

CHAPTER 5 – ROOFING SYSTEMS

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CHAPTER 5—ROOFING SYSTEMS

Section 5.1 General Requirements

- 5.1.1 Whenever feasible, roofs with slopes greater than 3 inches per foot should be considered.
- 5.1.2 On low-sloped roofs, the minimum slope shall be 1/4" per foot. On new construction, and on existing construction where possible, the slope shall be a minimum of \square per foot.
 - 5.1.2.1 Sloping of insulation shall not be allowed on new construction. The new roof structure needs to provide the slope – not the insulation.
 - 5.1.2.2 Tapered insulation may be used on existing roofs to achieve proper slope to drains.
- 5.1.3 For low-sloped roofs, the following types are preferred: Two or Three -ply Modified Bitumen Sheet. Consider contaminants and pollutants known to be present when choosing the membrane material. The mod-asphalt membrane to meet or exceed 20 year warranty, cold application of membrane.
- 5.1.4 The specifications shall prohibit:
 - 5.1.4.1 The use of any asbestos-containing materials for the entire system.
 - 5.1.4.2 Lightweight concrete shall not be used in lieu of insulation.
 - 5.1.4.3 Organic felts shall not be used. Modified Bitumen is required.
 - 5.1.4.4 Pitch pans shall not be used.
 - 5.1.4.5 Top nails shall not be used.
- 5.1.5 Avoid penetration and placing of equipment directly on roofs as much as possible.
- 5.1.6 All roofs shall have overflow systems. If overflow piping is used, the piping systems shall be separate from the regular roof drain system. Consideration should be given to the use of scuppers or other highly reliable overflow systems.
- 5.1.7 The specifications and drawings shall note that often the manufacturer is willing to warrant a roof system for the required period of time if details are used that are less comprehensive than the details shown in the drawings. In those cases, we require the details drawn to be used. – No exceptions!**
 - 5.1.7.1 Use a 10-year warranty as the base bid and the 20-year warranty as an alternate for all specifications.
- 5.1.8 New roofing systems shall not be installed over an existing roof system without removal and replacement of the old roof system.
- 5.1.9 The following references and guidelines should be used in roofing design:
 - 5.1.9.1 NRCA Roofing and Waterproofing Manual, including NRCA Construction Details.

5.1.9.2 SMACNA Architectural Sheet Metal Manual.

5.1.9.3 FM Approval Guide, current edition.

5.1.10 The design system shall be able to meet 1-90 wind uplift ratings.

5.1.11 All roofing systems shall include the use of a vapor barrier. Review vapor barrier on a roof by roof basis with Owner to determine final needs.

5.1.12 Insulation

5.1.12.1 The insulation specified shall be compatible with the application method required and the other materials of the roofing system. Require the roofing membrane manufacturer to approve the insulation in writing. Preferred insulation is polyisocyanurate. Coverboard is ¾" fiberglass.

5.1.12.2 Where overall insulation thickness is 2" or greater, it is preferred that the insulation be installed in more than one layer with the joints staggered. For this purpose, a recovery board can be considered a layer.

5.1.12.3 Lightweight concrete insulation systems are not allowed unless prior approval of the Owner is obtained.

5.1.13 Use crickets, saddles, and edge strips to direct water flow away from penetrations and parapet walls. Provide a minimum of 2 times the roof slope to ensure resulting finished surfaces are sloped, not flat. Show all cricket layouts on the roof plan.

5.1.14 Penetrations

5.1.14.1 Minimize use of roof penetrations to the greatest extent possible. Maintain proper clearance between penetrations to allow for flashing installation. Do not install penetrations in valleys or near drains or scuppers.

5.1.14.2 Maintain a minimum of 12 inches between penetrations. Maintain a minimum of 8 feet to all roof drains and scuppers.

5.1.14.3 Show all penetrations on the roof plan and provide applicable details including detail references keyed in the roof plan or legend. Clearly show all details of the construction requirements for the deck, insulation, membrane, curbing, base flashing and counterflashing, etc. necessary to completely communicate requirements. Use of pre-manufactured pipe boots is not allowed.

5.1.14.4 All penetration flashings shall extend a minimum of 12" above the roof membrane.

5.1.14.5 All penetrations are to be through a box; pitch pans are not allowed.

5.1.15 Equipment Supports

5.1.15.1 Use round shapes to construct equipment supports. Equipment supports should be as shown below. Note that these minimum apply at the end of the equipment support on the upslope side of the framing.

5.1.15.2 Width of Equipment Height of Legs above Membrane

| | |
|-----------|-----|
| Up to 24" | 24" |
| 25 to 47" | 36" |
| Over 48" | 48" |

5.1.16 Flashings

- 5.1.16.1 Copper is the preferred material for flashings and removable counterflashings. Galvanized sheet metal shall not be used. Other materials may be considered based on prior Owner approval.
- 5.1.16.2 On new construction, and on existing construction whenever feasible, install counterflashings a minimum of 12" above the roof system.
- 5.1.16.3 Before designating sheet metal items for reuse in reroofing work, consider whether the component can withstand removal, reinstallation, bending, or resetting without damage and as necessary to perform its intended function.
- 5.1.16.4 Where fascia replacement is required, the preferred system is a two-piece system similar to Anchor-Tite as manufactured by Metal-Era Roof Edge Systems.

5.1.17 Walkways shall be provided to all roof-mounted equipment.

5.1.18 The designer shall consider the need for snowguards or ice breakers, especially on roofs with eaves over sidewalks.

5.1.19 Required elements common to KSU roof projects include placement of roof hatches, ladders between roof levels, hose bibs and electrical access on each roof level. Metal expansion joints only – no neoprene materials are allowed on KSU projects.

Section 5.2 Modified Bituminous Systems

5.2.1 Modified Bitumen Sheet (MBS) – Refer to the detailed specification draft used on all KSU roofing projects for greater detail of requirements.

5.2.1.1 All MBS roofs shall be designed to 20-year standards, regardless of the warranty period. Refer to 5.1.7.1 for requirements of bid specifications.

5.2.1.2 All MBS systems shall use a layer of recovery board.

Section 5.3 Metal Systems

5.3.1 Metal roofing systems shall be of the standing seam type only. The minimum height for the seam is 1 ¾".

5.3.2 Minimum metal thickness is 24 gauge.

5.3.3 In the field, mechanically crimped seams are preferred. Other types of seams may be considered. However, seams utilizing a "U" clip will not be considered.

5.3.4 The minimum slope for metal roofing systems is 1" per foot.

5.3.5 All panels shall be continuous with no lateral splices.

- 5.3.6 The roof support systems shall be designed for the anticipated loadings per UBC code, but in no case shall the metal be required to span more than 5'.
- 5.3.7 All clips shall be concealed and shall allow for expansion and contraction of the metal.
- 5.3.8 All accessories shall be pre-manufactured and approved as a part of the roofing system.
- 5.3.9 All fasteners shall be stainless steel.
- 5.3.10 Underlayment shall be a minimum of 15 Lb. felt. Other systems may be considered.
- 5.3.11 For those roofs that need to be colored for aesthetic reasons, the standard of quality for the color finish is Penwalt Corp. Kynar 500 resin. Roofs that do not need to be colored shall have a "Galvalum" finish.

Section 5.4 Other Systems

5.4.1 Asphalt Shingles

- 5.4.1.1 Architectural laminated asphalt shingles shall be warranted for 40 years and must be of the sealtab lam, type TAMKO Heritage 40 "Oxford Gray" to match the University standard color.
- 5.4.1.2 The minimum roof slope for fiberglass shingles is 3" per foot.
- 5.4.1.3 All fiberglass shingles shall have an underlayment of a minimum of two layers of 30 Lb. felt.
- 5.4.1.4 A galvanized drip edge shall be installed on all fiberglass shingle roofs.

5.4.2 Single Ply Membrane Systems

- 5.4.2.1 As a matter of course this is not a preferred roofing system on the main and Vet Med campus. Examples of this type do exist. Discuss with Owner prior to considering this system.

5.4.3 Spray On Foam System

- 5.4.3.1 Limited trials of a sprayed-on system are under trial applications on the main campus. Discuss with owner prior to considering the system.