

## **075000 Roofing Systems**

### **Sections Included In This Standard:**

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### **PART 1 - GENERAL**

#### **1.1 REFERENCE STANDARDS**

##### **A. Roof Design Standards:**

1. **Florida Building Code**
2. American Society of Civil Engineers – Minimum Design Loads for Buildings and Other Structures (ASCE 7-02, or edition referenced by the current edition of the Florida Building Code).

##### **B. Roof Industry Guidelines: All roofing installations shall comply with following industry resources and guidelines:**

1. The NRCA Roofing and Waterproofing Manual, current edition, published by the National Roofing Contractors Association
2. Architectural Sheet Metal Manual published by SMACNA (Sheet Metal and Air Conditioning Contractors' National Association, Inc.)
3. FM Global RoofNav (Factory Mutual Systems Approval Guide)
4. Underwriters Laboratory (UL) Building Materials Directory
5. UL Fire Resistance Directory
6. American Society for Testing and Materials (ASTM) Annual Book of Standards Volume 4.04 for Roofing, Waterproofing and Bituminous Materials
7. Metal Roofing System Association (technical details).
8. Concrete and Clay Roof Tile Installation Manual published by the Florida Roofing, Sheet Metal and Air Conditioning Contractors Association, Inc. (FRSA) and the Tile Roofing institute (TRI) formerly known as Roof Tile Institute.
9. FEMA Guidelines for Buildings to be Used as Public Shelters

#### **1.2 ROOF SYSTEM DESIGN**

- ##### **A. Registered Architect or Engineer Required: All new, repair, and replacement roofing projects shall have plans and specifications developed by a registered architect or engineer licensed by the State of Florida. The professional consultant shall have a minimum of ten (10) years direct experience in roofing design and analysis of roof systems.**

- B. Design Criteria: Design of low slope roofing systems shall consider wind uplift resistance, primary drainage, secondary emergency drainage, and insulation to provide thermal resistance.
1. Wind Design: Design roof systems to resist extreme wind forces. Structural analyses are required to verify the integrity of all roof components. Wind uplift design shall comply with the most stringent requirements of applicable codes and the latest edition of American Society of Civil Engineers – Minimum Design Loads for Buildings and Other Structures (ASCE 7, edition referenced by the current edition of the Florida Building Code).
  2. The designer shall specify roof systems and system components that have current Florida Building Code Product Approval or Miami-Dade Notice of Acceptance (NOA) indicating that the system has been satisfactorily tested to resist wind uplift design pressures determined by the project structural engineer. The wind uplift design pressures shall be indicated on the plans according to the Florida Building Code.
  3. Roof Drainage Design: Florida Plumbing Code, current edition.
- C. Design Details: All requirements of this Standard and referenced standards shall be strictly adhered to. All penetrations and conditions be shall detailed (including fan bases, power supply, equipment, corners, terminations, drains, scuppers, overflows, edges, flashings and slopes) according to the recommended procedures provided in the latest edition of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual and installed per manufacturer's instructions. The details in the Manual show standard conditions that shall be adapted to suit each individual project.

### 1.3 **SPECIAL CONSIDERATIONS**

- A. Contractor Qualifications: All roofing contractors working on University facilities shall have a current State of Florida license and be certified/approved as a roofing contractor by the manufacturer for the system being installed or repaired. Roofing contracting firms shall have a minimum of five (5) years of experience installing the type of system specified. This experience shall have been earned by the firm proposing the work, not by individual employees. In addition, the job site superintendent shall have a minimum of five (5) years of experience installing the type of system specified.
- B. Protection Plans: The specifications shall require a specific protection plan for all reroofing projects to describe the means of maintaining the building in a safe and watertight condition throughout the construction period. Existing and newly installed roof systems shall be considered in the protection plan to ensure roofing operations do not damage them. Areas where the roof deck/structure are (or may be) damaged or deteriorated shall only be re-roofed when the occupied spaces below are unoccupied. Other potential phases of reroofing operations can be hazardous to the facility and its occupants and shall be carefully reviewed during design bidding and at appropriate phases during construction.
- C. Roof Access: All roof areas not accessible by "high reach" manlift equipment shall be permanently equipped with a reasonable means of access for purposes of maintenance of the roof system and any roof-mounted equipment. Provide non-public interior access to all roof areas. In buildings of two or more stories with mechanical equipment on the roof, provide stairwell access. In one-story buildings, provide roof hatches with ladders located in separate closets; do not install in offices, classrooms or other publicly accessible spaces. Exterior built-in ladders from main roof may be used to provide access to remote roof areas. Roof access to any roof area via a built-in ladder from the ground outside the building is

prohibited.

1. Access Door Thresholds: Access door thresholds to the roof or roof hatches shall be 12" above the adjacent roof surface. An acceptable walking surface shall be installed immediately outside the access door threshold on the roof system.
  2. Walk Pads: Provide walk pads from roof access to all roof-mounted equipment. Pads shall extend around each piece of equipment, wide enough for workmen to lay out tools and work. Pads shall be compatible with the roof membrane systems.
  3. Roof Hatches: Roof hatch covers shall be prefabricated and installed on curbs approximately 12-inches above the surface of the roof membrane.
- D. Roof-Mounted Equipment: Roof-mounted equipment is not acceptable if other locations for placement can be found. All roof-mounted equipment shall be provided with roof surface walkway access rated for the heaviest piece of removable equipment to allow ease of maintenance and minimize roof surface damage. If necessitated by design, roof-mounted equipment shall be consolidated to minimize number of curbed areas. Roof mounted equipment in excess of 50 pounds shall have a means of removal (e.g. elevator rated for the heaviest piece of equipment or a davit assembly mounted over the loading dock area).
1. All roof-mounted equipment when approved, including skylights, shall be set on curbs, and attached to resist area wind loads. Flat skylights are not allowed. Skylights are strongly discouraged.
  2. Roof-mounted antennae and satellite / cellular dishes, lightning protection anchorage, lab equipment and exhaust fans, or scientific devices shall be located in areas specifically designed for that purpose. Roof loads, walking surfaces, anchoring devices, mounting pads, equipment stands, curbs, or utility needs shall be designed and provided using appropriate details, adapted as required, from the NRCA Roofing and Waterproofing Manual. The number of roof penetrations shall be kept to a minimum.

#### **1.4 LOW SLOPE MEMBRANE SYSTEMS**

- A. Modified bituminous 4-ply over lightweight insulating concrete fill: Roof membrane system consisting of a minimum of a four-ply modified bitumen membrane system (one mechanically fastened base sheet, two modified bituminous interply sheets, and one modified bituminous cap sheet). Two ply base flashing is a part of the system and shall match the field membrane material. Cap sheet shall have a white granular or white reflective surfacing. The following application methods may be used:
1. Hot mopped asphalt
  2. Torch application
  3. Cold adhesive or cold process
- B. Modified bituminous 4-ply over rigid insulation: Roof membrane system consisting of a minimum of a four-ply modified bitumen membrane system (one base sheet adhered to a cover board, two modified bituminous interply sheets, and one modified bituminous cap sheet). Two ply base flashing is a part of the system and shall match the field membrane material. Cap sheet shall have a white granular or white reflective surfacing.

The following application methods may be used:

1. Hot mopped asphalt
  2. Torch application
  3. Cold adhesive or cold process
- C. Built up roof – hot mopped asphalt: Three plies of Type IV or Type VI glass fiber felts may be applied directly to a mechanically fastened base sheet or a rigid insulation cover board with hot mopped asphalt. Cap sheet shall have a white granular or white reflective surfacing. Two-ply base flashing is a part of the membrane and shall match the cap sheet membrane material.
1. The use of hot mopped asphalt systems is discouraged and must be approved by UF Planning Design & Construction. See “Re-Roofing” section below.
- D. Torch application: Torch application of roofing and flashing materials requires the use of a fire watchman and roofing contractor employees who are currently certified under the NRCA / MRCA CERTA (Certified Roof Torch Applicator) Program.
- E. Plaza decks or “green roofs” with vegetation: Plaza decks or “green” roofs shall have insulation, waterproofing membranes, and protection board systems. Waterproofing membranes shall be satisfactorily flood tested and protected during construction until the over burden material is applied over the membrane assembly.
- F. Temporary dry in membrane: If necessary when re-roofing, a “dry-in” membrane of two plies of Type IV or Type VI glass fiber felts may be applied directly to a primed structural concrete deck or other suitable substrate to keep the building dried in. Decks exposed to weather over occupied spaces are prohibited.
- G. Approved Roofing Materials: The selection of roofing materials shall be limited to those manufacturers with a 15-year history of satisfactory manufacture and installation of at least 250,000 squares of their roof system, and who provide a minimum 20-year unlimited warranty/guarantee for labor and materials, including metal finishes.
- H. Membrane system manufacturers: Acceptable manufacturers include:
1. Johns Manville
  2. Soprema
  3. Garland
  4. Siplast
- Other manufacturers may be added during design with prior written approval from the UF Design & Construction Standards Steering Committee.
- I. Aggregate Surfacing: The use of gravel or slag surfacing or loose stone ballast is discouraged.
- J. Roof Coatings: Specific spray-applied polyurethane foam roof systems and specific roof coatings may be considered for new and reroofing projects where the Architect/Engineer can demonstrate that their use is appropriate and when specific and acceptable monitoring and control measures are employed throughout the design and construction periods. Written approval from the UF Design & Construction Standards Steering Committee shall be obtained prior to use.

- K. Alternative Roof Systems: If the Architect/Engineer proposes a specific alternative roof system, i.e. a unique or non-traditional system, the request to install an alternative roof system shall be in writing and include justification data. Written approval from the UF Design & Construction Standards Steering Committee shall be obtained prior to using an alternative system.
- L. Base Flashing: All base flashing shall extend a minimum of eight (8) inches from the top of the roof membrane to the top of the base flashing up the vertical sides of curbs, walls, or roof penetrations.

## **PART 2 - PRODUCTS**

### **2.1 STEEP SLOPE ROOF SYSTEMS**

- A. Steep slope roofing includes shingle, slate, tile and metal roof systems. Steep slope roofing shall not be used on University facilities with roof slopes of less than four (4) inches per foot unless a self-adhered modified bituminous waterproof underlayment system is installed beneath the steep roofing components. Under no circumstances, shall slate or tile be installed on roofs with slopes of less than two (2) inches per foot.
- B. Clay Tile Roofs: Tile shall be flat slab clay tile. Size, shape and edges shall match existing where possible. Tile shall meet Grade 1 requirements of ASTM C1167, latest edition. Installation shall be based on the Concrete and Clay Roof Tile Installation Manual published by the Florida Roofing, Sheet Metal and Air Conditioning Contractors Association, Inc. (FRSA) and the Tile Roofing institute (TRI).
  - 1. Acceptable Manufacturer: Ludowici (minimum SRI 29 for roofs greater than or equal to 2:12)
  - 2. Tile Color: Summer Rose or Santiago Rose
- C. Existing Clay Roof Tile: The University may require the salvage of any unneeded and unbroken clay roofing tile, having it neatly stored on pallets and delivered to the Physical Plant Division storage yard. Attic stock of new tile shall be contained inside the building for which its use is intended.
- D. Metal Roofs: Metal roofs may be used for special conditions with prior written approval from the Director of the responsible University maintenance entity. Metal roofs shall have true standing seams with concealed clips and fasteners and a high performance coating. The use of panels with exposed fasteners is discouraged. Design and construction of longer panels must accommodate expansion and contraction. Flashings shall be isolated from copper flashings required by other sections of this specification.
- E. Shingle Roofs: Shingle roofs are not preferred, except on small projects, and may be used for special conditions with prior written approval from the Director of the responsible University maintenance entity. Use minimum 235 pound Class A, self-sealing tab, fiberglass shingles, with a 25-year warranty, rated for wind speed of current building code.

### **2.2 ENERGY EFFICIENCY AND ROOF INSULATION**

- A. General Roofing Requirements: All University facilities will be designed and constructed according to Leadership in Energy and Environmental Design (LEED) criteria, including all newly constructed facilities and roofing replacement projects. Generally, the roof system

designs for these facilities will require reflective surfacing materials which comply with Energy Star guidelines.

- B. Energy Management: Roof system design shall be consistent with energy management requirements of the University of Florida, Florida Statutes and applicable Codes. Insulating values of the finished roof system shall be designed on the basis of economic life cycle return on investment when evaluated against fuel costs.
- C. Insulation Requirements: Insulation materials shall comply with the Florida Building Code and ASHRAE 90.1. Additional insulation or improved thermal performance materials and systems may be required to achieve energy efficiency goals associated with LEED certification requirements.
- D. Minimum Slope: A minimum final slope of  $\frac{1}{4}$ " per foot shall be required on all new roof systems. The roof surface shall have positive slope with no ponding after 24 hours. Areas exhibiting ponding shall be reworked, not merely have the number of plies increased.
- E. Temporary Roofs: Temporary roofs may be left in place under the roof insulation, where practical.
- F. Lightweight Insulating Concrete:
  - 1. Lightweight insulating concrete shall be aggregate based and have a minimum compressive strength of 300 psi.
  - 2. Applicable Standards: All lightweight insulating concrete systems shall meet the following standards:
    - a) Current Florida Building Code Product Approval (or Miami-Dade Notice of Acceptance (NOA)) indicating that the system has been satisfactorily tested for wind uplift design pressures determined by the project structural engineer.
    - b) Tested by Underwriters Laboratories in accordance with the procedures of ASTM E-119 and listed in the most recent Underwriters Laboratories Fire Resistance Directory;
    - c) Tested by Factory Mutual Research and listed in the most recent Factory Mutual Approval Guide as non-combustible or Class 1;
    - d) Tested by Factory Mutual Research for windstorm classification I-120 and listed in the most recent Factory Mutual Approval Guide.
  - 3. Ventilation of Lightweight Insulating Concrete: If lightweight insulating concrete is installed over slotted or perforated galvanized steel roof deck, additional ventilation may not be required. If lightweight insulating concrete is installed over a non-ventilated deck like structural concrete, non-slotted metal deck or over existing roof assemblies, temporary membranes or vapor barriers, additional ventilation is required. If one-way vents are used to provide additional ventilation, they must be insulated, spun aluminum roof vents having a one-way valve design. The vents must be furnished by roofing material manufacturer and specifically included in the manufacturer's warranty. Roof vents constructed of PVC are not acceptable.

H. Rigid Insulation:

1. Rigid thermal insulation shall consist of polyisocyanurate foam insulation. For hot mop applied or torch applied built up roof or modified bituminous systems, a mineral perlite cover board must be used over polyisocyanurate foam insulation.
2. Provide tapered insulation and crickets to develop proper roof slope.
3. Do not mop rigid insulation directly to wood decks. Provide mechanically fastened base sheets over rosin paper.

### **2.3 SHEET METAL FLASHING AND TRIM**

- A. Roof termination penetrations and flashing details shall be based in part by standard details prepared by SMACNA and NRCA. Construction documents shall include project specific details and fastener requirements.
- B. Acceptable materials and minimum thickness:
  1. Copper, 16- ounce
  2. Aluminum with factory applied finish coating, 0.032-inch
  3. Stainless Steel, 26-gage
  4. Lead flashing, 4-pound
  5. At concealed low-slope roofs and the back side of parapet walls, a liquid-applied flashing (Soprema Alsan or similar) may be used, provided that incompatible materials are addressed as needed (e.g., copper flashing termination bar where alternate flashing meets silicone caulking).
- C. Galvanized metal is prohibited.
- D. Flashings shall always be separated from dissimilar metals.
- E. For buildings with steep slope tile roofs in the historic district, copper is required for all exposed flashing, gutters and downspouts.
- F. Roof detailing and sheet metal fabrications:
  1. Gutters: Gutters shall be sized based on drainage calculations. At a minimum, the width shall be 6", with anchors 16" on center and slope 1/8" per foot. Long gutter lengths shall have expansion joints. Internal gutters are prohibited on new facilities. Internal gutters on existing facilities shall be eliminated during reroofing or renovation projects to the extent practicable.
  2. Downspouts: Rectangular shaped downspouts shall be sized based on drainage calculations. Mount at least 1" out from the building wall. Provide brass or stainless steel hardware cloth strainers at the top and splash blocks or underground drainage at the bottom. Water from downspouts shall not be directed into the roof drainage system except through roof drains. Provide access to allow for cleaning of downspout/underground connection.
  3. Roof Expansion Joint Covers: Roof expansion shall be carefully considered, especially in membrane roofs. Locate membrane joints above plane of roof, with copper or stainless steel expansion cover instead of bellows type covers. Detail termination of expansion joints carefully. Structural expansion joints occurring in new construction shall be located at high points in the structure or roof insulation to

the maximum extent practicable to allow water to flow away from them on the roof surface. Under no circumstances are expansion joints to be placed such that roof water must flow across them to reach drains.

4. Through-Wall Flashings. New facilities shall locate through-wall flashings at least 12-inches above anticipated finished roof level to ensure minimum base flashing heights as defined herein can be met. Elevations and accessibility of other components shall also be considered for their impact on roofing installation including reroofing of the facility. Such components are siding, windowsills (above roof level), equipment supports, stucco facades, etc.
5. Counterflashing: Counterflashing shall be two-piece with the receiver built into the wall. Stop the wall finish above the counterflashing receiver. Existing buildings may require the reglet to be cut into existing wall construction. Where surface mounted flashings are necessary install a double flashing, both complete, one installed above the other. The top flashing protects the bottom.
6. Parapet Walls: Cap all parapet walls with copper coping. Coping shall have either covers and pans, or standing seams. All joints shall be soldered except for planned expansion joints designed to SMACNA standards. Stone coping may be used to match existing or adjacent architecture, but shall have continuous through wall flashing below it. Built-in flashing with cap and receiver is required. Consideration shall be given to the flow of water around and through parapet walls, especially masonry walls. Waterproof the roof side of parapet wall to preclude excessive weathering or leakage.
7. Pitch Pockets: Metal formed pitch pockets or pitch pans are specifically prohibited, including those filled with bituminous materials, urethane, butyl rubber, or similar pourable sealer. Alternate materials including cast urethane curbs with pourable sealers or urethane coatings with reinforcing fabrics may be used provided they are installed according to the manufacturer's written recommendations and specifically included in the roof membrane manufacturer's warranty.

## **2.4 ROOF DRAINS**

- A. Roof Drains: Roof drains shall be factory painted cast iron drains assemblies with painted cast iron strainers. Drains shall be installed with factory furnished clamping rings and set in sumps below the surrounding roof level.
- B. Emergency Overflow Protection: All flat and low slope roof systems shall have a secondary means of evacuating water from the surface of the roof in the event the primary drainage system is blocked. The secondary system shall be totally independent of the primary system and may consist of overflow scuppers through walls, an independent internal overflow drainage system, or other suitable means. The structural components of a roof system shall be reviewed by a licensed professional structural engineer to ensure that any water that accumulates on a roof system in the event of failure of the primary system will not overstress the structure. Water shall not be allowed to accumulate to a depth greater than allowed by the applicable building code. Overflow drains, when used, shall be equipped with an appropriate strainer, and should be located approximately within 4-feet of primary roof drains.
- C. Internal Gutters: Internal gutters are prohibited on new facilities. Internal gutters on existing facilities shall be eliminated during reroofing projects to the extent practical.



## 2.5 ROOF ACCESSORIES

- A. Utility Supply Lines: Utility supply lines (electrical, water, gas, etc.) to roof-mounted equipment shall be installed within the supporting curb of that equipment to the extent practical.
- B. Condensate drain lines: Drain lines for roof top air conditioning units shall be supported on stands and routed to internal roof drains, not to scupper drains or other drains that discharge above grade.
- C. Lightning Protection System: Lightning air terminals, cables and accessories shall not be attached to or penetrate the base flashing.
- D. Cants: Four-inch pressure treated wood cants shall be required around all vertical interruptions of the roof system, such as curbs or walls. In certain circumstances, fiber cants are permitted with UF Project Manager's approval.

## PART 3 - EXECUTION

### 3.1 ROOF WARRANTIES AND CLOSE-OUT REQUIREMENTS

- A. Contractor's Warranties: Contractor shall provide a guarantee against defects in materials and/or workmanship for a period of 2-years from the date of the Certificate of Substantial Completion.
- B. Manufacturer's Warranties: Manufacturers shall provide system warranties that meet the following criteria:
  - 1. Roofing system shall be guaranteed against defects in materials and/or workmanship for a period of 20-year NDL (No-Dollar-Limit) warranty from the date of the Certificate of Substantial Completion. During this period, the manufacturer shall pay all costs of repairs to the roof system necessary to correct roof leaks resulting from any one of the following causes:
    - a. Improper workmanship in application of roofing system and substrate components.
    - b. Deterioration of roof membrane or flashing caused by ordinary weathering and/or exposure to ultra-violet light.
    - c. Blisters, buckles, ridges, wrinkles, fish mouths, and slips.
    - d. Damage to roofing system and substrate due to thermal shock (extreme temperature fluctuations).
    - e. Slippage of roofing system components.
    - f. Breaks in roofing system or substrate components.
- C. During the warranty period, the Manufacturers and the Contractor agree that, within 24 hours of receipt of notice from the Owner, they will inspect and make immediate emergency repairs to defects or to leaks in the roofing system. They further agree that, within a reasonable time, they shall restore the affected items to the standard of the original specifications.
- D. All emergency work and permanent work done during the Warranty Period shall be done without cost to the Owner, except in the event it is determined that such leaks were caused by Owner abuse, vandalism, lightning, hurricane, tornado, hail storm or other cause typically excluded by warranty documents.

- E. Guarantee shall be in written form acceptable to the Owner and shall be made by an authorized representative the manufacturer of the roofing membrane system used and shall be for the full period of time as specified herein.
- F. Training: For non-standard systems, the Contractor shall provide training to instruct University maintenance personnel in proper care and maintenance of the roofing system. For major projects or roof projects greater than 5,000 square feet, training shall be a minimum of 4 hours.
- G. Roof Database: Provide data sheet to facilitate the addition of the roof system information and Warranty information to the Owner's Roof Asset Management database. Contact the maintenance group in charge of the facility for data input forms and more information.

### 3.2 **RE-ROOFING**

- A. Design of Roof Replacement Systems
  - 1. When replacement of a roof is required, criteria for the replacement roof shall be in full compliance with these Standards. Design for wind uplift, drainage and thermal insulation shall meet the current Florida Building Code criteria to the extent practical. Reroofing projects shall improve existing conditions without degrading the performance of surrounding construction (especially masonry weeps).
  - 2. Roofing Over Existing Roofs: The application of new roof materials over an existing roof structure will not be permitted until a nuclear or infrared scan (or other acceptable method of moisture detection) of that roof has been completed and all wet areas detected by that scan/method have been removed. After the new roof is installed, roof scans shall be made to record the condition of the new roof and compliance with specifications.
  - 3. Slope for Drainage: On existing roofs where it is impractical to attain the required 1/4" slope, a minimum slope of 1/8-inch per foot may be permitted with prior written approval from the Director of the responsible University maintenance entity if other provisions are made to ensure that the integrity of the roof and drainage systems are maintained. Built-up roofs constructed with coal tar pitch as the interply mopping and surfacing may be applied on flat areas where existing conditions prohibit installation of tapered materials and the roof system manufacturer shall issue the required warranty with no exclusion for standing water. Overflow protection shall be provided.
  - 4. Test Cuts: Roof replacement designs require test cuts to determine the composition of the existing roofing and insulation assembly. Fastener pull tests may need to be performed before a replacement roof is designed. Sampling and testing of suspect asbestos containing roofing and flashing materials may be required. Contact EH&S Asbestos Coordinator for further information. (352) 392-3393. or [www.ehs.ufl.edu](http://www.ehs.ufl.edu) .
  - 5. Laboratory Fume Hood Policy: All work on roof tops with fume hood exhausts shall be in compliance with the University's Fume Hood Policy issued by the Environmental Health & Safety Division. The project Architect shall consult with the University Environmental Health and Safety Division – Lab Safety Office to

determine what substances existing roof mounted laboratory hood exhaust stacks are discharging, and then shall specify in the project construction documents what protective measures must be undertaken by the contractor and his/her sub-contractors to protect their workers.

- B. Construction of Roof Replacement Systems: When replacement of a roof is required, criteria for the replacement roof shall be in full compliance with these Standards. In addition to the other requirements in this Standard, the following points shall be included in the technical specifications section.
1. Generally, all University facilities should be considered to be occupied and must be protected from moisture intrusion during re-roofing operations. Provide protection for interior spaces, furnishings and equipment.
  2. In the absence of prior active reported roof leaks, any leakage from the roof area into the building during re-roofing projects will be assumed to be the responsibility of the Contractor.
  3. Prior to starting work of the project, the Contractor will verify that all roof drains are working. Report any blockages to the UF Project Manager prior to beginning work. Report all broken and missing roof drain part such as clamping rings, bolts, and drain strainers.
  4. Do not allow water build-up on roof due to changed drainage patterns. Provide for roof drainage during re-roofing, either by direct drainage to roof drains or pumps. Do not discharge water from roof directly to grade without specific authorization from the UF Project Manager.
  5. Existing lightning protection systems shall be carefully removed prior to re-roofing. After the lightning protection systems are reinstalled, they must be re-certified to comply with the Florida Building Code criteria for education facilities.
  6. To prevent the entrance of odors into building air intakes, kettles or tar pots shall be located remote from building air intakes, have their odors exhausted to another location, or be filtered to remove the odors. Hot mopping near building fresh air intakes may require temporarily closing the intakes in the vicinity of the work. Such closures shall be coordinated with EH&S and the building occupants through the UF Project Manager. Whatever measures are necessary to prevent fumes from entering the building must be employed. The use of tankers for asphalt, torch-down applications or cold application methods does not relieve the Contractor of this responsibility.
  7. The Contractor shall be present at the job site during and immediately after heavy rains in order to identify and repair leaks clean up water and repair water damage. Immediately remove water from interior spaces and to wet-vac and clean areas in order for the occupants to proceed with their daily duties without interruption or inconvenience. Storage areas, mechanical rooms and unoccupied areas shall be cleaned and repaired same as occupied areas. Proceed immediately with clean up as soon as discovered, do not wait for the next day to do this work.
  8. The Contractor shall be aware that any expenditure by the University to repair or stop leaks, or provide custodial services will be charged to the Contractor.
  9. Promptly repair all damage to University property, including vegetation and

irrigation systems. It is the Contractor's responsibility to identify areas with subsurface irrigation and utility systems.

10. Dig permits shall be obtained before installing fencing.

C. Asbestos Containing Materials:

1. Prohibition on Use: The use of roofing and flashing materials containing asbestos is prohibited in the installation of new or the repair of existing roof systems.
2. Removal Requirements: The removal of old roofing material shall not proceed until it is known whether it contains asbestos. The removal of roofing containing asbestos shall be carried out by State certified roofing Contractors. Asbestos roofing removal shall be conducted in accordance with all requirements of Environmental Protection Agency, Occupational Safety and Health Administration, and Florida Statutes; and all applicable rules of the Department of Business and Professional Regulation, Department of Environmental Protection, Department of Labor and Employment Security, or other state agencies having jurisdictional authority. Contact EH&S Asbestos Coordinator for further information [www.ehs.ufl.edu](http://www.ehs.ufl.edu).

### 3.3 ROOF REPAIRS

- A. Existing Roof Warranties: Any new work on or through a warranted roof shall be done with the knowledge and permission of the warranty holder.
- B. Re-saturants. Re-saturants are not acceptable for rejuvenation of an existing built-up roof system.

### 3.4 QUALITY CONTROL

- A. Pre-Construction Conferences: The University shall coordinate a roofing preconstruction conference for all new and reroofing projects. Participants should include the University office responsible for administering the project, the University office responsible for maintaining the facility, the Architect/Engineer, Contractor, Roofing Contractor, Roofing Manufacturer's representative, and other related trades representatives.
- B. Quality Control: The installer shall be certified by the manufacturer and the manufacturer shall certify the installation on completion.
- C. Building Commissioning: The University may employ an independent consultant to serve as building envelope Commissioning agent. In such cases, the technical specifications should stipulate Commissioning procedures and requirements.
- D. Testing Requirements: Testing may include fastener resistance withdrawal tests for base sheet or rigid insulation fasteners, and compressive strength, unit weight or wet density tests for lightweight insulating concrete. Specifications shall stipulate test procedures and frequency and shall require the presence of the O&M entity during testing.
- E. Roof Construction Monitoring Requirements:
  1. Roof Construction Monitoring: The University reserves the right to provide

independent roof construction monitoring whenever a roof is installed.

2. Inspector Qualifications: The inspector shall be knowledgeable in roofing specifications and appropriate installation or repair procedures.
3. Inspection Reports: The inspector shall be required to issue written reports on a daily basis which include, at a minimum: the name, address and phone number of the Roofing Contractor, the name of the roofing foreman/superintendent, description of the day's weather, number of roofers/sheet metal mechanics on project, location of the day's work, description of work accomplished, deficiencies observed in the work requiring correction, a description of materials incorporated into the work and those stored for later use, and a quantitative summary of unit price items incorporated into the day's work.
4. Membrane Manufacturer Inspections: The project specifications the requirement that the roof membrane manufacturer make a minimum of three visits during application and one visit at the time of the substantial completion inspection with a written report of each visit to the Architect/Engineer and UF Project Manager. Manufacturer inspections shall be accomplished by technical representatives with a minimum of five (5) years direct working experience with the technical department of that manufacturer.

#### G. Roof Moisture Survey

1. New Roofs: After a minimum 90-day weatherizing period, all new roofing shall be scanned using infrared thermography or other approved methods to verify that the new insulation has not been damaged by moisture intrusion. Test cuts to verify non-destructive survey results shall be repaired by the Contractor who installed the roof. The roof system manufacturer shall approve the repair methods.

END OF SECTION