

# **DIVISION 07 – THERMAL AND MOISTURE PROTECTION**

## **07 00 00 ROOFING**

### **PART 1 - GENERAL**

#### 1.01 DESIGN CRITERIA

- A. Preferred roofing types include Membrane, Metal, and Composition Shingles.
  - 1. Membrane roofing is preferred for flat roof decks.
  - 2. Use of asphalt-based roofing requires specific approval from the WSU Project Manager.
  - 3. Ballasted roofs are not acceptable.
- B. Thermal Insulation:
  - 1. New Construction: All elements of the building envelope shall comply with the current edition of the WA State Energy Code.
  - 2. Re-Roofing: Design roof systems with a minimum average value of R38.
- C. All roofing shall be provided with a vapor barrier (minimum 40 mil) installed per the manufacturer's recommendations.
- D. Design sloped roof systems to prevent sheets of ice or snow being discharged to walkways and other occupied areas below. See specific requirements in section 07 70 00 "Roof and Wall Specialties and Accessories."
- E. The use of Exterior Insulation and Finishing Systems (EIFS) shall not be considered, designed or specified for any application.
- F. No roofing material shall contain asbestos in any form or quantity.

#### 1.02 SPECIFIC REQUIREMENTS

- A. Design for Wind Load: The Engineer of Record is responsible to design all roof assemblies for wind loads in accordance with ASCE 7 (Minimum Design Loads and Associated Criteria for Buildings and Other Structures).
  - 1. As of April 2018, the design wind speed for Pullman is 110 mph, but the current edition of ASCE 7 shall govern design.
- B. Design for Fall Protection: Hierarchy of priority for fall protection design elements shall be as follows:
  - 1. Parapets: Wherever possible, provide roofs with full parapets, minimum 42 inches above the adjacent roof deck.

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2. Guardrails: Where parapets are not feasible, provide guardrails conforming to the requirements of WAC 296-24-75011 (at a minimum).
3. Fall Arrest/Restraint Anchor Points: At a minimum, provide anchor points within six feet (6') of all serviceable equipment and systems (including roof drains) conforming to the requirements of WAC 296-155-24613 and - 24615.
4. Roof-Mounted Equipment: Any roof-mounted equipment shall be situated such that all service access is further than ten feet (10') from the edge of the roof. See limitations on roof-mounted mechanical equipment below.
5. Skylights: Do not specify without approval from the WSU Project Manager. If skylights are approved, provide a standard skylight screen or a fixed standard railing on all exposed sides, per WAC 296-24-75003.

#### **C. Design for Safe Foot Traffic**

1. Designs shall deter casual, unauthorized roof access except for periodic inspection and maintenance by authorized personnel. The design shall limit unwanted access through windows, over parapet walls, etc.
2. Penthouses shall have direct access from within the building.
3. Minimize roof-mounted mechanical equipment. Any roof-mounted mechanical equipment outside the penthouse requires approval from the WSU Integrated Engineering and Infrastructure Group (IEIG); coordinate approval through the WSU Project Manager.
4. Design protected walking surfaces from roof access points to mechanical equipment, ladders, drains, gutters, electrical and communications equipment.
5. See specific requirements for all the above in section 07 70 00 "Roof and Wall Specialties and Accessories."

#### **D. "Low Slope" Roof Systems:**

1. New Construction: Final roof slope shall be 3/8 inch per lineal foot minimum and 3/4 inch per lineal foot maximum.
2. Re-Roofing: Final roof slope shall be a minimum of 1/8" per lineal foot. When existing conditions dictate use of tapered insulation, the maximum height shall be 10". Do not compromise the minimum 8" flashing height.

#### **E. Roof Drains and Drainage**

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1. Roof drains shall be cast iron with flange, deck clamp, bottom outlet, removable galvanized dome strainer and flashing ring. Set roof drains with the top of the flashing ring at least three inches (3") above the deck to achieve the required insulation thickness.
2. All drains, overflows, eaves, gutters, and downspouts shall be provided with heat trace cable. See specific requirements in section 07 70 00 "Roof and Wall Specialties and Accessories" and Standard Drawing 23 83 13 E1 "Typical Heating Cable Control Schematic."
3. Mechanical units or penetrations shall not be located in valleys or drain areas or restrict the flow of water. Provide adequate space between mechanical units, penetrations, and walls so that roofing materials can be installed properly.
4. See related requirements in section 07 71 23 "Gutters and Downspouts."

#### **F. Scuppers and Overflows:**

1. Use of scuppers to replace overflow drains requires specific approval from the WSU Project Manager.
  - i. Scuppers shall be provided with heat trace cable to ensure ice-free performance. See specific requirements in section 07 70 00 "Roof and Wall Specialties and Accessories."
  - ii. Scuppers shall be through wall so that water discharges 4-6 inches away from the face of the structure.
2. Parapet type (through the wall) roof drains shall not be used.

#### **G. Expansion Joints:**

1. All expansion joints, particularly those which abut existing walls, shall have an 8 inch curb above the waterproof membrane plane.
2. Structural deck shall slope away from expansion joints.

#### **H. Parapet Protection Details:**

1. Roof membrane shall cover the full parapet height and extend over the outside parapet edge.
  - i. During construction, temporarily fasten membrane along outside parapet edge (to prevent blowoff and moisture infiltration) until permanent parapet cap is installed.
2. Parapets shall have a permanent waterproof coping, cap or capstone.

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- i. Full waterproofing (membrane and metal cap) is required below capstone.
- I. Integrating Moisture Protection System with Vertical Surfaces:
1. New Construction:
    - i. Wherever possible, employ through-wall counterflashing.
    - ii. Where through-wall counterflashing is not possible, terminate moisture protection systems with a clamping bar with reglet and flashing above.
    - iii. At brick parapets, provide through-veneer two-piece sheet metal reglet and counter flashing fully installed in the mortar bed.
  2. Re-roofing or Renovation: Surface-mounted termination bars are acceptable for re-roofing and renovation of existing structures.
  3. Counterflashing shall extend down and cover a minimum of 1” of any adjacent materials.
  4. Penthouse walls shall have roof base and reinforcing extended up a minimum of 8” with clamp bar and adequate flashing.
  5. Skylights/roof hatches shall have curbs that extend a minimum of 8” above the adjacent membrane surfaces. All roof hatches and skylights shall have crickets on the up-hill side of each unit.

#### **PART 2 - PRODUCTS**

- A. See specific product requirements in the Design Standards sections of each roofing type and material.

#### **PART 3 - EXECUTION**

##### **3.01 MANUFACTURER'S QUALIFICATIONS**

- A. Shall be a nationally recognized manufacturer in good standing with the National Roofing Contractors Association.
- B. Shall have had a minimum of twenty years continuous service manufacturing roofing products.
- C. Shall have completed at least three approved applications of proposed system located within 200 mile radius of project site.
- D. Shall be able to show five installations similar to the proposed system within a 200 mile radius of the Washington State University.

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- E. Manufacturer's representative (not the installing contractor) shall make on-site quality assurance visits during the roofing material application.

#### **3.02 INSTALLER'S QUALIFICATIONS:**

- A. Shall be a certified applicator of the approved thermal and moisture protection system manufacturers. Provide a copy of certification.
- B. Shall have had a minimum of five continuous years of experience with similar system applications.
- C. Shall be able to show two installations, at least two years old, similar to proposed system, in satisfactory condition.
- D. Installer shall maintain a full-time supervisor/foreman on job site during all times work is in progress. Supervisor requires at least five years' experience with applications similar in nature and scope to specified system.

#### **3.03 INSTALLATION**

- A. All roofing materials shall be installed per manufacturer's recommendations, including recommendations regarding adverse weather conditions.
- B. Fall Arrest/Restraint Anchor Points: Contractor shall perform anchor point pull-tests and furnish documentation to the WSU Construction Manager no later than Substantial Completion. See specific requirements in section 07 70 00 "Roof and Wall Specialties and Accessories."

#### **3.04 STORAGE**

- A. All roofing and associated materials shall be stored on raised platforms a minimum of six inches off the ground and protected with coverings that extend down sides completely while providing for adequate air circulation. Manufacturer-installed shrink wrap is not considered adequate protection.

#### **3.05 EXISTING ROOF PROTECTION REQUIREMENTS**

- A. Protection of existing roofs shall require the WSU Construction Manager's written authorization for access to or use of existing roofs.
- B. The existing roof surface shall be thoroughly inspected by a team including the WSU Construction Manager, WSU Roofing Shop and the Contractor's representative. Written documentation of any existing roofing flaws will be signed and dated by all team members.
  - 1. After this written document is accepted by the Contractor, any further roof damage during the project shall be repaired at the Contractor's expense.

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- C. All existing roof areas adjacent to construction shall be protected by a minimum of 1” rigid foam insulation covered with a 3/4” thick layer of exterior grade plywood.

#### **3.06 INSTALLER'S WARRANTY (DATED FROM SUBSTANTIAL COMPLETION):**

- 1. The Installer shall provide a signed warrantee stating the Installer shall maintain the moisture protection system in a watertight condition for two (2) years from the date of Substantial Completion.
- 2. The Installer's warrantee shall confirm that all workmanship and materials in the completed moisture protection system are installed as specified and as required by the manufacturer.

#### **3.07 MANUFACTURER'S WARRANTY (DATED FROM SUBSTANTIAL COMPLETION):**

##### **A. Membrane Roofing: 20 years**

- 1. See Special Warranty requirements in section 07 50 00 “Membrane Roofing.”

##### **B. Composition Shingles: 50 years**

##### **C. Metal Roofing System: 20 years**

##### **D. Damp-Proofing and Waterproofing: See section 07 10 00 “Damp-Proofing and Waterproofing.”**

**END OF SECTION**