Roofing Design Requirements

(UPDATED DECEMBER 2018)

NOTE

This document is subject to change. Please review the above date before starting design work to ensure compliance to the current roofing design requirements.

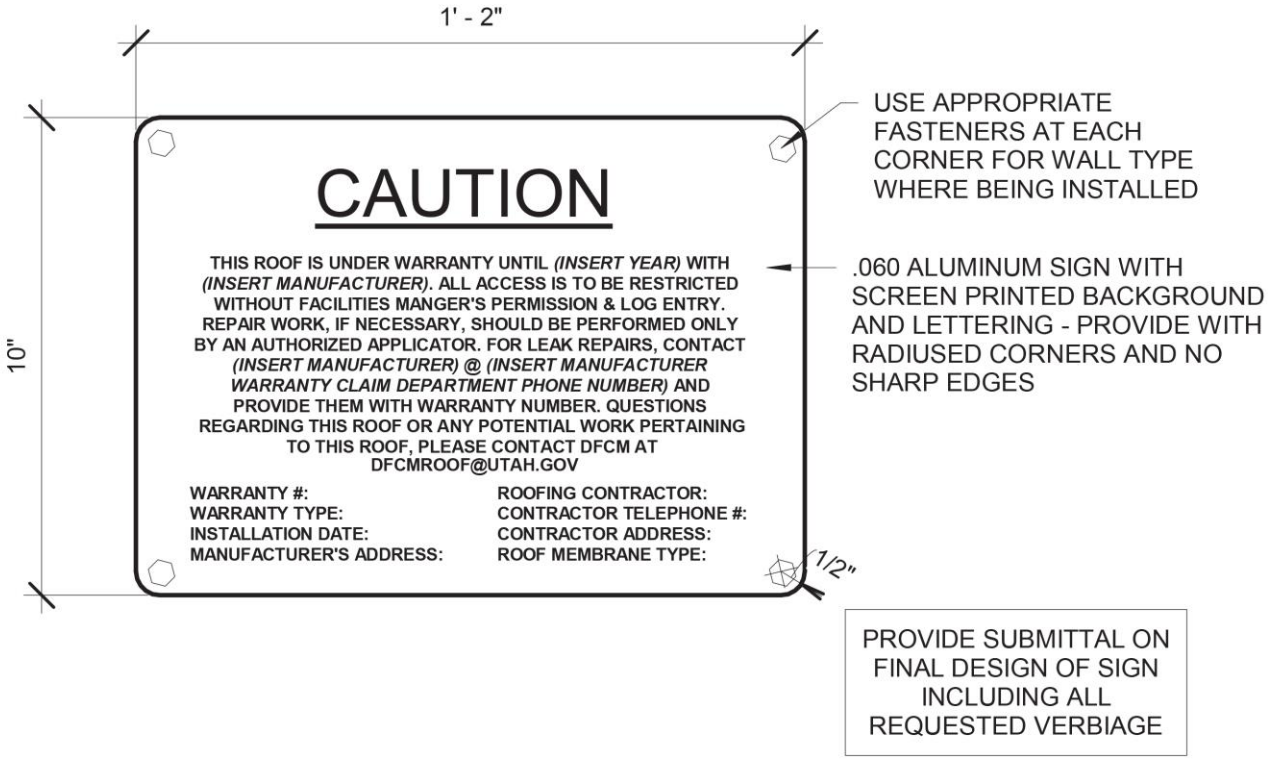
NOTE

The DFCM Roofing program manager should review and approve any variance from standards listed hereto.

General Requirements for Low Slope Roofing

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

1. Energy efficient roof design using Energy Star & LEED rated products should be used on roofs. Exception can be taken when Built-up Roofing or EPDM is justified. Energy efficient designs should still be considered when using these systems.
2. Minimum Manufacture Warranty periods on a new construction project is to be 25 years on appropriate DFCM Roofing Warranty. Designers are to calculate the life cycle cost difference between the 25 year and the 30 year system. The designer is then to specify the most cost effective system based on the lowest yearly life cycle costs. PMR systems are to have the maximum warranty duration specified available as dictated by life cycle costs - typ. 20 years. Reroofing projects may receive a 20 year warranty where life cycle costs show that a 20 year system is most cost effective, & it is approved by the DFCM Roofing Program Manager.
3. Minimum Contractor workmanship Warranty period should be 5 years on DFCM Contractor Warranty.
4. Design & require a 99-m.p.h. minimum wind speed rider with all manufacturers' warranties in low wind areas and 110-m.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 a 1-90 or a 1A-90 rating does not provide the necessary wind speed requirements.
5. A DFCM roof history record is required on all roofing systems (Contractors responsibility).
6. *Warranty Sign - Contractor to provide & install a metal sign with vinyl lettering containing the following information and similar format for all roofs:*



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.

7. 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 and doors are to be a minimum of 16" above the roof line.
8. All mechanical equipment is required to be set on a structural roof curb attached to the roof deck. No equipment should be installed over insulation.
9. All metal associated with the roof should be 24 gauge, color clad, using standing seams joints where possible. Follow SMACNA guidelines for all metal work. All cap and edge metal should utilize a continuous clip on the outside edge. All coping metal should be structurally sloped to drain back on the roofing system. The top of all parapets are to be structurally sloped to drain back onto the roof and structurally supported by a wood nailer.
10. All roof wall substrates are to be a wood or primed roof board suitable for adhering the roof wall flashings as approved by the roofing system manufacturer.
11. Only Mechanically fastened or fully adhered systems should be used. No ballasted systems will be allowed on single ply roof systems.
12. No concrete walkway pads are allowed on roof system. Manufacturer's walk pad should be attached when applicable to the membrane surface and a different color than the roofing membrane. Roof walk pad should be installed around all serviceable roof top equipment. Depending on roof type, a walk path should be installed to provide safe access to said roof top equipment.
13. Pre-manufactured accessories are required for all pipe flashings, inside and outside corners and any other location pre-manufactured accessories are available as required by the manufacturer's warranty requirements.
14. Where manufacturer's standards show one or more possible approach for compliance to the standard, provide the most stringent approach as defined by the Architect or DFCM Roofing Project Manager.
15. Eliminate conflict between roof penetrations. Roof penetrations must be a minimum of 18" away from any other roof penetration. Minimize penetrations (i.e. pipe penetrations) as much as possible. Multiple line sets are not allowed through a single roof flashing.
16. 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.
17. Determine the need for vapor retarder based on dew point calculations, and facility use.
18. The DFCM roofing program manager is to review roofing specifications and roof details prior to bid.
19. The DFCM roofing program manager is to be included in roofing pre-construction meeting and final inspection of roof system.
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 specification will be enforced that is more stringent as determined by the Architect or DFCM Roofing Project Manager.
21. **No Asbestos Containing** Material (ACM) is to be used during repairs or installation of new roofing system under any circumstances.
22. All roof top mounted equipment should not have any penetrations or fasteners through a horizontal surface that cannot provide a seal equal to the roof warranty.
23. Agencies requesting solar equipment, roof gardens, decorative rock, or any other decorative overburden on the roof surface, must sign an MOU (Memorandum of Understanding) with DFCM that the said agency will be responsible for all / any costs associated with the

installation, maintenance, repair, or removal of said overburden for the life of the roof. Agencies will be responsible for said cost whether an M.O.U is held by DFCM or not.

24. All drain bowls are to receive cast iron covers. Plastic drain bowl covers are not allowed.
25. All drain sumps are to be constructed out of manufactured taper insulation panels. Hand cut taper sumps are not allowed.
26. Roof drains that are elevated above the roof deck must be supported with a treated wood nailer or some sort of structural element that will minimize.
27. Secondary roof drains are to be positioned on the roof so that water will drains=to the primary (upslope), and they should not be installed at the same elevation as the primary.

New Construction

1. Roof slope of 1/4 per foot" 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. Cricket angles & slopes are to be constructed to maintain positive slope / drainage the entire distance of the valley. Roof slopes & crickets are to be designed to eliminate all ponding water on the roof.
2. Please review the specific roofing systems for system requirements - see appropriate section below.
3. Designers are to verify the compatibility of flat roofing systems and air barriers=tie-ins as applicable.
4. Fall protection for maintenance personal should be considered in design. Parapets should be built at the appropriate height or anchor points should be included. Roof hatch guards should be installed on all roof hatches with self-closing gates. All roof davits (anchor points) should be hot dipped galvanized with the galvanizing hole being below the roof surface.
5. Special consideration should be made during the design of the roofing system to account for feasibility & cost savings for future reroofing projects - i.e. roof to wall material transitions & flashings.
6. When feasible, HVAC equipment & design should be designed in order to keep said equipment off of the roof surface. Life cycle cost analysis should be conducted to provide justification when said equipment is to be installed on the roof top. Said analysis should incorporate roof temperatures and reduced equipment life cycles from being exposed to the elements.

Roof Replacement

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. Roof diaphragm should be evaluated by a structural engineer to determine whether the diaphragm needs to be upgraded to meet current seismic requirements as required by current State building code.
4. When new roofing systems will increase the roof load on a building, then the roof deck structure should be evaluated by a structural engineer to determine the existing dead and live load capacity as required by current State building code.

5. Existing roof top equipment should be evaluated and abandoned obsolete roof top equipment & associated penetrations removed - i.e. line sets & curbs.

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, the requirements of the building, and DFCM design standards.
4. Insulation should always be installed in a minimum of two layers with joints staggered one foot minimum in both directions. The only exception is when all that is required is a cover board. In such instances, the end joints of the cover board should be staggered also.
5. All insulation stored on project site should be elevated off the roof deck & covered with a weather tight barrier to protect from UV and moisture on all sides. The factory wrap is not an acceptable cover material. Any wet or moisture damaged insulation is to be removed from the job site.
6. Expanded polystyrene EPS insulation that is used in a roofing system must be a minimum of a 1.25lb per square foot density, and it must be compatible with the surrounding roofing products.

Low Slope Manufacturer 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. The system must have a five year successful history minimum with that product.
4. Manufacture must show documented proof of how they plan to meet warranty obligations. Must be provided in contractor's submittal package.
5. 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. By signing the State of Utah warranty, manufactures agree to relinquish any of the terms or conditions listed in any of their standard warranty conditions.
6. Manufacture must have a certified installer/contractor program. This program must include continuing education for the contractor.
7. Contractor must submit a pre-installation notice signed by an authorized representative of the 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.
8. 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.

9. 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 the manufacture minimum requirements.
10. Manufacture must have a history of meeting Warranty obligations.
11. Manufacture is required to release all inspection reports concerning warranted roof system to the contractor to submit to project architect.

Membrane PVC *(*Polyvinyl Chloride) Roof Systems

1. Membrane must be Energy Star & LEED Rated.
2. Only sheets with stable or low-migrating plasticizers will be acceptable.
3. 10-year minimum performance history on membrane. Minor formulation changes are acceptable as long as the membrane has a successful history.
4. Membrane must be manufactured with low-wicking scrim.
5. Only balanced sheets will be acceptable. Scrim must be near center of membrane with no less than 30-26 mils polymer above scrim.
6. Thickness: 60 mil (57mil minimum) polymer thickness, not over all thickness minimum. 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.
7. Must meet or exceed ASTM D 4434
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.

KEE – (Ketone Ethylene Ester) & PVC – (Polyvinyl Chloride) Roof Systems

KEE Section

1. Must meet or exceed ASTM D 6754-02
2. Must meet or exceed ASTM D 751
3. Must meet or exceed ASTM D 2136
4. Must meet or exceed ASTM D 5602
5. Must be Energy Star & LEED Rated
6. 10 year performance history on the membrane. Minor formulation changes are acceptable as long as the membrane has a successful history.
7. Membrane must be manufactured with a non-wicking scrim.
8. Only balanced sheets are acceptable. The scrim must be near the center of the sheet w/ a minimum of 18 mils polymer above scrim.
9. Membrane should be a minimum of 50 (47 mil minimum) mils thickness, not overall thickness minimum. Polymer should be measured between scrim. Variances to this will

only be allowed by approval from the DFCM Project Roofing Manager & on performance type basis per project

10. Sheets shall be no wider than eight feet and no longer than 100 feet on a mechanically fastened system.

PVC Section

1. Membrane must be Energy Star & LEED Rated.
2. Only sheets with stable or low-migrating plasticizers will be acceptable.
3. 10-year minimum performance history on membrane. Minor formulation changes are acceptable as long as the membrane has a successful history.
4. Membrane must be manufactured with low-wicking scrim. Only balanced sheets will be acceptable. Scrim must be near center of membrane with no less than 26 mils polymer above scrim.
5. Thickness: 60 mil (57mil minimum) polymer thickness, not over all thickness minimum. 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.
6. Must meet or exceed ASTM D 4434
7. Must meet or exceed ASTM D 5635
8. Must meet or exceed ASTM D 2136
9. Membrane rolls / sheets are not to be wider than eight feet on a mechanically fastened system.

TPO (Thermoplastic Olefin) Roof Systems

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 26 mils polymer above scrim.
5. 60 mil (57mil minimum) polymer thickness, not over all thickness minimum.
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 & LEED Rated.
11. Membrane rolls / sheets are not to be wider than eight feet on a mechanically fastened system.

EPDM (Ethylene Propylene Diene Monomer) Roof Systems

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.

Built-up Roof (B.U.R.) Systems

1. Type III (3) asphalt should be used at a minimum. Type IV (4) asphalt should be used if slope is greater than W.
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) fiberglass felts and a 4-ply system should be used. Phazed construction as defined in the NRCA manual, current edition is not allowed.
5. Minimum #4 lbs. 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 (ACM) is to be used, i.e. mastics, coatings, paints, etc..

Protected Membrane Roofing (P.M.R.) System

1. Roof membrane must meet or exceed CSGB 37.50-M89
2. Roof membrane should be placed directly over an acceptable substrate as identified by the membrane manufacturer.
3. Design should prohibit the entrapment of water within the roof assembly.
4. 15 year minimum performance history without formulation changes on the membrane.
5. Contractors must have a successful track record installing
6. P.M.R. systems of a minimum of 5 years and be approved by the membrane manufacturer. Foreman must have a minimum of 5 years successful track record of installing PMR systems.
7. Membrane must contain a filler that can provide resistance against fertilizers (ASTM D-896), acids (ASTM D 896-94), and building washes (ASTM D-896).

8. Roof membrane should be monolithic, with no seams, installed at 215 mils - fabric reinforced. Uncured neoprene detailing required at all critical roof areas per manufacturer's recommendations.
9. Roof membrane must be 100% solids, no solvents.
10. The roofing membrane must be able to withstand moist environment for a prolonged period of time, & it shall have a successful performance history in moist environment.
11. Insulations must be highly resistant to moisture and physical damage, extruded polystyrene only.
12. Membrane must not be used as a traffic surface and must be protected from sunlight & traffic.
13. Protected roof membrane assembly should meet & conform to local wind design guidelines / codes and receive manufacturer system warranty for wind performance, thermal performance of the insulation (80% of original value) and overburden removal & replacement.
14. Insulation design should be capable of in-place reuse or recycle in future roof iterations.
15. All components including expansion joints shall be warranted by the same PMR manufacturer.
16. A 20 year minimum warranty is required. As availability of warranty durations increase, AE's should perform a life cycle cost analysis to select the duration with the best life cyle cost.
17. Roofing membrane shall be tested by electronic conductive testing to ensure water tightness before application of overburden.

Vegetated Roof Assemblies:

1. Vegetated roof assemblies must be constructed using Protected Roof Membrane design requirements eliminating potential damage from landscaping operations.
2. The roofing membrane must be fully bonded to the permanent substrate and seamless.
3. The roofing membrane must be able to withstand a moist environment for a prolonged period of time. The roofing membrane should have a minimum 15 year successful performance track record in buried, moist environments.
4. The depending on the type of vegetated roof, the assembly should have an overburden consisting of protection course, root barrier, drain layer, insulation, moisture retention layer, reservoir layer, filter fabric layer, and engineered soil-based growth medium with plantings. To ensure compatibility all components of the vegetated roof assembly should be supplied and warranted by a single source manufacture.
5. A minimum 40 psi compressive strength Extruded Polystyrene insulation should be used within the assembly.
6. The vegetated roof manufacturer must have minimum of 10 vegetated roof projects performing successfully for a minimum of 10 years.

Other System Requirements

1. The DFCM Roofing program manager is to review and approve any hybrid, non-typical roofing, or assembly that is not listed in these guidelines.

Overburden On Flat Roofing Systems - Green, Plaza Decks, Solar Equipment

1. Any agency requesting overburden on the roof must first sign an MOU as outlined in Low Slope Roofing - General Requirements: Item #24. Designers are to provide a detailed cost analysis for the agency of installation costs, maintenance costs, and removal costs of overburden prior to the agency signing the MOU.
2. Roofs that are to receive any of the aforementioned overburdens are not to be installed on roof areas that were not designed to receive said overburden - structurally or architecturally.
3. New roofing systems that will receive said overburden are to be designed with the maximum life expectancy / warranty possible with a successful fifteen year minimum past roofing system history.
4. Said overburden will not void the roofing manufacturer's warranty.
5. All equipment, i.e. - solar panels, must be on a structural stand with a minimum of 12" above the finished roofing system. Equipment must be spaced to allow reasonable access to inspect and repair the roof as needed.
6. Overburden systems are to be designed as to withstand wind loads of the building areas.
7. Instances where overburden will eliminate the visibility of the roofing system, those sections of roofs are to receive a moisture test(s) prior to the installation of said overburden.
8. Redundancy is recommended in detail flashings / weak points in the roofing system.

Low Slope Contractor Requirements

(see section entitled "Contractor Requirements" towards bottom of document.)

Warranties and History Records

Provide the following as it relates to job specific roofing system:

1. Designers are to require the most current version of the warranties & forms available published on the DFCM website - https://dfcm.utah.gov/construction-management/roofing-program/
2. Roof Warranty Sign - See Low Slope Roof Requirements -Item #6.

General Requirements for Steep Slope Roofing

With the vast array of steep slope products available, designers should carefully select a roofing system that will provide longevity and performance with the consideration of the buildings environmental factors in selecting a roofing system. The following items are to be required unless prior written approval is given by the DFCM Roofing Manager:

1. Any product used in steep slope roofing should have a proven history and be recognized by the NRCA.
2. All eves should are to overhang the wall a minimum of 16".
3. Ice and water shield should extend 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 on the roof or drainage system. All designs are to have a clear drainage channel off of the roof -i.e. no dead valleys.
5. All roof slopes 4/12 and below are to have a full ice and water shield dry-in with a felt dry-in over the top of the ice & water shield. Roof slopes 5/12 to 8/12 are to have a felt dry -in with a minimum of 18" side laps & 12" end laps. Roof slopes 9/12 and higher will require a dry-in with a minimum of 3" side laps & 12" end laps.
6. A minimum of a #30 ASTM felt should be used as an underlayment. Synthetic underlayment may also be used in lieu of a #30 felt provided it is an acceptable substitute to the roofing manufacturer. The primary underlayment is to cover the secondary underlayment on all steep slope roofing systems.
7. Internal rain gutters are not allowed without written approval from the DFCM Roofing Manager.
8. All rain gutters, downspouts and internal drain systems are required to have high quality heat cable that is thermostatically controlled. All fasteners for heat cable shall be concealed within the roof system.
9. Only concealed fasteners will be acceptable in metal roofing. No exposed fasteners will be allowed.
10. Minimum of a 10-15 year leak free manufactures warranty is required on all steep slope roof systems.
11. Three tab shingles are not allowed. A minimum of a 270lb per square laminated shingles should be used that provides a 10 year 110 mph wind warranty.
12. All material and details should meet the requirements of ASTM, NRCA, SMACNA, UL and FM.
13. Roofing systems that have a history of snow sliding off the roof must have an appropriate snow retention system that will protect the building occupants and pedestrians traffic around the building.
14. Minimum Contractor workmanship Warranty period should be 5 years on DFCM contractor Warranty.
15. A DFCM history record is required on all roofing systems.
16. Wood framed crickets filled with insulation should be installed on the up slope side of all curbs, units, chimneys, etc.
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 (ACM) is to be used.
19. Project designer are to verify that proper attic air intake & exhaust ventilation is specified to comply with roofing manufacturer requirements and State building codes.

New Construction

1. All penetrations should are to be located a minimum of 36" 18" away from the center of the valley.
2. Crickets are to be installed behind (up slope side) 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 are to verify that proper attic air intake & exhaust ventilation is specified to comply with roofing manufacturer requirements and local & national State 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 to the deck to comply with IBC Code 15.10.3 Item #3 before new roof is installed.
2. Roof diaphragm should be evaluated by a structural engineer to determine whether the diaphragm needs to be upgraded to meet current seismic requirements.
3. Roof deck structure should be evaluated by a structural engineer to determine the existing dead and live load capacity.

Manufacturer Requirements

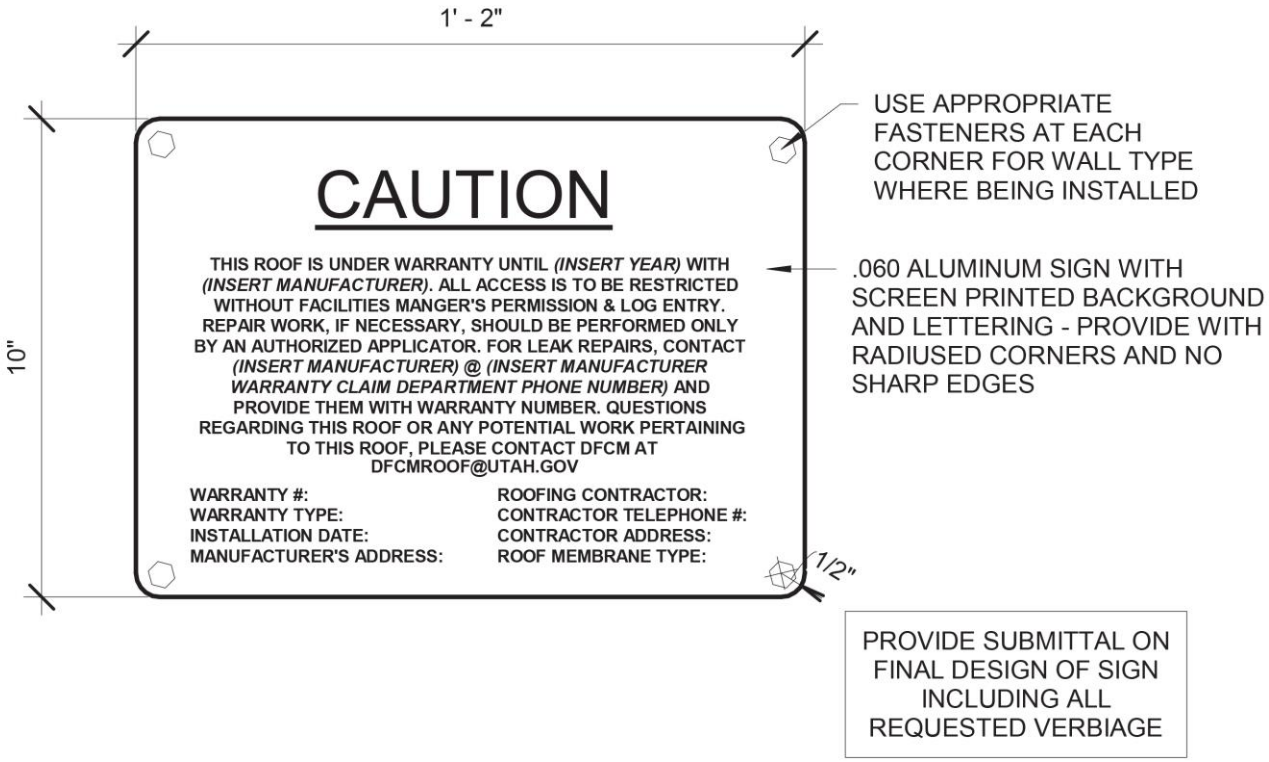
1. Manufacture must be listed in NRCA's steep slope roofing materials guide.
2. Manufacture must have a successful 10-year history as a roofing product manufacture (manufacture only not product).
3. Manufacturer must show 5 years successful use.
4. Manufacture must show documented proof of how they plan to meet warranty obligations.
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 notice signed by an authorized representative of the manufacture prior to start of any work. This will include confirmation that the roofing components 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.
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 the project architect.

Warranties

1. DFCM contractor warranty
2. Manufactures warranty to be issued from manufacturer
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 for those steep slope roof warranties that have a leak free warranty:



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.

CONTRACTOR REQUIREMENTS FOR LOW SLOPE AND STEEP SLOPE

1. Contractor must have Five (5) years of experience as a roofing contractor.
2. Contractor must have Five (5) years of experience with the specified product or comparable 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.