

7 Thermal & Moisture Protection

NOTE: Significant revisions or additions to the previous standards are highlighted in italics.

GENERAL

Designers shall verify that all applicable portions of these standards are incorporated into the project's design, drawings, specifications and final construction. Requests for variances from these standards shall be submitted in writing to the FPD Project Manager, using the KU Standards Variance Request Form found in [Appendix A1.1](#), for review and written approval or rejection as indicated on the form.

RELATED DOCUMENTS & REQUIREMENTS

Refer to the following for requirements that also apply to work of this section.

- ☐ Division 1 - General Requirements; refer to sections regarding construction testing and field quality control requirements.
 - ☐ Unless directed, the Owner will separately contract for quality control testing during construction, not the Contractor. Verify with FPD for each project.
- ☐ Division 26 – Electrical: Includes lightning protection, which is required for all University of Kansas buildings, unless specifically approved otherwise by FPD.
- ☐ Division 33 – Utilities: Includes foundation and storm drainage systems, to which all roof drainage systems shall connect, unless otherwise approved by KU.

WATERPROOFING AND FOUNDATION DRAINAGE – DESIGN GUIDELINES

General: Waterproof membranes, drainage membranes and/or granular fill, and foundation drains shall be provided on all foundation walls of below-grade interior spaces.

- ☐ Sheet waterproofing shall be provided beneath all wood floors on slabs-on-grade, in lieu of less effective vapor barriers.
- ☐ Utility tunnels shall also have waterproof membranes and foundation drainage, unless otherwise directed by FPD.

Foundation and Underfloor Drains: 4" diameter rigid perforated PVC and pre-fabricated fittings. Flexible bellows-type drainage piping is not to be used.

Underfloor Drainage: Provide beneath all slabs-on-grade that occur below finish grade and are in areas where water tables or sub-surface water is possible to occur.

Waterstops: Bituminous flexible strip waterstops may be preferable over traditional rubber or PVC waterstops with fused or prefab covers at splices. Provide waterstops in all concrete joints below grade, whether in walls or slabs, or where walls meet slabs or other walls.

Below-Grade Expansion Joints: Designers shall detail sealant on backer rod on both sides of below-grade expansions joints, such as when a new foundation wall abuts an existing wall, even if exterior-side of joint is covered by a waterproof membrane. Continue joints in all directions, vertically and horizontally, to provide continuous water protection.

INSULATION – DESIGN GUIDELINES

Energy conservation is an important goal of the University. Structures shall be well insulated, preferably beyond minimum industry standards.

Expanded Polystyrene (EPS) Insulation: EPS insulation must be 2.0 PCF minimum.

- ☐ When used as a roofing insulation, provide with ½" high-density wood fiberboard factory-bonded to top.

Tapered Roof Insulations: Taper to 1" minimum thickness, and complete remainder of taper with fiber or perlite edge.

ROOFING – GENERAL DESIGN GUIDELINES

General: Roofing systems and their detailing are an area of great concern to the University. Consultants shall select an appropriate roofing system for each project that is of the highest possible quality. The proposed roofing systems and associated details shall be reviewed thoroughly with KU, with special care and attention given these by the consultant to ensure that durable, watertight, easily maintained roofing systems are achieved on each project.

Wind Uplift: Systems shall be designed to be consistent with UL I-90 wind uplift requirements.

Class Rating: All roofing systems shall be UL Class A compliant.

Roofing Warranties: KU's preference is to get the longest warranty available for each roofing system and typically would seek a 15-20 year period following the date of substantial completion.

- ☐ Consultants shall verify the warranty requirements for each project with FPD.

Lightning Protection: Reroofing projects shall require maintaining the existing lightning protection system and upgrading it as required to meet current codes or adding one if none currently exists. *Any modifications to an existing system or new systems must be by a UL certified lightning protection specialist.*

Vapor Barriers: Project Designers shall clearly indicate the vapor barrier on the design and construction drawings for the entire building envelope, including the roof systems and their interface with wall systems. Project Designers shall include all necessary details, for all locations required for proper vapor control or moisture protection.

Roof Drains: Interior roof drain lines shall be not less than 4" diameter.

Overflow Drains and Scuppers: All outlets shall be located and detailed so that any overflow water that occurs is caught and dispersed by appropriate catch basins or splashblocks. Water discharging from overflows or scuppers shall not be allowed to splash onto pedestrians, vehicles or building surfaces in the design of the project.

Roof Access: Designers shall provide a built-in means of accessing every low-slope roof area for maintenance, by means of stairs to roofs, ladders and roof access hatches, ladders between varying roof levels, and similar means. Verify specific provisions with FPD and FS.

- ☐ If equipment that requires periodic maintenance is located on sloped roofs, Designers shall also provide permanent ladders and walkways as necessary to provide service access to all components of that equipment. Exceptions must be approved by FPD, the University Architect and the affected FS maintenance supervisors.

Roof Walkways: Provide to all rooftop equipment that may require periodic maintenance and at high traffic areas. Walkways shall extend from roof hatches or other designated access points to and around all sides of each piece of equipment. Walkway material shall be as approved by roofing manufacturer and shall be adhered to roofing membrane.

Rooftop Equipment: Permanent visual screening shall be provided around all equipment located on roofs and visible to pedestrians from any point on campus. Verify specific requirements with FPD.

- ☐ Rooftop equipment and roof access hatches shall be located so they are kept not less than 10' from roof edges, for both maintenance personnel safety and aesthetic reasons.

Rooftop Tie-off / Anchors: *All new construction and major building renovations that incorporate vast amounts of glazing shall provide tie off anchors and provisions for workers to safely anchor for performing required maintenance work on roofs or glazing.*

Maintenance Materials: Verify roofing materials and quantities that are to be specified as maintenance materials with FPD and FS.

STEEP-SLOPE ROOFING SYSTEMS – DESIGN GUIDELINES

Acceptable Steep Slope Roofing Systems:

- ☐ Clay Tile (Ludowici or equal) or Slate
 - ☐ *Alternatively, DaVinci roofing system may be considered on case by case basis*
- ☐ Metal Roofing Systems (concealed fasteners, mechanically-seamed)
- ☐ Asphalt shingles shall not be used, unless approved by FPD and the University Architect on a project-specific basis.

Steep-Slope Roofing Underlayment: All steep roofing systems, regardless of roofing type used, are to be specified and detailed to require the provision of a layer of an "Ice Barrier"-type, adhesive, elastomeric underlayment material under 100% of the roof area, in lieu of traditional 30# felt underlayment. *Designers must incorporate pedestrian safety by including ice guards above doorways or sidewalks.*

- ☐ Acceptable Manufacturers: Manville; GAF; Tamko

Color: KU's Main Campus has an aesthetic tradition for sloping red roofs that should be respected and continued on all steep-sloped roof assemblies.

- ☐ **KU's Standard Red Roof Colors:** Designers shall verify which of these red colors to use with FPD and the University Architect on each project; typically match the predominant adjacent color:

- ❑ South Campus: Kynar 500 Fluoropolymer coating "Colonial Red"; examples: Allen Fieldhouse, Capitol Federal Hall, & surrounding buildings.
- ❑ Main Campus: Kynar 500 Fluoropolymer coating "Terra Cotta"; examples: Dyche Hall, Bailey Hall, traffic control booths.

LOW-SLOPE ROOFING SYSTEMS – DESIGN GUIDELINES

General: Low-slope ("flat") roofs are typically expected at areas where rooftop equipment is clustered or other project requirements make them advisable.

- ❑ All low-slope roofs shall be sloped $\frac{1}{4}$ " per foot minimum over their entire surface area as measured along their fall line / slope directly towards each roof drain, gutter, scupper or outlet. Roofs must have positive drainage over their entire area to roof drains, gutters, downspouts or scuppers, with no flat areas permitted.
- ❑ Water is not permitted to sheet drain over roof edges, but shall be directed down and away from buildings in a controlled manner acceptable to Owner.
- ❑ Roofing colors of any type must be approved prior to installation by FPD.
 - ❑ *White or gray roof surfaces are generally preferred for low-slope systems.*

Acceptable Low-Slope Roofing Systems:

- ❑ TPO
- ❑ Others as approved or requested by KU.

Installation Method: Roofs shall be installed with a fully adhered system.

- ❑ *Pavers and loose gravel ballast are not allowed for new or reroof situation unless approved by FPD.*

METAL ROOFING – 074113

General: Designers shall not specify systems that utilize snap-on mullion or batten covers. Metal roofing systems shall have permanent, formed seams or battens, and shall be proven prefabricated systems in lieu of custom-fabricated systems, unless otherwise approved by FPD and the University Architect.

All metal roofing systems shall include a watertight "ice and water shield" membrane beneath them.

ROOF SPECIALTIES – 077100

Copings and Roof Edges: Designers shall detail and specify prefabricated units that have a proven performance in high wind areas similar to the project's location.

Flashings: Designers shall detail all flashings to have not less than an 8" clear vertical height above the adjacent roof surfaces, with 12" heights preferred.

All flashings shall have an upturned inside edge, and a down-turned outside drip edge, and shall lap all other materials by at least 1-1/2" or more to guard against wind-blown or snow-drift induced seepage to building interiors.

ROOF ACCESSORIES – 077200

Equipment Roof Curbs: Details and/or specifications shall require all roof curbs to extend a minimum of 12" above adjacent roof surfaces.

- ☐ Roof curbs shall be insulated, with a wood nailer on top.
- ☐ Bid documents shall clearly stipulate whether roof curbs are to be provided by the General Contractor or each trade furnishing the equipment to be supported.

Roof Hatches: Roof hatches shall be provided with a padlock hasp or keyed cylinder, unless located in a room secured by an FS PX maintenance key. Roof hatches shall include an extension pole for grasping when moving onto the roof.

VEGETATED ROOF SYSTEMS – 077273

General: "Green Roofs" shall only be used with the approval of FPD and the University Architect. If provided, a green roof system shall include an automatic irrigation system capable of maintaining the planted materials in good health, and all planted materials shall be in a tray system to facilitate future removal and replacement, as needed.

JOINT SEALANTS – 079200

Sealant Materials: Polyurethane, one or two-part sealants, are typically used on campus. Silicone sealants are typically limited to glazing systems, but may be considered elsewhere if recommended for those applications by the product manufacturer.

Sealant Application: Installers shall be required to submit proof of at least five years successful experience applying products of the type specified. Designers are expected to check on these qualifications prior to approving proposed subcontractors and submittals.

- ☐ Joints in horizontal masonry systems, such as *stone or precast* copings, sills and ledges, shall be sealed with joint sealant in lieu of mortar. Project Designers shall also detail a continuous horizontal stainless steel or copper gutter plate which is sealed into sawcut kerfs at the mid-point of each side of a stone or precast coping or cap.
- ☐ Project Designers shall pay special attention to the installation of all joint sealants and shall conduct a pre-installation conference with the installer to confirm that all specified steps and work required by the manufacturer's written directions and recommendations are followed faithfully and completely, to ensure a long-lasting permanent installation.
 - ☐ Designers shall emphasize the importance of cleaning and priming joint substrates, of proper placement of backer rods, correct tooling of the material and protection of adjacent surfaces, among others.
 - ☐ KU shall expect the Project Designers and Contractors to very carefully monitor and inspect this work, and to immediately reject any non-conforming work.

Sealant Colors: *Proposed colors must be verified with FPD Project Manager for each sealant location via mockup prior to any installation.*

- ❑ As a general rule, it is recommended to match the brick color rather than the mortar color in vertical joints, since sealants will tend to blend into the field color of the brick and be less noticeable. Horizontal joint sealants in brick joints should match the mortar color.

EXPANSION JOINT ASSEMBLIES – 079513

General: All floor expansion joint assemblies shall have ADA-compliant edges and transitions and shall not create a trip-hazard in any condition of movement. *Flush transitions are preferred when possible.*

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