1200% ASTM D 412

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

1. Provide positive drainage through entire valley areas.
2. Polyisocyanurate cricket material with 1/2 inch thick cellulosic-fiber covers board. All crickets and cant strips to be installed with specified Fas N Free solvent free insulation adhesive.

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing per warrantable standards.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place and free flowing.
2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Make sure and protect the inside of the facilities per Districts procedures. Before any re-roofing can take place, the Districts representative will sign off on the decks and authorize any replacement per unit costs given by roofer.

B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSULATION INSTALLATION

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 roof insulation.

C. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

3.04 WOOD NAILERS and PANELS

A. Treated wood nailers shall be installed at the perimeter of the roof where no vertical wall exists and around other projections and penetrations that are to be flashed.

B. Nailers new shall be securely anchored to the deck to resist 200 lbs. per foot applied in any direction.

The thickness of the nailer shall be provided such that the top of the nailer is flush with the surface to which the TPA membrane is to be applied.

3.05 WOOD NAILERS and PANELS

A. Treated wood nailers shall be installed at the perimeter of the roof where no vertical wall exists and around other projections and penetrations that are to be flashed.

B. Nailers new shall be securely anchored to the deck to resist 200 lbs. per foot applied in any direction.

C. The thickness of the nailer shall be provided such that the top of the nailer is flush with the surface to which the Insulation is to be applied.

3.06 Base Sheet and Foil Backed Rosin Sheet Attachment:

A. Install one ply of foiled backed rosin sheet and one ply of Composite Ply HT to the light weight concrete deck with mechanical fasteners.

3.07 Insulation Attachment

A. Base layer of Insulation:

1. Install with Low Rise Insulation Adhesive.

B. Additional Layers of Insulation Attachment:

C. Low Rise Insulation Adhesive. See below.

D. Surfaces to receive *Tremco Low Rise Foam Insulation Adhesive* must be clean, dry, free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, deteriorated membrane and other contaminants that may result in a surface that is not sound or is un-even.

E. APPLICATION PROCEDURES: *Tremco Low Rise Foam Insulation Adhesive*

1. Surfaces to receive *Tremco Low Rise Foam Insulation Adhesive* should be clean, dry, and free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, deteriorated membrane and other contaminants that may result in a surface that is not sound or is un-even.
   Application rates shall be determined for project, taking into consideration substrate, insulation type, height and location of building.
3. Size, complexity, accessibility and adhesive application rate for project, will help in determination of which adhesive applicator should be used.
4. Select a location to protect and store *Tremco Low Rise Foam Insulation Adhesiv*e in a dry, well-vented and weatherproof location. Do not allow Tremco Low Rise Insulation Adhesive to be stored at temperatures below 45°F (7°C). Keep temperature of the *Tremco Low Rise Foam Insulation Adhesive* between 70° - 85°F (22° - 29°C) 24 hours before use. Do not store product containers in direct sunlight or high temperatures (95˚F /35°C and higher).

5. Only materials to be used the same day shall be removed from the material storage location. Remove only enough material as needed for immediate use. Keep materials away from open flame or welding sparks.
6. For the Dual Joined Cartridge Set, use a utility knife to remove the molded tips at the groove from the Cartridge Mixing Head. Attach a Static Mixing Tip to the Threaded Mixing Head. Place the prepared cartridge into the Gun.
7. Apply the *Tremco Low Rise Foam Insulation Adhesive* directly to the properly prepared substrate using a ribbon pattern. Typically this pattern will be 8" OC; however, project requirements may dictate tighter bead spacing. Space the ½" to ¾" wide beads accordingly to achieve proper coverage rates for insulation/Dens-Deck attachment.

8. As adhesive being applied, immediately place approved insulation/Dens Deck

3.09 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer's recommendations.

B. Install roofing membrane, base flashings, and component materials in compliance with requirements in Roofing Manufacturer's Guide.

C. Install roofing system in accordance with the following NRCA Manual Plates and NRCA recommendations; modify as required to comply with requirements of references above:

1. Metal Parapet Cap (Coping) and Base Flashing: Plates BUR-I and BUR-I S.
2. Embedded Edge Metal Flashing: Plates BUR-3 and BUR-3S.
3. Surface-mount Counter flashing: Plates BUR-4 and BUR-4S.
4. Base Flashing for Wall Supported Deck: Plates BUR-5 and BUR-5S.
5. Base Flashing for Vented Base Sheet: Plates BUR-SA and BUR-5AS.
6. Expansion Joint with Metal Cover: Plates BUR-7 and BUR-7S.
7. Expansion Joint with Pre-Manufactured Cover: Plates BUR-7A and BUR-7AS.
8. Equipment Support Curb: Plates BUR-9 and BUR-9S.
9. Equipment Support Stand with Typical Rain Collar: Plates BUR-II and BUR-II S.
10. Raised Curb Detail: Plates BUR-13 and BUR-13S.
11. Skylight, Scuttle, and Smoke Vent: Plates BUR-I 4 and BUR 14S.
12. Isolated Stack Flashing: Plates BUR-17A and BUR-17AS.
13. Plumbing Vent: Plates BUR-I 8 and BUR-18S.
14. Penetration Pocket: BUR-I 9 andBUR-19S.
15. Roof Drain: BUR-20 andBUR-20S.
16. Gutter: BUR-22 and BUR-22S.

D. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel. Roofing contractor must have approval from Material Manufacturer and District to begin.

E. Where roof slope exceeds 2 inch per 12 inches, install sheets of built-up roofing membrane parallel with slope.

1. Back nail roofing membrane sheets to substrate according to roofing system manufacturer's written instructions.

F. Cooperate with testing and inspecting agencies engaged or required to perform services for installing built-up roofing system.

G. Coordinate installing roofing system components so insulation and roofing membrane sheets are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

H. Cold Process Asphalt Heating

1. An in-line heat exchange unit may be used to facilitate application.

a. Do not exceed maximum adhesive temperature of 1000 F.

2. Heat exchange unit: Use heat transfer oil approved by heating equipment manufacturer.
3. Follow operation procedures recommended by heating equipment manufacturer.

I. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.5 ROOFING MEMBRANE INSTALLATION

A. Install base sheet to Coated Fiberboard Insulation ½ Inch Board with adhesive at a rate of 3½ gallons per 100 square feet.

B. Install two base sheets starting at low point of roofing system. Align sheets without stretching. Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane. Shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.

1. Cut plies in 18'-20' lengths maximum and allow to relax.
2. Embed each ply sheet in a solid coating of cold applied adhesive at rate of 2½ gallons per I00 sq. ft. to form a uniform membrane without ply sheets touching.

C. Surface Membrane: Install lapped granulated cap sheet starting at low point of roofing system. Offset laps from laps of preceding ply sheets and align cap sheet without stretching. Lap in direction to shed water. Extend cap sheet over and terminate beyond cants.

1. Embed cap sheet in a solid application of PowerPly Cold Adhesive at a rate required by roofing system manufacturer. Application Rate is 2½ gallons per 100 sq. ft.
2. Side and end laps to be sealed by applying heat seaming method.

D. Embed # 11 White Granules into all excessive adhesive and at all three or five course applications.

3.6 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Backer Sheet Application: Mechanically fasten backer sheet to walls or parapets. Adhere backer sheet over roofing membrane at cants in flashing adhesive.
3. Flashing Sheet Application: Adhere to backer sheet in flashing adhesive.

B. Extend base flashing up walls a minimum of 8 inches above roofing membrane and 6 inches onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

1. At parapets walls, extend flashing sheet up entire wail and mechanically fasten at outside edge of nailer below coping cap.
2. At high parapet walls, extend flashing sheet up wall 8-12 inches above roofing membrane and secure edge with butyl TF sealant tape and termination bar fastened at 8 inches OIC.
3. Install 24 gauge. Galvanized metal counter flashing at all vertically terminated base flashings.

4. For existing roofs (as applicable): Architect/District verify the following existing condition(s): On all parapet walls that are not wrapped with base flashing, prime and install two coats of Tremco Wall-Tite White Elastomeric Coating.

D. Install 4 inch and 6 inch stripping plies where metal flanges and edgings are set on built-up roofing.

1. Set in flashing adhesive.

E. Install all edge metal, metal counter flashing, and metal coping according to NRCA details and industry standards and manufacturers warrantable details.

F. Pipe penetrations: Install split lead flashing and strip in edges same as metal edges.

G. Irregular penetrations: Use Chem. Curb flashing component system. Must be approved by material manufacturer first.

H. Roof Drains: Set 30-by-30-inch 4 lb. lead flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with stripping and extend a minimum of 4 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

I. Install stripping of not less than two roofing membrane ply sheets, each set in a continuous coating of asphalt roofing cement.

J. Install new reinforced hypalon, lead jack or sheet metal flashing to all pipes and penetrations, as required by roofing manufacturer. Seal penetration with a counter flashing umbrella, TF-Tape, and clamping ring.

K. Install new reinforced hypalon, lead jack or sheet metal flashing to all pipes and penetrations, as required by roofing manufacturer. Seal penetration with a counter flashing umbrella, TF-Tape, and clamping ring.

L. Install Reinforced TPA Flashing to all perimeter walls, base, and curb flashing; install batten bars and flashing tape to middle of walls greater than 12" in height. Install batter bars/termination bars at the top of all base or curb flashing, with TF-Tape, and secure to wall with fasteners.

M. Install reinforced TPA Flashing up and over the parapet wall, and nail to wood nailer on the outside.

N. Install new batten bars to middle of TPA Sheeting with mechanical fasteners and two sided sealant-tape.

O. Install reinforced TPA Flashing around all new TPA metal scuppers.

P. Elastomeric Flashing:
   1. Adhere elastomeric sheeting completely to flashing surface, cant, and roofing with flashing adhesive. After application of adhesive, allow adhesive to remain open for 15 minutes minimum to flash off solvent prior to setting elastomeric sheeting into flashing adhesive.
   2. Apply consistent pressure to entire surface of elastomeric sheeting using a steel hand roller to achieve full adhesion of the sheet to the flashing substrate. Ensure complete bond and continuity without wrinkles or voids.
   3. Lap sheeting ends 4 inches. Fully heat weld flashing laps.
   4. Elastomeric sheeting width: Sufficient to extend at least 6 inches beyond toe of cant onto new roof.
   5. Seal vertical and horizontal edges of sheeting with reinforcing membrane embedded in a base course of flashing adhesive and a top course of Modified Asphalt Mastic.

Q. Hot air heat welding of Hypalon:
   1. Wipe both sides of lap surfaces to be joined with toluene solvent.
   2. Adjust welding equipment air temperature prior to start. Utilize steel roller or weighted wheel on automatic welding equipment to provide pressure on lap area during heat welding.
   3. Maintain air nozzle temperature, nozzle speed, and lap pressure when joining laps together.
   4. Test lap areas to assure proper bonding. Remove lap sample from the roof. When lap sample is cool, pull test lap apart. When torn, the reinforcing scrim should become exposed. Patch test areas with new TPA of the same color and style, using a minimum 2" lap area.

R. On curb details, plies will extend 2" above cants. Reinforced TPA Sheeting will be set in Sheeting Bond and nailed inside wood nailer 6" on center. The outside edge of Sheet will be 5-coursed with Burmesh Membrane and Rock-it Adhesive, and surfaced with White #11 Granules. Flashing seams shall be with heat seaming or Lap Adhesive Install TF-Tape to both sides of the TPA Flashing at the Termination Bars.

S. On wall details, plies will extend 2" above cants. Reinforced TPA Sheeting will be set in butyl-based adhesive or Sheeting Bond onto roof surface 6" and up wall under flashing metal and fastened to nailer 12" on center. The outside edges of the plies of sheeting will be 5-coursed with Burmesh Membrane and Rock-it Adhesive, and surfaced with White #11 Granules. Install TF-Tape to both sides of the TPA Flashing at the Termination Bars.

3.7 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect or Owner.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

B. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements. Make sure all drains .are free flowing.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction. Coat all projections, foot marks, or bleed through with specified white on white adhesive.

END OF SECTION