

SECTION 07510 - BUILT-UP ROOFING SYSTEM

City of San Diego, CWP Guidelines

PART 1 – GENERAL

1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing roofing system and all appurtenant work, complete.

1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 07210 Building Insulation
2. Section 07600 Flashing and Sheet Metal
3. Section 07720 Roof Accessories
4. Section 07800 Skylights

1.3 CODES

- A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:

1. Uniform Building Code

1.4 SPECIFICATIONS AND STANDARDS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

1. Federal Specifications:

SS-A-701 Asphalt, Petroleum (Primer, Roofing, and Weatherproofing)

SS-C-153 Cement, Bituminous, Plastic

2. Commercial Standards:

ASTM D 41 Specification for Asphalt Primer Used in Roofing and Waterproofing

ASTM D 226 Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

ASTM D 249 Specification for Asphalt Roll Roofing (Organic Felt) Surfaced with Mineral Granules

ASTM D 312 Specification for Asphalt Used in Roofing

ASTM D 1668	Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing
ASTM D 1863	Specification for Mineral Aggregate Used on Built-Up Roofs
ASTM D 1866	Test Method for Translucency of Mineral Aggregate Used on Built-Up Roofs
ASTM D 2178	Specification for Asphalt Glass (Felt) Used in Roofing and Waterproofing
ASTM D 2626	Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing
FM	Factory Mutual
UL	Underwriters Laboratories, Inc.

3. Trade Standards:

NRCA	National Roofing Contractors Association
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1.5 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted in compliance with Section 01300:

1. **Manufacturer Information:** The manufacturer's specifications, literature, and published installation instructions for each major roofing element, product or system.
2. **Samples:** Aggregate color samples for selection of color by the CONSTRUCTION MANAGER.
3. **Roofing Contractor:** Roofing shall be applied by a contractor approved by the roofing manufacturer, in writing. A copy of such approval shall be submitted to the CONSTRUCTION MANAGER.

1.6 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL in compliance with Section 01300:

1. **Affidavit:** After installation of the roofing, the CONTRACTOR shall furnish a signed affidavit that the roof complies with the requirements of these Specifications and the manufacturer's recommendations for the class and type of roof indicated.
2. **Guarantee:** The CONTRACTOR shall furnish duplicate signed copies of a 2-1/2-year Roof Guarantee.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. **Delivery of Materials:** Manufactured materials shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.
- B. **Storage:** All materials shall be carefully stored in a manner that will prevent damage of the products and in an area that is protected from deleterious elements.

[1.8 FIELD TESTING

- A. The CONTRACTOR shall take one 4-inch by 36-inch test cut for each 5,000 sq ft of the installed roofing and shall have the test cut tested by an independent laboratory acceptable to the CONSTRUCTION MANAGER. The test cuts shall be taken and shall be tested for weight and layers or plies. The laboratory test reports shall be provided by the CONTRACTOR to the CONSTRUCTION MANAGER for verification of conformance with the requirements of the Contract Documents.
- B. Repairs to the roofing system necessitated by the test cuts shall be made by the CONTRACTOR per manufacturer's written instructions.
- C. The CONTRACTOR shall pay the cost of all test cutting, testing, and repairs. If deviation from written and approved manufacturer's specifications are found, the CONTRACTOR, at its own expense, shall make all corrections necessary to meet the requirements of the Contract Documents, the roofing manufacturer recommendations, and the requirements of the CONSTRUCTION MANAGER.]

[1.9 INSPECTION SERVICE

- A. The [CONTRACTOR] [OWNER] shall engage and pay all costs for the service of an independent roofing inspection service to ensure compliance with the specifications of the roofing system. The roofing inspection service shall be performed by National Roofing Consultants, Roofing Consultants Inc., or equal, approved by the CONSTRUCTION MANAGER. Independent roofing inspection service means a roofing inspection service which has no connection or obligations to the roofing products manufacturer, the roofing applicator or the CONTRACTOR.
- B. The inspection service shall inspect and report on the built-up roofing system's sub-deck, insulation, embedments, curbs and flashing prior to application to confirm that these sub-system components are suitable and ready for the roofing, and shall provide continuous, on-the-job inspection during roofing application. The inspection service shall issue a final report on the built-up roofing after the roofing work, sheet metal work, and roof equipment installation is completed. The final report shall include all items of pick-up and corrections necessary to complete the roofing systems (built-up and metal) and to ensure that the roofings are guaranteeable and bondable.
- C. The roofing service may require the CONTRACTOR to take roof test cuts at 12 inches x 12 inches or 4 inches x 36 inches. Areas from which test cuts have been taken shall be repaired in accordance with roofing manufacturer's instructions and per roofing inspection service instructions.
- D. The roofing service shall issue copies of its daily log reports and a final inspection report to the CONTRACTOR and CONSTRUCTION MANAGER.]

1.10 GUARANTEE

- A. The CONTRACTOR shall furnish a 10-year guarantee from date of final acceptance of roofing and associated work specified in this Section, agreeing to repair or replace WORK which leaks water, deteriorates or otherwise fails (due to failures of materials or workmanship) to perform as roofing and providing a waterproof, watertight roofing system.

PRODUCTS

1.1 MATERIALS REQUIREMENTS

- A. **Manufacturers' Standards:** The roofing products shall be in accordance with the manufacturer's literature and published specifications for the indicated products.
- B. **UL Approval:** Materials and roofing systems shall be provided which have been tested, listed, and labeled by UL for the specified Class or Rating of roofing. Bitumens and felts shall be the products of the same manufacturer, and all other materials used within the system shall be acceptable to the approved manufacturer.
- C. **System Rating:** The built-up roofing and base system shall be not less than a designed system that may be bondable for 10 years and that is rated as a UL Class A built-up system.
- D. **Color:** Roof aggregate color [shall match existing aggregate used on existing buildings in the same complex.] [samples shall be submitted for selection by the CONSTRUCTION MANAGER.]

1.2 ROOFING MATERIALS

- A. **Asphalts and Primer:** Asphaltic materials for built-up roof shall conform to the following requirements:
 - 1. Low melt asphalt for dead level application on roofs with a maximum pitch of 1/4 inch per foot shall conform to ASTM D312, Type I.
 - 2. Medium melt asphalt for flat application on roofs with a maximum pitch of 1 inch per foot shall conform to ASTM D312, Type II.
 - 3. High melt asphalt for steep application on roofs with a maximum pitch of 3 inches per foot shall conform to ASTM D312, Type III.
 - 4. Special asphalt for very steep application on roofs, walls or parapets with a pitch over 3 inches per foot shall conform to ASTM D312, Type IV.
- 5. Asphalt primer shall conform to ASTM D 41, and Federal Specification SS-A-701.
- B. **Felts:** Felts for built-up roof construction shall conform to the following:
 - 1. Asphalt saturated organic felt shall conform to ASTM D 226, Type II.
 - 2. Base flashing felts shall be a durable, flexible, reinforced modified bitumen roof flashing that incorporates flexible polyester mats with a fiberglass core (mat) and an elastomeric base material consisting of SBS rubber and a high quality asphalt. The product shall be provided with a colored ceramic or mineral top surface for ultraviolet light protection. Base flashing felt shall be a fire resistant product. Color shall be selected by the CONSTRUCTION MANAGER from manufacturer's standard colors.

Base flashing shall be Dyna Flex FR as manufactured by Manville, Roofing Systems Division; Flintlastic FR, as manufactured by GS Roofing Products.

3. Asphalt impregnated inorganic glass fiber felt shall conform to ASTM D 2178, Type III.
- C. **Base Sheet:** Base sheet shall conform to ASTM D 4601, Type II.
- D. **Cap Sheet:** Mineral-surfaced cap sheets shall conform to ASTM D 3909.
- E. **Reinforcing Fabric:** Woven glass fabric for reinforcing shall conform to ASTM D 1668.
- F. **Aggregate:** [Roof aggregate shall be "Commercial Grade", opaque, clean, and thoroughly dry crushed rock, 1/4-inch to 5/8-inch in size, conforming to ASTM D 1863.] [Roof aggregate shall be "Commercial Grade" opaque, clean, and thoroughly dry slag approved for roofing use. It shall be graded so that 100 percent passes a 5/8-inch sieve, 90 percent is retained on a 3/8-inch sieve, and 100 percent is retained on a 1/8-inch sieve.] Aggregate materials shall be opaque to ultraviolet radiation when tested in accordance with ASTM D 1866.
- G. **Plastic Cement:** Plastic cement shall conform to ASTM D-2822, Type I.
- H. **Flashing Cement:** Flashing cement shall be a two component elastomeric adhesive specially formulated to be compatible with SBS felts and asphaltic roofing system.
- Flashing cement shall be Manville's MBR Flashing (or equal).
- I. **Mechanical Fasteners:** Mechanical fasteners shall be approved by roofing and insulation manufacturers for application of the first ply into insulation and/or as required to meet the FM windstorm classification criteria.
- J. **Walkways:** Roof walkways shall be 1/2-inch thick, 24-inch minimum width homogeneous material consisting of a core of asphalt, plasticizers, and inert fillers bonded by heat and pressure between 2 saturated and coated sheets of fiber glass membrane or organic felt. The top sheet shall be weather-coated with embedded ceramic or mineral granules.
- K. **Edge and Cant Strips:** Tapered edge strips and cant strips shall be asphaltic impregnated fiber strips.

1.3 ROOFING SYSTEM PRODUCTS

- A. **Built-up Roof Systems:** Built-up, inorganic, glass-felt roofing system for decks with inclines of zero to 3 inches in 12 inches shall be the following products, or equals:
1. Non-nailable (concrete) decks or rigid insulation deck surfaces shall be roofed with the following roofing system:

Product	Number of Plies or Coats	Minimum Weight in lb/100 sf
Primer coat (asphalt)	1 gal min	8-15 lbs
Spot mopping (Type III asphalt)	1	15 lbs
Base coat	1	23 lbs
Felts (inorganic glass)	3	24 lbs
Moppings (Type III asphalt)	3 @ 25 lb/coat	75 lbs
Flood Coat (Type III asphalt)	1	60 lbs

Gravel (slag @ 300 lbs/min)	1	400 lbs
	Total	605 lbs min

Roofing system shall be Manville's, Specifications 4G1G; GS', Specification AAA-3-3 (or equal).

2. Nailable decks (wood or lightweight insulating concrete deck surface shall be roofed with the following roofing system:

Product	Number of Plies or Coats	Minimum Weight in lb/100 sf
Sheathing papaver (Mfg. Standard)	1	@ wood decks only
Base sheet	1	23 lbs
Felts (inorganic glass)	3	24 lbs
Moppings (Type III asphalt)	3 @ 25lbs/coat	75 lbs
Flood coat (Type III asphalt)	1	60 lbs
Gravel (slag @300 lbs min)	1	400 lbs
	Total	582 lbs min

1.4 MANUFACTURERS

- A. Base flashing systems of the type indicated shall be manufactured by one of the following (or equal):

1. With reglet at concrete or masonry walls:

GS Roofing Products "BF-1"
Manville "DFE-1"

2. Without reglet at concrete or masonry walls:

GS Roofing Products "BF-2"
Manville "DFE-2"

3. With reglet at wood backing:

GS Roofing Products "BF-4"
Manville []

4. Without reglet at wood backing:

GS Roofing Products "BF-2"
Manville "DFE-3"

5. Base flashing and wall covering at concrete or masonry walls:

GS Roofing Products "BF-5"
Manville "FD-11W"

6. Base flashing and wall covering at wood backed walls:

PART 1.2 -- EXECUTION

2.1 GENERAL

- A. The installation shall conform to applicable codes and the manufacturer's published or written recommendations, specifications, and published installation instructions for the type of work being performed. The construction shall be coordinated with the work of other trades.
- B. The roofing work shall be performed by an installer authorized by the roofing system manufacturer.
- C. The CONTRACTOR shall investigate the substrate and the conditions under which roofing work is to be performed, and shall notify the CONSTRUCTION MANAGER in writing of unsatisfactory conditions. The work shall not proceed until such unsatisfactory conditions have been corrected.

2.2 CANT AND EDGE STRIPS

- A. Cant strips and tapered edge strips shall be provided at all intersections of roof surfaces with vertical walls, parapets, curbs, and accessories which do not have built-in cants, and shall be miter cut at corners. Cant strips and tapered edge strips shall be firmly attached in place prior to roof application.

2.3 PITCH POCKETS

- A. Pitch pockets shall have all surfaces of sheet metal cleaned and primed with asphalt primer before installation into roofing. Pitch pockets shall be filled with insulation filler (same material as building ridged roof insulation) to within one-inch of rim of pitch pocket. The one-inch area between the insulation and rim shall be filled level to rim with flashing cement. Flashing cement shall be allowed to settle. A month later additional flashing cement shall be applied in a sloping configuration from the embedded object to the outside of the pan so water will drain off the pitch pocket. Pitch pockets may be filled with a product designed specifically for filling pitch pockets when approved by the CONSTRUCTION MANAGER.

2.4 WALKWAYS

- A. Roof walkways shall be installed in dabs of flashing compound. Roof walkways shall be installed per roofing and walkway manufacturer's written instructions and with a 6-inch space between walkway pads for drainage. The joint lines shall remain straight and true while the pads are embedded firmly into the dabs of flashing compound.

2.5 APPLICATION OF BITUMEN

- A. The final coat of bitumen shall be applied on an area as rapidly as practicable. Incomplete roofing shall be protected from dampness by a glaze of bitumen when final coating is delayed.

2.6 EDGES AND PENETRATIONS

- A. At penetrations and edges of the roof not contained by a wall, an additional lower-ply extension of base sheet folded back over top ply to form an envelope, shall be provided by the CONTRACTOR.

2.7 FASTENING

- A. Spot mopping, nailing, or mechanical attachment shall be not less than the most stringent requirement of the manufacturer, codes and Factory Mutual's "Wind Uplift Requirement." The most stringent attachment requirement shall govern and be followed in installation of the base sheet. The asphalt mopping installation of the roof insulation shall be as required by the roofing and insulation manufacturers. The most stringent requirement for installation of the roof insulation shall govern. The CONTRACTOR shall obtain written acceptance of the agreed-on insulation system from the product manufacturers.

2.8 EMBEDMENTS

- A. All sheet metal and other items embedded into the roofing shall be prime coated not less than 24 hours prior to installation, unless otherwise instructed and approved by manufacturer and CONSTRUCTION MANAGER in writing.

[2.9 TEST CUTS

- A. Test cuts shall be made after all layers or plies of roofing are laid and before the flood coat and aggregate surface coat is applied. The CONSTRUCTION MANAGER shall check the samples for even distribution of bitumens between the felts and the tightness of bond between plies prior to sending to the test laboratory. The CONTRACTOR shall repair the areas where sample cuts are taken per roofing manufacturer's instructions.]

** END OF SECTION **