



Los Angeles Community College District Design Standards

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LACCD Facilities Design Standards – Roofing/Waterproofing **Campus Facility Standards Cross-Reference: Div. 07, 08, & 33**

General Requirements

1. Install walking pads with shims on low slope roof surfaces along a path from the roof hatch or access door to mechanical equipment requiring maintenance, installed with a sufficient area to limit damage to finished roof system from foot traffic and service tools/equipment.
2. Roof system designs shall incorporate all aspects of roof waterproofing, including parapet walls, skylights, flashings, drains, scuppers, gutters, downspouts, etc. and comply with current NRCA and SMACNA standards.
3. The new roof system shall comply with all mandatory requirements under The California Green Building Standards as listed under Title 24 Part 11.
4. New low-slope roofs, roof alterations, and roof replacements must comply with Title 24 Part 6 Non-residential Energy Efficiency Standards. Compliance can be achieved using a performance approach or the prescriptive approach. For roof alterations and roof replacements, confirm that sufficient insulation exists to eliminate the need for a vapor barrier. Refer to CRRC's rated product directory on the CRRC website (www.coolroofs.org)
5. All roof penetrations must be lead flashed with an umbrella cover for rain cover per NIBS Guideline 3.
6. No ponding area larger than 4' square.
7. Building envelope leakage testing per ASHRAE Guideline 3, AAMA 502-02 & ASTM E 1105 performed by an accredited agency approved by the College. Provide flooding test on all flat roof area prior to final acceptance.
- 8. Foam Roofs will not be accepted.**
9. Provide one (1) hose bib every 100 Ft. each way for the entire roof for maintenance where applicable.
10. Down spout from the roof drain shall not drain onto any walking surface and hardscape area.

Asphalt Shingles Roofs

Specify a 2-ply laminated shingle, conforming to ASTM D3462, with a minimum 50-year material warranty and a minimum 15-year non-prorated labor and material watertightness warranty (i.e. Certainteed-Sure Start Plus 5 Star, GAF-Golden Pledge, Malarkey-steep slope system, etc.).

1. Specify algae resistant shingles.
2. In high wind areas, (greater than 90 mph) specify wind resistant shingles rating to wind speed determined by ASCE 7, and requires a 10-year wind warranty.



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3. Fasten shingles with minimum 12 gauge corrosion resistant nails only. Minimum nail head diameter shall be 3/8". Shank shall penetrate minimum of 3/4" in wood decking or completely through plywood decking.
4. Asphalt-saturated felt underlayment shall meet ASTM D 226 and/or D 4869. Use double layers on roof slopes less than 4:12.
5. Specify roof perimeter edge metal and step flashing at walls and chimneys.
6. Minimum slope 3:12.
7. Specify open, closed, or woven valleys.

Clay and Concrete Tile Roofs

1. Specify clay tile manufacturers who offer a 20-year labor and material warranty, for the installed cost of roof, to replace defective tiles resulting from defects in materials or workmanship.
2. Clay Tile shall meet or exceed ASTM C1167 Grade 1 requirements for durability and ASTM C1167 Type I, for appearance.
3. Concrete tile shall meet or exceed ASTM C1492 requirements and shall be cool tiles for LEED credit.
4. Specify 2 layers of modified self-adhering underlayment – HPR SA FR Base Sheet & HPR Aquashield. HPR Aquashield to be the top layer. Sheets to be applied in a shingle fashion as to avoid any blocking of water flow.
5. Contractor shall provide additional 5% replacement tiles to FMO at close out of the project.

Metal Roofs

1. Specify metal roof manufacturers who offer Full System Manufacturer's Roofing Warranty for 30-year labor and material warranty, for the installed cost of roof, to repair leaks in the roof panels, flashing and trim resulting from defects in materials or workmanship. Roof manufacturers shall be required to inspect the work during construction.
2. Specify one layer of SBS modified self-adhering base sheet complying with the manufacturer warranted system. Underlayment to carry a 20 year warranty.
3. Steep roof (hydrokinetic) roofs shall pass air and water infiltration tests per ASTM E1646 and E1680. Low slope (hydrostatic) roofs shall pass water infiltration tests per ASTM E2140. Submit test report.
4. Specify Kynar 500 or Hylar 5000 paint finish on metal panels which require paint.
5. Specify 22 gauge, galvanized



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6. For architectural panel roofs, specify snap type standing or batten seam with continuous length panels. Panel should be kept off substrate by manufacturer's clips.
7. For structural or structural/architectural panel roofs, specify concealed fasteners and clips for panel attachment. No fasteners shall be located in the pan of the panel except at the ridge.
8. Panels and trim shall be rolled formed at the manufacturer's prime manufacturing plant or on-site with manufacturing equipment.
9. Specify manufactured prepared shop drawing on a minimum 24" by 36" sheet.
10. Metal shingles and shingle panels to be used on steep slope (3:12 or greater). Investigate the bottom, top and side of each shingle to determine the interlocking mechanism and water tightness of the lap, joint and seam. Examine ridge, valley, hip and perimeter flashings profiles for water tightness.
11. Specify self-adhered high temperature underlayment.

Low Slope Roof Systems

1. Contact College Facility Director for direction to proceed with one of the following low slope roofing system options:
 - a. SBS (Styrene-Butadiene-Styrene) Modified Bitumen Roofs
 - i. Specify a 2-ply system where roofing products, including each type of sheet, are all manufactured in the United States, supplied by a single manufacturer which has been successfully producing the specified types of primary products with the same materials without making adjustments, modifications or alterations to the chemical or physical composition of the products for not less than the specified warranty period.
 - ii. Roofing systems shall be designed for a minimum 30-year non-prorated, no-dollar-limit, labor-and-materials guarantee. The roofing membrane, base flashings, liquid applied flashing, roofing membrane accessories, roof insulation, fasteners, cover board, walkway products, and other single-source components of the roofing system must be covered under the guarantee. Manufacturers of products only. Private Label not permitted.
 - iii. APP systems are not permitted.
 - iv. Specify SBS roof systems where high puncture resistance, exposure to abuse or frequent access is needed on the roof to maintain mechanical equipment.
 - v. Specify torch down systems with minimum MD 310 lbf/in. tensile and 510 lbf/in. tear for the cap sheet; avoid hot mop asphalt. Independently tested at 73 degrees.
 - vi. Specify a dense, fire and water resistance cover board made from gypsum or other man made materials to be placed over the deck or insulation board. Use adhesive to attach cover board to insulation.



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- vii. Specify cant strips and curbs to be pressure treated wood unless metal curbs are used. Fiber products are not permitted.
 - viii. Specify a pre-manufactured 2-piece counterflashing; coping system; roof edge/fascia system; and mechanical equipment curbs per ANSI SPRI ES-1.
 - ix. Minimum roof pitch of 1/2"/ft. and 1/4"/ft. along valleys.
 - x. Manufacturer to perform site visits minimum 3 days per week during construction of roof.
- b. SBS Modified Built Up Roofing (CMAS Purchase of Materials to Avoid Contractor Material Mark-Up Costs)
- i. Specify a 2-ply system with the materials to be purchased through the utilization of the California Multiple Awards Schedule (CMAS). College to use contract #4-01-56-0006A.
 - ii. Direct purchase of materials to provide cost savings by avoiding contractor mark-up on materials, while ensuring quality workmanship with approved applicators.
 - iii. Roofing systems shall be designed for a minimum 30-year non-prorated, no-dollar-limit, labor-and-materials guarantee. The roofing membrane, base flashings, liquid applied flashing, roofing membrane accessories, roof insulation, fasteners, cover board, walkway products, and other single-source components of the roofing system must be covered under the guarantee. Manufacturers of products only. Private Label not permitted.
 - iv. All system components to be manufactured in the United States, supplied by a single manufacturer which has been successfully producing the specified types of primary products with the same materials without making adjustments, modifications or alterations to the chemical or physical composition of the products for not less than the specified warranty period.
 - v. Specify a dense, fire and water resistance cover board made from gypsum or other man made materials to be placed over the deck or insulation board. Use adhesive to attach cover board to insulation.
 - vi. Specify cant strips and curbs to be pressure treated wood unless metal curbs are used. Fiber products are not permitted.
 - vii. Specify a pre-manufactured 2-piece counterflashing; coping system; roof edge/fascia system; and mechanical equipment curbs per ANSI SPRI ES-1.
 - viii. Minimum roof pitch of 1/2"/ft. and 1/4"/ft. along valleys.
 - ix. Manufacturer to perform site visits minimum 3 days per week during construction of roof.
- c. Single-Ply Membrane Roofs
- i. *Architect, Specifier, and/or Designer to receive written and signed permission from campus Facility Director prior specifying a single ply roofing system.*



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- ii. Specify roofing products, all manufactured in the United States, supplied by a single manufacturer which has been successfully producing the specified types of primary products with the same materials without making adjustments, modifications or alterations to the chemical or physical composition of the products for not less than the warranty period.
- iii. Specify a 20 year system and require a 15-year System Roofing Manufacturer's Warranty for labor and material, without monetary limitation, to correct defects in materials or workmanship. Warranty shall contain no exclusions for random occurrences of ponding water.
- iv. Specify PVC with 60 mil minimum thickness and EIP (Ethylene-Interpolymer) with 60 mil minimum thickness, systems to be mechanically attached. Roof membrane is visible from ground shall be fully adhered.
- v. EPDM (Ethylene Propylene Diene Monomers) system shall be fully adhered 60 mil thickness, using 7" wide tape seams, and be warranted for 20 years.
- vi. TPO (Thermoplastic polyolefin) membranes shall not be specified.
- vii. Specify single-ply roof system when foot traffic is minimal, roof shape is complex or when numerous roof penetrations are present.
- viii. Specify a dense, fire and water resistance cover board made from gypsum or other man made materials to be placed over the deck or insulation board. Use adhesive to attach cover board to insulation.
- ix. Specify a pre-manufactured 2-piece counterflashing; coping system; roof edge/fascia system; and mechanical equipment curbs.
- x. Minimum roof pitch of $\frac{1}{2}$ Inch/ft. and $\frac{1}{4}$ Inch/ft. along valleys.

Specialty Roofs

- Evaluated on a case-by-case basis.
- Green roof – Obtain College Facility Director approval before adopting the system into building design.

Waterproofing Systems & Coatings

1. Specify waterproofing products, all manufactured in the United States, supplied by a single manufacturer which has been successfully producing the specified types of primary products with the same materials without making adjustments, modifications or alterations to the chemical or physical composition of the products for not less than the warranty period.
2. Specify an ENERGY STAR® qualified, highly reflective multi-purpose, single-component, aliphatic urethane liquid waterproofing membrane designed to maintain, restore and upgrade the



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performance of existing, aged single-ply, metal, smooth BUR, and modified bitumen roof systems. It shall provide a white reflective surface and meet South Coast AQMD standards.

3. Specify a minimum 15-year Manufacturer's Warranty for labor and material, without monetary limitation, to correct defects in materials or workmanship. Warranty shall contain no exclusions for random occurrences of ponding water.
4. Specify the use of certified contractors to apply the waterproofing system and that the work must be inspected by the manufacturer at a minimum of once a week during installation.
5. Waterproofing below the water table may limit the selection of the waterproofing membrane.
6. Select waterproofing systems that are typically used on substrates as stated in the manufacturer's literature.