DESIGN GUIDELINES
AND
TECHNICAL STANDARDS
DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07 2100 – THERMAL INSULATION

1. General: This section outlines general requirements for building insulation.

2. Design Considerations:
   a. Architect shall perform a dew point analysis of the exterior wall enclosure.
   b. Thermal Insulation: Provide the following minimum R values:
      i. Walls: R20
      ii. Roofs: R30
   c. Vapor Barriers: Provide a continuous vapor barrier system at the warm side of building insulation.

END OF SECTION
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SECTION 07 2700 – BARRIERS (FIRE STOPPING AND SMOKE STOPPING)

1. General: This section outlines general requirements for firestopping and smoke stopping systems.

2. Design Considerations
   a. General: Products for fire stopping and smoke stopping shall be by a single manufacturer throughout the project.

   b. Fire Stopping:
      i. Provide penetration seal assemblies whose fire-resistance ratings have been tested in configurations required and have appropriate fire-resistance ratings for the fire-rated assembly in which they are to be installed.

      ii. Comply with applicable codes; provide assemblies listed by Underwriters Laboratories Inc. (UL).

      iii. Provide products which emit no hazardous, combustible, or irritating by-products during installation or curing period and do not require special tools for installation.

   c. Smoke Stopping:
      i. Use Hilti Foam or other approved joint sealant suitable for the application; use only fully curing types where accessible in the finished work.

      ii. Provide products which:

         1. Allow normal expansion and contraction movement of the penetrating item without failure of the penetration seal;

         2. Emit no hazardous, combustible, or irritating by-products during installation or curing period; and

         3. Do not require special tools for installation.

   b. Provide a “use matrix” indicating manufacturer and UL label system for each condition on the drawings or in the technical specifications.

END OF SECTION
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SECTION 07 3126 – SLATE SHINGLES

1. General: This section outlines general requirements for slate shingles.

2. Materials:

   a. Slate Shingles: ASTM C 406 Grade S2 slate shingles, machine punched for two nails located for proper head lap and complying with the following requirements:

      i. Type: Standard shingles.

      ii. Texture: Rough texture.

      iii. Colors: To be reviewed with the NU Project Manager during the design phases of the project.

   b. Snow Guards: Prefabricated copper units designed for use with slate shingle roofing and complete with hook for installation onto slate.

      i. Basis of Design:

         1. Snow Guards as manufactured by Zaleski Snow Guards, Inc.

END OF SECTION
DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07 5200 – MODIFIED BITUMINOUS MEMBRANE ROOFING

1. General: This section outlines general requirements for modified bituminous membrane roofing systems.

2. Design Considerations:
   a. Do not use single ply roofing in high traffic areas.

3. Performance Requirements: Meet standards of both of the following:
   a. Factory Mutual System Classification: Provide roofing materials and a roofing system assembly, which have been listed in the Factory Mutual System "Approval Guide" as being acceptable for Class I roof assembly construction. Provide roof system, including insulation and fasteners, rated by FM for Class I-90 wind uplift.
   b. UL 790: Class A rating for flammability for external fire exposure.

4. Roof System:
   a. Provide a two-ply system, with a heavy base sheet as the bottom ply. Finish with Type II flood coat at 70 lbs / square and gravel at 400 lbs / square.
   b. Provide APP of SPS base flashings cover with fibrated coating after installation.
   c. Insulation System Requirements:
      i. Flame spread: 75 or less when tested in accordance with ASTM E 84.
      ii. Minimum average "R-value" in accordance with ASTM C 518 after conditioning: R30 at 75 degrees F.
      iii. Polyisocyanurate Foam: ASTM C 591.
      iv. Top: 1/2 inch thick, perlite board is preferred.
   d. Accessories:
      i. Roof Drain Flashing: 2-1/2-pound to 4-pound lead sheet.
      ii. Walkways: Roofing membrane manufacturer's granule-suraced modified bituminous sheet intended for use as a protection course for foot traffic.
         1. Width: 36 inches.

5. Warranty Requirements: Review project specific requirements with NU Project Manager.
6. Quality Assurance:

   a. Manufacturer's Qualifications:

      i. A company that has produced roofing materials and accessories of the type included in this section for at least 5 years.

      ii. Certification: Furnish to the University, before roofing contract award, written documentation that installer is manufacturer-certified to install roofing systems of the type included in this section.

   b. Installer Qualifications:

      i. Installation Requirements: The installer shall execute the entire project with a single crew and superintendent.

      ii. Installer supervision: Have installer identify a supervisor with at least 5 years experience in the application of the type of modified bituminous sheet roofing system included in this section, to provide full-time review of built-up roofing installation work.

   c. Initial Roofing Meeting: Before start of roof deck construction, a meeting shall be held with General Contractor, roofing installer; installers of roof deck, roof-mounted equipment, and other work adjacent to or integral with the roof system; the architect; the owner and other parties concerned with roofing system performance.

   d. Pre-Roofing Meeting: Contractor shall organize and conduct a meeting at the construction site 2 weeks before scheduled start of roof system installation with roofing installer; installer of each component of related work, including deck or substrate construction, roof equipment, penetrations of roof deck, and other work integral with or adjacent to roofing; the architect; the owner; the roofing manufacturer's representative; and other parties involved with roofing system performance, including owner's insurance representative, independent testing agencies, and governing authorities.

END OF SECTION
DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07 5323 – ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

1. General: This section outlines general requirements for EPDM roofing systems.

2. Design Considerations:
   a. Do not use single ply roofing in high traffic areas.

3. Performance Requirements: Meet standards of both of the following:
   a. Factory Mutual System Classification: Provide roofing materials and a roofing system assembly, which have been listed in the Factory Mutual System "Approval Guide" as being acceptable for Class I roof assembly construction. Provide roof system, including insulation and fasteners, rated by FM for Class I-90 wind uplift.
   b. UL 790: Class A rating for flammability for external fire exposure.

4. Roof System:
   a. Single Ply Roofing Membrane:
      i. Membrane Material: EPDM sheet, 0.060 inch (60 mils) thick.
      ii. Minimum properties: ASTM D 4637, Type I, Grade 1 or 2, Class SR, scrim or fabric internal reinforced.
      iii. Manufacturers: Provide products by one of the following manufacturers:
         2. Firestone Building Products Company.
         3. Other manufacturers may be considered upon reviewed with NU.
      iv. Color: Manufacturer's standard black or dark gray.
   b. Flashing: Cured EPDM, Nominal 0.060 inch thick except uncured EPDM, Nominal 0.060 inch thick, for conditions where flashing is formed around corners, projections, or changes in direction. Match color of membrane material.
   c. Insulation System Requirements: Provide type and style of insulation that meets contract requirements and is approved by the membrane manufacturer for the indicated installation.
      i. Flame spread: 75 or less when tested in accordance with ASTM E 84.
ii. Minimum average "R-value" in accordance with ASTM C 518 after conditioning: R30 at 75 degrees F.


iv. Top: 1/2 inch thick, perlite board is preferred.

d. Walkways: Provide 2 foot square precast concrete pavers at 26-inches on center leading from roof access point to all equipment areas.

i. Concrete shall provide a minimum of 4000 psi compressive strength and 95/115pcf density.

ii. Provide manufacturer recommended slip sheet under pavers.

5. Warranty Requirements: Review project specific requirements with NU Project Manager.

6. Quality Assurance:

a. Manufacturer's Qualifications:

i. A company that has produced roofing materials and accessories of the type included in this section for at least 5 years.

ii. Certification: Furnish to the University, before roofing contract award, written documentation that installer is manufacturer-certified to install roofing systems of the type included in this section.

b. Installer Qualifications:

i. Installation Requirements: The installer shall execute the entire project with a single crew and superintendent.

ii. Installer supervision: Have installer identify a supervisor with at least 5 years of experience in the application of the type of modified bituminous sheet roofing system included in this section, to provide full-time review of built-up roofing installation work.

c. Initial Roofing Meeting: Before start of roof deck construction, a meeting shall be held with General Contractor, roofing installer; installers of roof deck, roof-mounted equipment, and other work adjacent to or integral with the roof system; the architect; the owner and other parties concerned with roofing system performance.

d. Pre-Roofing Meeting: Contractor shall organize and conduct a meeting at the construction site 2 weeks before scheduled start of roof system installation with roofing installer; installer of each component of related work, including deck or substrate construction, roof equipment, penetrations of roof deck, and other work integral with or adjacent to roofing; the architect; the owner; the roofing manufacturer's representative; and other parties involved with roofing system
performance, including owner's insurance representative, independent testing agencies, and governing authorities.

END OF SECTION
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SECTION 07 5419 – POLYVINYL CHLORIDE (PVC) ROOFING

1. General: This section outlines general requirements for PVC roofing systems.

2. Design Considerations:
   a. Do not use single ply roofing in high traffic areas.

3. Performance Requirements: Meet standards of both of the following:
   a. Factory Mutual System Classification: Provide roofing materials and a roofing system assembly, which have been listed in the Factory Mutual System "Approval Guide" as being acceptable for Class I roof assembly construction. Provide roof system, including insulation and fasteners, rated by FM for Class I-90 wind uplift.
   b. UL 790: Class A rating for flammability for external fire exposure.

4. Roof System:
   a. Single Ply Roofing Membrane:
      i. Membrane Material: PVC sheet, minimum 0.060 inch (60 mils) thick. Review the option of 0.080 inch (80 mils) thick membrane with NU Project Manager.
      ii. Minimum properties: ASTM D 4434, Type II, Grade I, glass fiber reinforced, felt backed.
      iii. Manufacturer - Roof System: Provide products of the following manufacturer:
      iv. Color: Manufacturer's standard white.
   b. Flashing: PVC 0.060 inch thick.
   c. Insulation System Requirements:
      i. Flame spread: 75 or less when tested in accordance with ASTM E 84.
      ii. Minimum average "R-value" in accordance with ASTM C 518 after conditioning: 30 at 75 degrees F.
      iii. Polyisocyanurate Foam: ASTM C 591.
iv. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (13 mm) factory primed.

1. Products: USG; Securock.

2. Roof /cover board should be installed in accordance with local building codes, roof system manufacturer’s written instructions, and FMG and UL installation requirements.

d. Accessories:

i. Roof Drain Flashing: Zinc-Tin Alloy-Coated Stainless Steel

ii. Walkways: PVC walkway protective membrane as coordinated with the PVC roofing membrane manufacturer.

5. Warranty Requirements: Review project specific requirements with NU Project Manager.

6. Quality Assurance:

a. General: Roofing system, insulation, and cover board shall be installed in accordance with local building codes, roof system manufacturer’s written instructions, and FMG and UL installation requirements.

b. Manufacturer's Qualifications:

i. A company that has produced roofing materials and accessories of the type included in this section for at least 5 years.

ii. Certification: Furnish to the University, before roofing contract award, written documentation that installer is manufacturer-certified to install roofing systems of the type included in this section.

c. Installer Qualifications:

i. Installation Requirements: The installer shall execute the entire project with a single crew and superintendent.

ii. Installer supervision: Have installer identify a supervisor with at least 5 years of experience in the application of the type of modified bituminous sheet roofing system included in this section, to provide full-time review of built-up roofing installation work.

d. Initial Roofing Meeting: Before start of roof deck construction, a meeting shall be held with General Contractor, roofing installer; installers of roof deck, roof-mounted equipment, and other work adjacent to or integral with the roof system; the architect; the owner and other parties concerned with roofing system performance.
e. Pre-Roofing Meeting: Contractor shall organize and conduct a meeting at the
construction site 2 weeks before scheduled start of roof system installation with
roofing installer; installer of each component of related work, including deck or
substrate construction, roof equipment, penetrations of roof deck, and other work
integral with or adjacent to roofing; the architect; the owner; the roofing
manufacturer's representative; and other parties involved with roofing system
performance, including owner's insurance representative, independent testing
agencies, and governing authorities.

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SECTION 076 200 – SHEET METAL FLASHING AND TRIM

1. General: This section outlines general requirements for sheet metal flashing and trim.

2. Materials: Do not use galvanized metal in exterior applications. Use one of the following:
   a. Stainless Steel Sheet: ASTM A 167, Type 316L, non-corroding. Finish: 2D (dull annealed).
   b. Copper Sheet: ASTM B 370, of temper appropriate for use.
   c. Terne Coated Stainless Steel Sheet: ASTM A 167, Type 304 sheet, coated both sides with terne alloy (80 percent lead; 20 percent tin); FS QQ-T-201F, Type II. Minimum coating weight: 40 lb., nominal (1.45 ounces per square foot total coating weight).
   d. Fasteners: Fasteners shall be stainless steel screw-type fasteners. Nail-in or driven type fasteners shall not be allowed.

3. Preformed Reglet Flashing Systems:
   a. Furnish manufactured product wherever possible. Provide secure interlocking of separate reglet and counterflashing pieces.
   b. Basis of Design Manufacturers: Subject to compliance with requirements, provide products by the following manufacturers:
      i. Fry Reglet Corporation.

4. Gutters And Downspouts:
   a. Fabricate from same material and finish used for adjacent exposed flashings.
   b. Provide removable debris screens for gutters, fabricated from 1/4-inch mesh wire cloth of same material used for gutters or approved compatible material.
   c. Provide formed sheet metal frame on 4 sides of each screen unit. Length of screen units shall not exceed 10 feet.
   d. Provide wire basket type strainers at downspouts, fabricated from wire and sheet metal of same material used downspouts or approved compatible material. Provide sheet metal baffles 6 inches high with legs 18 inches long at gutter corners below roof valleys.
e. Provide formed metal splash pans fabricated from same type of sheet metal used for downspouts. Locate where downspout discharges onto lower roof.

END OF SECTION
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SECTION 07 7200 – ROOF ACCESSORIES (HEAT AND SMOKE VENTS)

1. General: This section outlines general requirements for roof accessories including heat and smoke vents.

2. Design Considerations:
   a. Heat and Smoke Vents:
      i. Labels: Provide units listed and labeled by Underwriters Laboratories Inc. (UL) or Factory Mutual System (FM) for emergency automatic heat and smoke relief venting.
         1. Operation to be by fusible link, with temperature rating of 50 degrees F above highest ambient temperature.
      ii. Construction: Cover in galvanized sheet steel, mill phosphatized to receive paint finish; 14 gage outside face, rigid insulation 1 inch thick, 22 gage inner liner; fully welded and reinforced for rigidity.
      iii. Curb: Fully welded units, manufacturer's standard height but not less than 12 inches from base flange to top of frame. Fabricate from same material and thickness used for cover top.
      iv. Insulation: Wood fiberboard, minimum 1 inch thick, protected by metal liner of same material and thickness used for inner liner of cover.
      v. Hinges: Spring lift mechanism, sized to open doors with 10 pounds per square foot uniform live load applied to exterior.
         1. Shock absorbers or similar damping mechanism to prevent uncontrolled rapid opening of doors.
         2. Hold-open arm, set to hold cover at 90 degrees, with detent release.

END OF SECTION
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SECTION 07 9200 – JOINT SEALANTS

1. General: This section outlines general requirements for joint sealants.

2. Quality Assurance:
   a. Field Installation Tests: Before installation, test the adhesion of each sealant to actual substrates.


4. Warranty: Review project specific requirements with the NU Project Manager.

5. Materials:
   a. Elastomeric Sealants:
      i. Elastomeric Sealants – General: Chemically curing elastomeric sealants of types indicated, complying with ASTM C 920, including specific Type, Grade, Class, and Uses indicated, as well as all other requirements specified.
   b. Paving Joint Sealants:
      i. Two-part Urethane Paving Sealant: Pourable, chemically curing (cold-applied) complying with FS SS-S-200.
      ii. Composition: Urethane, with minimum movement capability of plus or minus 12-1/2 percent.
   c. High Movement Silicone Sealant:
      i. One- or two-part, non-acid-curing, ASTM C 920, Grade NS (Non-Sag), Class 25, Use NT, plus movement capability of at least 50 percent in both extension and compression.
   d. Low-Modulus Urethane Sealant:
      i. Non-Sag, two-part, ASTM C 920, Type M, Grade NS, Class 25, Use NT, plus movement capability of 50 percent in both extension and compression.
   e. Urethane Exterior Wall Sealant:
      i. Nonsag, two-part, ASTM C 920 for Use T: Type S or M, Grade NS, Class 25, Use T.
f. Solvent-Release-Curing Sealants:
   i. Acrylic Sealant: Nonsag, one-part, solvent-release-curing; complying with ASTM C 920, Type S, Grade NS, Use NT, with the following exceptions:
   ii. Weight loss: 15 percent maximum.
   iii. Movement capability: 7-1/2 percent in both extension and compression, minimum.

  g. Butyl Sealant:
   i. Nonsag, one part, solvent-release-curing; complying with FS A-A-272, Type III; nonstaining; paintable.

  h. Latex Sealants:
   i. Acrylic-Latex Emulsion Sealant: One-part, nonsag, mildew-resistant, paintable; complying with ASTM C 834.

  i. Noncuring Sealers:
   i. Butyl Polyisobutylene Sealant: Noncuring, nondrying, solvent-release; complying with 809.2, as described in AAMA 800.

  j. Sealant Backers:
   i. General: Non-staining.
   ii. Recommended or approved by sealant manufacturer for specific use.

6. Schedule of Recommended Joint Sealers:
   a. Exterior Joints for Which No Other Sealer Is Indicated:
      i. Use one of the following sealants: High movement silicone sealant or two-part nonsag low-modulus urethane sealant.
      ii. Backer: Backer rod.
      iii. Joint shape: Concave joint configuration.

   b. Interior Joints for Which No Other Sealer Is Indicated:
      i. Use the following sealant: Acrylic-emulsion latex sealant.
      ii. Backer: Backer rod.
      iii. Joint shape: Concave joint configuration.
c. Below-Grade Joints:
   i. Use the following sealant: Urethane sealant for water immersion.
   ii. Backer: Backer rod.
   iii. Joint shape: Concave joint configuration.

d. Exterior Joints Well Protected from Weather and Not Subject to Movement:
   i. Use one of the following sealants: Acrylic sealant; Butyl sealant.
   ii. Backer: Backer rod.

e. Vehicular Paving Joints, Not Over 1-1/2 Percent Slope:
   i. Use the following sealant: Two-part cold-applied urethane paving sealant. Use bond-breaker tape.
   ii. Backer: Joint filler as required.

f. Interior Floor Joints and Pedestrian Paving Joints, Less than 1-1/2 Percent Slope:
   i. Use one of the following sealants: Silicone sealant for Use T; Two-part nonsag urethane sealant for Use T.
   ii. Backer: Backer rod.
   iii. Joint shape: Flush joint configuration.

g. Joints around Pipes, Ducts, and Conduit Penetrating Exterior Walls and Roofs:
   Same as used for adjacent substrates.

h. Joints in Interior Wet Areas:
   i. Mildew-resistant silicone sealant.
   ii. Backer: Backer rod.
   iii. Joint shape: Concave joint configuration.

i. Concealed Joints in Acoustical Assemblies:
   i. Butyl polyisobutylene sealant.

END OF SECTION