Roofing Design Requirements

Low Slope Roofing Requirements

- **New Construction**
- **Roof Replacement**
- **PVC Roof Systems**
- **TPO Roof Systems**
- **EPDM Roof Systems**
- **Built Up Roof Systems**
- **Other Systems**
- **Insulation**
- **Low Slope Manufactures**
- **Contractors**
- **Warranties**

Steep Slope Roofing Requirements

- **New Construction**
- **Roof Replacements**
- **Manufacture Requirements**
- **Contractor Requirements**
- **Warranties**

Low Slope Roofing

General Requirements for all low slope roofing systems (New and Replacement)

1. Energy efficient roof design using energy star rated products should be used on roofs. Exception can be taken when Built Up Roofing or EPDM is requested and justified, energy efficient design should still be considered when using these systems.

2. Minimum Manufactures Warranty period should be 20 years on appropriate DFCM Roofing Warranty.

3. Minimum Contractor workmanship Warranty period should be 5 years on DFCM Contractor Warranty.

4. A DFCM history record is required on all roofing systems (Contractors responsibility).

5. Minimum flashing height requirements are 8” for all mechanical, skylights, wall flashings or any other item that extends above the roof line. This is a minimum flashing height, windows or other such items should be well above 8”above the roof line.

6. All mechanical equipment is required to be set on a roof curb attached to the roof deck. No equipment should be installed over insulation.

7. All metal associated with the roof should be 24 gauge, color clad, using standing seam joints where possible. Follow SMACNA guidelines for all metal work. All cap and edge metal should utilize a continuous clip on the outside edge.

8. Only Mechanically fastened or fully adhered systems should be used. No ballasted systems will be allowed on single ply roof systems.

9. No concrete walkway pads are allowed on roof system.

10. Pre-manufactured accessories are required for all pipe flashings, inside and outside corners and any other location pre-manufactured accessories are available.

11. Guidelines of the NRCA, SMACNA, UL and SPRI should be followed when designing roof system and specific details.

12. Where manufacturer's standards show one or more possible approach for compliance to the standard, provide the most stringent approach.

13. Eliminate conflict between roof penetrations. Provide 18" access for installing roofing components. Minimize penetrations (i.e. pipe penetrations) as much as possible.

14. Provide reasonable access to all roof levels for maintenance personnel. Reasonable access is considered to be roof hatches, mounted ladders or door access. Portable ladder access is only considered reasonable on single story roof levels.

15. Determine the need for vapor retarder based on dew point calculations, and facility use.

16. Design for 90m.p.h. minimum wind speed in low wind areas and 100m.p.h. minimum wind speed in known high wind areas. Refer to local wind speed maps for other wind speed design requirements. Please note that an I-90 or an IA-90 rating does not **does not** provide the necessary wind speed requirements.

17. The DFCM roofing program manager should review roofing specifications prior to bid.

18. The DFCM roofing program manager should be included in roofing pre-construction meeting and final inspection of roof system.

19. The DFCM roofing program manager should review and approve any variance from that listed above.

20. Please include in all specifications a note to bidders that if the there are any discrepancies between or within the bidding documents, then the more stringent document or specification will be enforced.

21. **No Asbestos Containing Material** is to be used during repairs or installation of new roofing system under any circumstances.

New Construction

1. Roof slope of ¼" minimum is required on all roof systems. Slope should be built into the structure on new buildings. Crickets should be installed behind all curbs that obstruct drainage.

2. Please review the specific roofing systems for system requirements

3. Fall protection for maintenance personal should be considered in design. Parapets should be built at the appropriate height or anchor points should be included.

4. Special consideration should be made during the design of the roofing system to account for feasibility of future reroofing projects.

Roof Replacements

1. Evaluate the feasibility of using existing insulation, sheet metal and other existing roof system components if they are in like new condition and will not have an adverse effect on the new roof system.

2. Existing roof membrane should be removed.

3. Existing slope should be evaluated and slope added with insulation to improve drainage as conditions allow.

4. Roof diaphragm should be evaluated to determine whether the diaphragm needs to be upgraded to meet current seismic requirements.

5. Roof deck structure should be evaluated to determine the existing dead and live load capacity.

6. Existing roof top equipment should be evaluated and abandoned roof top equipment removed.

Membrane Requirements

PVC – Polyvinyl Chloride

1. Must meet or exceed ASTM D 4434

2. Membrane must be Energy Star Rated.

3. Only sheets with stable or low-migrating plasticizers will be acceptable.

4. 10-year minimum performance history on membrane. Minor formulation changes are acceptable as long as the membrane has a successful history.

5. Membrane must be manufactured with low-wicking scrim.

6. Only balanced sheets will be acceptable. Scrim must be near center of membrane with no less than 20 mils polymer above scrim.

7. Thickness: 60 mil minimum (57mil minimum) polymer thickness not over all thickness. Polymer should be measured between the scrim. Variances from this will only be allowed by approval from DFCM Roofing Manager and on a performance type basis.

8. Must meet or exceed ASTM D 4434 for linear dimensional change and for heat aging.

9. Must meet or exceed ASTM D 5635 for dynamic impact resistance.

10. Must meet or exceed ASTM D 2136 for low temperature flexibility.

11. Membrane rolls / sheets are not to be wider than eight feet on a mechanically fastened system.

TPO – Thermoplastic Olefin

1. Must meet or exceed ASTM D 6878-03

2. 10-year minimum performance history on membrane.

3. Membrane must be manufactured with low-wicking scrim.

4. Only balanced sheets will be acceptable. Scrim must be in center of membrane with no less than 20 mils polymer above scrim.

5. 60 mil (57mil minimum) polymer thickness not over all thickness.

6. Resistance to xenon-arc weathering (ASTM G 155) must be tested and pass a minimum of 17,640 kJ/m2 or 14,000 hours at an irradiance of 0.35 W/m2

7. Must meet or exceed ASTM D 4434 for linear dimensional change and for heat aging.

8. Must meet or exceed ASTM D 5635 for dynamic impact resistance.

9. Must meet or exceed ASTM D 2136 for low temperature flexibility.

10. Membrane must be Energy Star Rated.

11. Membrane rolls / sheets are not to be wider than eight feet on a mechanically fastened system.

EPDM – Ethylene Propylene Diene Monomer

1. Must meet or exceed ASTM D 4637

2. 20 year minimum performance history on membrane.

3. Only balanced sheets will be acceptable. Scrim must be in center of membrane with no less than 20 mils polymer above scrim.

4. 60 mil (57mil minimum) polymer thickness not over all thickness.

5. Heat Aging (ASTM D 573) must be tested and pass 28 days @ 240 f. with less than 1% dimensional change.

6. Resistance to xenon-arc weathering (ASTM G 155) must be tested and pass a minimum of 17,640 kJ/m2 or 14,000 hours at an irradiance of 0.35 W/m2

7. Must meet or exceed ASTM D 2137 for low temperature flexibility must be tested using the dynamic impact test.

8. Membrane rolls / sheets are not to be wider than eight feet on a mechanically fastened system.

B.U.R. - Built Up Roofing

1. Type III (3) asphalt should be used at a minimum. Type IV (4) asphalt should be used if slope is greater than ¼".

2. Low fuming asphalt should be used.

3. Cold process B.U.R. is acceptable and preferred on sites that smell is a concern.

4. Minimum of type VI (6) felts and a 4-ply system should be used.

5. Minimum #4 lb lead is required for all drains and any other location lead is used for flashing material.

6. Surfacing should be an Energy Star rated SBS modified FR cap sheet with granules where possible otherwise aggregate should meet requirements of ASTM D 1863, 3/8" or 9mm nominal.

7. No EPS or Extruded insulation will be allowed in any B.U.R. system.

8. No Asbestos containing material is to be used, i.e. mastics, coatings, paints, etc..

Other System Requirements

1. The DFCM Roofing program manager should review and approve any hybrid, non typical roofing system.

Insulation Requirements

1. All insulation in the roofing system must be covered under the appropriate DFCM manufacture warranty for low slope roofing.

2. All insulation incorporated into roofing system must be approved and documented as a UL rated assembly that meet code requirements of the building roofing system is installed on.

3. Long Term Thermal Resistance (LTTR) should meet current code and the requirements of the building.

4. Insulation should always be installed in a minimum of two layers with joints staggered in both directions. The only exception is when all that is required is a cover board.

5. All insulation stored on project site should be covered to protect from UV and water. The factory wrap is not an acceptable cover material.

6. All insulation stored on project site should be elevated off the ground or the roof deck to protect from moisture.

Low Slope Manufacture Requirements

1. Manufacture must be listed in NRCA's low slope roofing materials guide.

2. Manufacture must have a 10-year successful history as a roofing manufacture.

3. Manufacture must show documented proof of how they plan to meet warranty obligations. Must be provided in contractor's submittal package.

4. Manufactures must agree to and be willing to sign the appropriate State of Utah (DFCM) manufactures warranty for the roof system. The DFCM warranty not the manufactures standard warranty will be required at project completion.

5. Manufacture must have a certified installer/contractor program. This program must include continuing education for the contractor.

6. Contractor must submit a pre-installation noticed from manufacture prior to start of any work. This will include confirmation that the membrane and all accessories being used meet requirements of specification. This will also include confirmation that the scope of work is in accordance with published technical data as per manufacture. This also includes confirmation that a warranty has been requested and will be issued on the DFCM manufacture warranty form at the completion of roofing. This document must be included in contractor's submittal package.

7. Manufacture will provide at no additional cost to owner, start up meeting, progress inspections and a final warranty inspection at project completion by a full time technical representative. Manufacture required inspections should be listed in specifications. All inspections will be scheduled by project architect.

8. Any portion of specification that does not meet manufacture requirements will be installed per manufacture requirements at no additional cost to owner. Any portion of the specification that exceeds the manufacture minimum requirements will be installed according to specifications not manufacture minimum requirements

9. Manufacture must have a history of meeting Warranty obligations.

10. Manufacture is required to release all inspection reports concerning warranted roof system to the contractor to submit to project architect.

Contractor Requirements

1. Contractor must have Five (5) years experience as a roofing contractor.

2. Contractor must have Five (5) years experience with the specified product.

3. Contractor must be a Manufacture certified installer of roofing system to be installed.

4. Contractor must document continuing education for the foreman that will daily oversee the work on the roofing system. A minimum of 12 hours per year is required.

5. On site foreman must be able to clearly communicate with building owner/occupants.

6. Contractor will provide a 24 hour emergency phone number to project manager and agency contact person

7. Contractor must be legally licensed to perform roofing work in the State of Utah and carry liability insurance as required by State of Utah law.

8. Contractor must be willing to sign and agree to the terms of the DFCM 5-year contractor roofing warranty.

Warranties and History Records – Provide the following as it relates to job specific roofing system:

1. Single ply roofing warranty

2. Bituminous roofing warranty

3. Contractor 5-year warranty

4. Single ply history record

5. Built Up history record

6. *Warranty Sign – Contractor to provide & install a metal sign with vinyl lettering containing the following information and similar format **for all roofs**:*

Caution

This roof is under warranty until (insert year) with (insert manufacturer). All access is to be restricted without facilities manager's permission & log entry. Repair work if necessary should be performed only by an authorized applicator. For leak repairs, contact (insert manufacturer) @ (insert manufacturer warranty claim department phone number) and provide them with warranty number. Questions regarding this roof or any potential work pertaining to this roof, please contact DFCM @ 801-538-3018.

Warranty # :	Roofing Contractor:
Warranty Type:	Contractor Telephone # :
Installation Date:	Contractor Address:
Manufacturer's Address:	Roof Membrane Type:

These signs are to be installed next to all roof access points inside a building as permit able, preferably next to the roof hatch ladder. Signs are to have rounded corners and with no sharp protrusions or edges. Signs are to be a minimum thickness of 20 gauge or greater, and no larger than 10" X 14" landscape setting.

Steep Slope Roofing
General Requirements

With the vast array of steep slope products available no specific requirements have been set forth. The following items should however be considered.

1. Any product used in steep slope roofing should have a proven history and be recognized by the NRCA.

2. All eves should overhang the wall a minimum of 16".

3. Ice and water shield should extend up 3' past the inside the warm wall on the roof deck.

4. Valleys and gutters should be designed so ice dams will not be created. Designs should not allow for moisture to pond or not freely drain off of the roof.

5. All rain gutters, downspouts and internal drain systems are required to have high quality heat cable that is thermostatically controlled.

6. Only concealed fasteners will be acceptable in metal roofing. No exposed fasteners will be allowed.

7. Minimum of a 10 year leak free manufactures warranty is required on all steep slope roof systems.

8. No three – tab shingles are allowed. 40 year minimum laminated shingles should be used.

9. Roof pitch should have slope of greater than 4/12. Any slope less than 4/12 should have full ice and water shield installed.

10. All material and details should meet the requirements of ASTM, NRCA, SMACNA, UL and FM.

11. Minimum of #30 felt should be used as underlayment.

12. Minimum Contractor workmanship Warranty period should be 5 years on DFCM contractor Warranty.

13. A DFCM history record is required on all roofing systems.

14. The DFCM Roofing program manager should review and approve any variance from that listed above.

15. Wood framed crickets filled with insulation should be installed on the up slope side of all curbs, units, chimneys, etc.

16. All valleys should be designed to have a clear drainage channel off of the roof –i.e. no dead valleys.

17. All application procedures should comply at minimum with the NRCA's standards & requirements, unless written specifications from a manufacturer's specific product requirements contradict NRCA's standards. In such instances, written permission must be obtained from the DFCM Roof Manager.

18. No Asbestos containing material is to be used.

New Construction

1. All penetrations should be located a minimum of 18" away from the center of the valley.

2. Crickets should be installed behind (up slope side) of all curbs, units, chimneys, etc. to eliminate the possibility of ponding water.

3. Attic insulation baffles must be installed in order to prevent the obstruction of soffit intake vents caused by attic insulation.

4. Project designer should verify that proper attic air intake & exhaust ventilation is specified to comply with roofing manufacturer requirements and local & national building codes.

5. Roof design should give consideration to project location, wind speeds, ice damming, rainfall, and building contents when designing a new structure / roofing system.

Roof Replacements

1. If there is more than one existing roof, existing roofing should be removed before new roof is installed.

2. Provide adequate ventilation to comply with IBC Code.

3. Roof diaphragm should be evaluated to determine whether the diaphragm needs to be upgraded to meet current seismic requirements.

4. Roof deck structure should be evaluated to determine the existing dead and live load capacity.

Manufacture requirements

1. Manufacture must be listed in NRCA's steep slope roofing materials guide.

2. Manufacture must have a successful 10-year history as a roofing product manufacture. (manufacture only not product)

3. Manufacture must show documented proof of how they plan to meet warranty obligations.

4. Manufacture must have a certified installer/contractor program. This program must include continuing education for the contractor.

5. Contractor must submit a pre-installation noticed from manufacture prior to start of any work. This will include confirmation that the membrane and all accessories being used meet requirements of specification. This will also include confirmation that the scope of work is in accordance with published technical data as per manufacture. This also includes confirmation that a warranty has been requested and will be issued at the completion of roofing. This document must be included in contractor's submittal package.

6. Manufacture will provide at no additional cost to owner, start up meeting, progress inspections and a final warranty inspection at project completion by a full time technical representative. Manufacture required inspections should be listed in specifications. All inspections will be scheduled by project architect.

7. Any portion of specification that does not meet manufacture requirements will be installed per manufacture requirements at no additional cost to owner. Any portion of the specification that exceeds the manufacture minimum requirements will be installed according to specifications not manufacture minimum requirements

8. Manufacture must have a history of meeting warranty obligations.
9. Manufacture is required to release all inspection reports concerning warranted roof system to the contractor to submit to the project architect.

Contractor requirements

1. Contractor must have Five (5) years experience as a roofing contractor.

2. Contractor must have Five (5) years experience with the specified product.

3. Contractor must be a Manufacture certified installer of roofing system to be installed.

4. Contractor must document continuing education for the foreman that will daily oversee the work on the roofing system. A minimum of 12 hours per year is required.

5. On site foreman must be able to clearly communicate with building owner/occupants.

6. Contractor will provide a 24 hour emergency phone number to project manager and agency contact person.

7. Contractor must be legally licensed to perform roofing work in the State of Utah and carry liability insurance as required by State of Utah law.

8. Contractor must be willing to sign and agree to the terms of the DFCM 5-year contractor roofing warranty.

Warranties

1. DFCM contractor warranty

2. Manufactures warranty to be issued from manufactures standard

3. Steep slope history record

4. Warranty Sign – Contractor to provide & install a metal sign with vinyl lettering containing the following information and similar format:

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This roof is under warranty until (insert year) with (insert manufacturer). All access is to be restricted without facilities manager's permission & log entry. Repair work if necessary should be performed only by an authorized applicator. For leak repairs, contact (insert manufacturer) @ (insert manufacturer warranty claim department phone number) and provide them with warranty number. Questions regarding this roof or any potential work pertaining to this roof, please contact DFCM @ 801-538-3018.

Warranty # :
Warranty Type:
Installation Date:
Manufacturer's Address:

Roofing Contractor:
Contractor Telephone # :
Contractor Address:
Roof Membrane Type:

These signs are to be installed next to all roof access points inside a building as permit able, preferably next to the roof hatch ladder. Signs are to have rounded corners and with no sharp protrusions or edges. Signs are to be a minimum thickness of 20 gauge or greater, and no larger than 10" X 14" landscape setting.