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1. **Design & Performance Criteria:**

- a. Design roofing panels in compliance with code required wind loads.
- b. All roofing assemblies must comply with FM Global (FMG) requirements and be an approved assembly as listed in FMG's "Approval Guide"
- c. Review FMG data sheets and submit compliance with FM Global RoofNav to UVM project manager during design.
- d. Roofing systems shall allow for thermal movement resulting from ambient and surface temperature changes.
- e. Design consultant to specify fasteners that are compliant with engaged materials and meet manufacturer's requirements for warranty.
- f. Design Consultant shall avoid specifying incompatible materials in contact with each other.
- g. Snow guards shall be used on sloping roofs above entrances, exits, walkways, and lower roofs.
 - i. Snow guard installation areas shall consider ricochet areas and areas where snow drifts will accumulate on lower roofs that have the potential to drop secondary accumulation onto doors and walkways below.
- h. Design and locations of valleys shall consider where snow and water will fall below.
 - i. Avoid locating building entrances, exits, and walkways where roof valleys have the potential to deliver sliding ice and snow onto grade.
- i. Where items are indicated to be designed by the contractor, coordinate delegated design requirements with the UVM project manager and the division 00-01 specification writer for the University.
- j. Metal roofing assemblies shall be reviewed for compliance with NFPA 285 when applicable.
- k. A pre-installation conference shall be held at the project site before installation of roofing systems.
- l. A roofing mockup shall be constructed demonstrating compliance with the design documents, manufacturer's installation instructions, and coordination with insulation, air barrier, framing/secondary framing, flashing, and roofing systems. Mockup shall be constructed separate from the building construction.

2. **Reference Standards:**

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- a. FM Global Approvals Guide: <https://www.fmaprovals.com/approval-guide>
 - b. FM Global RoofNav: <https://www.fmaprovals.com/roofnav>
 - c. FM 4471 "Panel Roofs"
 - d. NFPA 285 Design roofing panels in compliance with code required wind loads.
 - e. SMACNA "Architectural Sheet Metal Manual"
 - f. NAAMM "Metal Finishes Manual for Architectural and Metal Products"
 - g. Design Consultant shall specify reference standards appropriate for the metal system used on the project.
3. **Submittals to be reviewed by University:**
- a. All equipment and product information
 - b. All product warranty information
 - c. Shop drawings showing panel sizes, lap joints, dimensioned seam locations, dimensioned fastener locations, edge conditions, side seam conditions, corners, anchorages, trim, closures, and accessories.
 - i. Included shop drawings of snow guards when included in scope of work.
 - d. Verification samples of fully finished metal panels and fasteners.
 - e. Samples of all warranties.
 - f. Maintenance Data
 - g. Product test reports
 - h. Qualification data for qualified installers.
4. **Products, Materials & Equipment:**
- a. Acceptable manufacturers include:
 - i. AEP Span:
 - ii. Atas International, Inc.,
 - iii. Centria,
 - iv. Metecno-Morin,
 - v. Peterson Aluminum Corporation
 - vi. Firestone/Copper Sales, Inc.
 - b. Roofing panels to be factory coated.
 - i. Basis of design is a 3 coat Fluoropolymer finish.
5. **Installation, Fabrication, and Construction:**

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- a. General contractor shall coordinate installation of all roofing assemblies, air barriers, vapor barriers, secondary framing, sheathing, flashings, and thermal insulation under or adjacent metal roofing systems.
 - b. Design consultant shall specify that installers have adequate training for correct fastener installation, FM Global requirements, and fastener sealing at air barrier and flashing penetrations.
 - c. Fasteners
 - i. A maximum of five percent unacceptable fasteners is allowed in a 100 SF area. Fasteners over five percent must be removed along with 100 percent of sheathing, air barriers, flashings, and all work. Installers shall be retrained or replaced.
 - 1. Remedial work for unacceptable fasteners
 - a. Remove unacceptable fasteners, fill holes in sheathing with sealant, Repair air barrier to comply with manufacturer's repair recommendations, repair flashings to comply with manufacturer's repair recommendations, provide new properly installed fasteners.
 - ii. Seal properly installed fasteners to provide a complete seal and encapsulate fastener penetrations through air barrier, flashing, waterproofing, and damp proofing to form a watertight seal.
 - iii. Do not allow any reduction in air barrier and flashing system performance at fasteners.
 - d. Installers shall be trained and approved by the roof panel manufacturer.
 - e. Roofing system substrates shall be examined prior to roofing installation. General Contractor shall prepare a written report, endorsed by the installer that lists conditions detrimental to the performance of the Work
 - i. Roofing installation shall not proceed until unsatisfactory conditions have been corrected.
6. **Warranties:**
- a. Design Consultant is responsible for describing standard and special warranty terms and inclusions with the UVM project manager on a case-by-case basis. See specifications.