**6. ENGINEERING SYSTEMS REQUIREMENTS**

**B30 ROOFING**

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SYSTEMS REQUIREMENTS
ROOFING TEMPLATE 06/23

Instructions for using this template: There are template files for each UNIFORMAT Level 2 Group Elements. This template is for Group Element D30-ROOFING. Text such as this is hidden text that will not print when the hidden text box in "Print/Options" is unchecked.

The Architectural Team Member must edit this template for the requirements of the project. The SYSTEMS REQUIREMENTS are intended to define items that are required throughout the facility or on a system wide basis that is common to several rooms. Room-specific requirements are defined in the Part 3 Chapter 5 ROOM REQUIREMENTS section. Coordinate with the lead programmer for ROOM REQUIREMENTS. Editing is required where brackets [ ] appear. Delete all building elements that are not required for the project. If additional elements or sub-elements are required for the project that do not appear in the template, refer to the NIST UNIFORMAT II publication for additional building element numbers and descriptions. The Uniformat II Work Breakdown Structure can be found at www.wbdg.org/ndbm/**

 **Coordinate with the PERFORMANCE TECHNICAL SPECIFICATION SECTION B30 to ensure that performance requirements are provided for all of the Building Elements listed here and that paragraph numbering matches.
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NOTE: Consider each roofing component relative to UFC 3-110-03, *Roofing*, Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*and UFC 1-200-02, *High Performance and Sustainable Building Requirements*.
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 **B30 GENERAL SYSTEM DESCRIPTION**

Provide watertight roof systems compatible with the facility function, construction, and service conditions. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation.

Submittal Requirements: Components of a minimum roof submittal include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Provide a Pre-Design Roofing Conference (if required in RFP Part 4) and Pre-Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

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NOTE: The minimum roof live load will be not less than 20 psf (960 Pa). Specify here if a greater load is required.
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Built-in gutter systems where drainage passes through an interior space or is concealed in the exterior cavity wall is prohibited.

Refer to Unified Facilities Criteria (UFC) 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02, *High Performance Sustainable Building Requirements* for additional roofing requirements.

[The project is an addition to an existing building, and the roof system of the addition must match the roof of the existing building, which is \_\_\_\_\_\_.]

 **B3010 ROOF COVERINGS**

 **B301001 STEEP SLOPE ROOFING SYSTEMS**

Steep slope roofing systems are preferred over low slope roofing systems. Steep slope roofing systems that are acceptable include [metal], [slate], [concrete tiles], [clay tiles], and [asphalt shingles].

Provide a roofing system that resists wind uplift pressures calculated in accordance with American Society of Civil Engineers (ASCE) 7. Uplift resistance must be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or American Society for Testing and Materials (ASTM) uplift resistance test procedures. [Steel panels must be zinc-coated steel conforming to ASTM A 653/A 653M; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ [55] [50] coating; or aluminum-coated steel.]

[Provide [galvanized] [shop painted] Sub-purlins for the Structural Metal Roof System.]

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NOTE: For Structural Standing Seam Metal Roofing Systems, specify here the 5-year or the 5-year plus 20-year warranties.
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[Structural Standing Seam Metal Roof System (SSSMRS) Warranty Certificate. At the completion of the project furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to the PTS section [, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weather-tightness warranty].

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NOTE: Few manufacturers regularly produce prefinished panels meeting these low gloss requirements and such sheets are available only in limited colors. Standard 70 percent (polyvinylidene fluoride) PVF2 finish, for example, has a medium gloss. Low gloss paint formulations result in reduced weathering properties. The project program must identify individual facilities requiring low gloss finish.

For roof of structures at airfields where glare would be objectionable and may be an operational hazard, the specular gloss value should be limited to 10 or less at an angle of 85 degrees.
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[Provide Specular Gloss of Finished roof surfaces for [\_\_\_\_\_] that have a specular gloss value of [10 or less at an angle of 85 degrees] [30 plus or minus [\_\_\_\_\_] at 60 degrees] when measured in accordance with ASTM D 523.]

 **B301002 LOW SLOPE ROOFING SYSTEMS**

Wind Uplift - Provide a complete roof covering assembly rated Class 1- 60, 75, 90, 105, 120, 135 or appropriate in accordance with Factory Mutual (FM) P7825, capable of withstanding an uplift pressure of [60] [75] [90] [105] [120] [135][\_\_\_]pounds per square foot (with a safety factor of 2) ([1.44] [2.15] [5.8] [\_\_] kPa), and FM 1-49 for perimeter and flashing attachment.

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NOTE: Specify Class B option only when Class A may not be attainable such as membrane system application directly to wood deck. Provide justification/rationale for Class B option with design submission
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[Fire Safety - Provide a complete roof covering assembly:

1. [Rated Class [A] [B] in accordance with ASTM E 108] [or] [FM 4470] [or] [UL 790]; and

2. Listed as [part of Fire-Classified roof deck construction in UL Roofing Materials and Systems Directory (RMSD)] [or] [Class I roof deck construction in FM P7825c].]

[Use a ventilating base sheet over any materials which may contain moisture which may need to transpire out of the building.]

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 NOTE: A three ply modified system consisting of modified base sheet, modified bitumen interply sheet, and modified bitumen cap sheet is the system of choice for new low sloped roofing.
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Low slope roofing systems that are acceptable include [aggregate surfaced four-ply built-up roofing], [three-ply built-up roofing systems with modified bitumen cap sheet surfacing] [or] [three-ply modified bitumen roofing] [or] [EPDM].

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NOTE: Specify the polyester reinforced cap sheet where roof traffic or the other requirements below warrant its use.
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[Provide polyester reinforced cap sheet on Modified Bitumen roofs expected to experience high levels of traffic, on roofs with congested equipment, where equipment is expected to receive regular service or high maintenance, and where other service conditions warrant.]

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NOTE: Third party certification standards promote the use of cool roofing, and increased energy conservation through additional insulation. In choosing a cool roof, consider that when cool roofing is used with insulation R values greater than 24, the 'cool roof' surface has little if no influence on the energy performance of the building. Additionally, designers must be aware of the possible negative impacts of using cool roofing that may result in unintended consequences. Poor design of cool roofs in ASHRAE climate zones 4 and higher have resulted in the unintended development of condensation forming below the membrane. Roofs that experience this condensation have had to be replaced.
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[Cool Roof - Meet the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.1 Chapter 5 values for cool roofing. If a cool roof is not selected in zones 1-3, meet one of the exception requirements listed in ASHRAE 90.1 Chapter 5 or provide thermal insulation above the deck with an R value of 33 or greater.]

 **B301003 ROOF INSULATION AND FILL**

Provide roof insulation values no less than in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements* and UFC 3-101-01, *Architecture*.

For fastening roof insulation on low-slope membrane roofs, place fasteners to withstand and obtain an uplift pressure of [60] [75] [90] [105] [120] [135] [\_\_\_]pounds per square foot (with a safety factor of 2) ([1.44] [2.15] [5.8] [\_\_] kPa) in the field of the roof and FM Loss Prevention Data Sheets (LPDS) 1-49 for perimeter component and flashing attachment.

 **B301004 FLASHINGS AND TRIM**

Flashing and sheet metal work includes scuppers, splash pans, and sheet metal roofing. Flashings must be [copper, sheet and strip - ASTM B 370, cold-rolled temper] [Lead-Coated Copper Sheet - ASTM B 101] [Lead Sheet - Minimum weight .19 kPa (4 pounds per square foot)] [Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M, minimum of 0.70 mm (24 gauge), and a minimum zinc coat weighting of 275 g/sm (90 ounces per square foot).] [Galvanized steel items must have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating] [Steel Sheet, Aluminum Zinc-coated - ASTM A792/A792M, minimum of 0.70 mm (24 gauge)] [Stainless Steel - ASTM A 167, Type 302 or 304, minimum of 0.64 mm (24 gauge)] [Aluminum Alloy Sheet and Plate - ASTM B 209] [Pre-Finished Aluminum. Finish must be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils].

 **B301005 GUTTERS AND DOWNSPOUTS**

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited.

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NOTE: Provide roof hatches where required by OSHA, and/or as access to roof when roof mounted equipment is used or other routine roof maintenance is required Provide skylights or other glazed roof openings only to supplement interior lighting levels. (generally in steep slope or vertical applications), and otherwise, are discouraged from use. Proper detailing is critical, and must be scrutinized closely to minimize the likelihood of future leaks at these locations. Provide guards or rails where required by OSHA or the building code.
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 **B301006 ROOF OPENINGS AND SUPPORTS**

Provide [insulated roof hatch] [and] [skylights] [\_\_\_\_ glazed roof openings] [and] [rails or guards].

 **B301090 OTHER ROOFING**

[Provide lightning protection, without penetrating the roof membrane or flashing components.]

[Reuse existing roof drains with new, compatible flashing materials, a new drain clamping ring and new bolts for anchorage.] [Provide new roof drains and accessories.]

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NOTE: When project includes "green" or "vegetative" roof, provide design-build team with complete criteria here and in PTS B30. If you don't have successful previous criteria, consult vegetative roofing specs located on the Whole Building Design Guide's "**[**Federal Green Construction Guide for Specifiers**](http://www.wbdg.org/ccb/browse_cat.php?c=250) **".
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[Provide an [intensive][extensive]vegetative roof in accordance with UFC 3-110-03, *Roofing*, Chapter 2 Vegetative Roofing Systems. [\_\_\_\_\_\_percent of the entire roof must be a vegetative roof][Locate vegetative roof \_\_\_\_\_\_\_\_\_\_].]

--End of Section--