

1.0 GENERAL

1.1 REQUIREMENTS

- A. Furnish and install a new weather and watertight --- High Performance KEE Thermoplastic Roofing System on the following:
Hassayampa Elementary School Square Gym
251 South Tegner Street
Wickenburg, AZ
- B. This roofing project consists of re-roofing approximately 8,000 sq. ft. using a Adhered FiberTite-XT FB 050 membrane. Contractor to verify square footage
- C. This specification is constructed around FiberTite Roofing Systems and Seaman Corporation's General Guide Specification as the standard of performance and quality and shall be considered part of these specifications.

1.2 PROJECT SCOPE

- A. Roofing Contractor shall furnish all labor, materials, tools, equipment, supervision and permits necessary to install a new High Performance Adhered FiberTite-XT FB 050 over the existing roof system; including roof related insulation and/or cover-boards, flashings, accessories and related metalwork in strict accordance with the contract, drawings and High Performance Membrane Roof System Manufacturer's most current specifications and details.
- B. The roofing contractor shall take core samples of the existing roof system to ensure that any wet or deteriorated insulation / substrate is identified, removed and replaced prior to installing the high performance membrane roofing system.
- C. The roofing contractor shall include a unit price to remove and replace any wet or deteriorated insulation / substrate identified.
- D. The actual removal and/or replacement of any wet insulation shall be coordinated with the owner / owner's representative to confirm unit area of replacement.
- E. The roofing contractor shall be an "Authorized Roofing Contractor" of the MRSM in good standing and be fully knowledgeable of all the requirements within the contract documents as well as all job site conditions that could affect their work.
- F. The roofing contractor shall confirm all given information and notify the building owner / owner's representative, prior to bid, of any conflicts that will affect the quality or cost of the proposal.
- G. Any contractor wishing to submit a proposal using an alternative "High Performance" roofing system other than the approved manufacturer(s) must submit a pre-qualification request in writing at least fourteen (14) days prior to the bid date justifying in writing that the alternate is of equal quality and performance in ALL RESPECTS to the high performance selected foundation of this specification.
- H. Failure to submit a timely pre-qualification proposal will be grounds for total rejection of the contractor's proposal.

1.3 QUALITY ASSURANCE

- A. **Manufacturer's Qualifications:** The High Performance Membrane Manufacturer shall be an American owned company with no less than 25 years experience as a commercial roofing manufacturer.
- B. **Installer Qualifications:** A licensed roofing contractor, authorized by the MRSM with a minimum of five (5) years experience installing the type of roof system specified for this project.
- C. **Source Limitations:** Obtain all components including roof insulation and/or cover-board, fasteners adhesives and other accessories as required, from the approved MRSM.
- D. The specified membrane roofing system must consist of the materials required and be installed under the following criteria.
 - 1. **UL Listing;** provide materials bearing Underwriters Laboratories (UL) marking / label on the packaging or containers indicating materials have been produced under UL classification and follow-up services.
 - 2. **FM Listing;** provide membrane roofing system and materials that have been evaluated by FM Global (FM) for spread of flame, seam leakage, hail resistance and wind uplift. Identify materials with FM Approved marking / label.
 - i Fire/Windstorm Classification: FM 1-90
 - ii Hail Resistance: SH
- E. Project requiring or subject to FMG Approval shall be defined by a specific RoofNav Assembly Number.
- F. The roofing contractor shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods necessary for the proper performance of the work. No allowance will be made for lack of skill on the part of the workers.
- G. Any deviations from contract, drawings and/or specifications must be submitted in writing for approval prior to implementation to the design professional representing the owner and the MRSM for acceptance / approval by both parties.
- H. Upon completion of the roof installation the roofing contractor shall arrange for a quality assurance / warranty inspection by the Technical Service Department of the approved MRSM. Notice of the inspection date and time will be given to the owner / owner's representative at least 72 hours prior to the inspection taking place.

1.4 REFERENCES

- A. ASTM D6754 Standard Specification for Ketone Ethylene Ester Based Sheet Roofing
- B. ASTM D 751 Test Methods for Coated Fabrics
- C. Seaman Corporation / FiberTite General Guide Specification FTR GS04/08
- D. UL 790 Underwriters Laboratories (UL) - Fire Hazard Classifications
- E. FM 4470 GM Global (FM) - Roof Assembly Classifications
- F. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual

1.5 **PERFORMANCE REQUIREMENTS**

- A. General Performance: completed high performance membrane roof system and base flashing shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation or other defects in construction.
- B. Material Compatibility: provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by the MRSM based upon insitu field evidence of the roofing membrane/systems service life cycle greater than 20-years.
- C. Roofing System Design: provide high performance membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated according to ASCE-7.
- D. Energy Performance: provide high performance membrane roofing system that is listed on the EPA website as ENERGY STAR qualified and has an initial Solar Reflective Index equal to or greater than 78.

1.6 **SUBMITTAL REQUIREMENTS**

- A. Prior to mobilization and commencement of work, the roofing contractor shall submit the following:
- B. Shop drawings showing roof layout, construction details to be implemented and identifying materials to be used
- C. Sample of MRSM Commercial Roofing Warranty
- D. Submit a letter from MRSM attesting that the roofing contractor is an authorized roofing contractor of the prescribed roofing material in good standing.
- E. If pre-finished metal is called for, submit a color chart for the pre-finished metal in order for a color selection to be made.
- F. Submit an assembly letter and/or an approved Pre-Installation Notice / Request for Warranty from the high performance membrane roof system manufacturer certifying compliance with the system requirements described in the Quality Assurance section of this specification.

1.7 **PRODUCTS AND/OR WORK NOT INCLUDED IN THIS SPECIFICATION**

- A. Rough Carpentry; wood nailers and wood blocking
- B. Masonry; waterproofing, through wall flashing, scupper openings
- C. Plumbing; installation of any roof drains
- D. Electrical; rooftop electrical penetrations
- E. Mechanical; rooftop HVAC equipment installation

1.8 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver all materials to the job site in manufacturer's original, unopened containers, with legible labels and in sufficient quantity to allow for continuity of work.

- B. Select and operate material handling equipment in a safe manner, guarding against damage to existing construction or newly applied roofing and conforming to manufacturer's recommendations of handling and storage.
- C. All rolls of membrane shall be stored, lying down, elevated above the roof deck and completely protected from moisture with tarpaulins. (Manufacturer's packaging is not considered adequate for outdoor storage.)
- D. Insulation and cover board materials shall be elevated on pallets and fully protected from moisture with tarpaulins. (Manufacturer's packaging is not considered adequate protection from moisture.)
- E. Adhesives and sealants shall be safely stored between 50° F and 80°F prior to use.
- F. Flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow all precautions as outlined in manufacturer's Material Safety Data Sheets.
- G. Materials, having been determined by the owner/owner's representative to be damaged, shall be immediately removed from the construction site and replaced at no cost to the owner.

1.9 COORDINATION

- A. Prior to installation of materials, a pre-roofing conference shall be held with the roofing contractor, general contractor, owner/owner's representative(s) and representatives of all trades that may be working on the roof / completed membrane to discuss the specified roofing system, coordinate its proper application and the expectations of all parties involved. The authorized roofing contractor and the owner/owner's representative shall notify all parties a minimum of fourteen days prior to the meeting.
- B. Plan and coordinate the installation of the roofing system with other trades in such a manner to avoid membrane damage, keeping the complete installation weather tight and in accordance with all approved details and warranty requirements.
- C. A Technical Representative of the MRSM shall be available to make recommendations necessary to ensure compliance with project specifications and specification alternatives due to unforeseen job conditions.
- D. Topics of discussion at the pre-construction meeting may include the following:
 - 1. Utility Usage
 - 2. Sanitary Facilities
 - 3. Material Storage Areas
 - 4. Roof loading areas
 - 5. Site Access
 - 6. Roof Access
 - 7. Project security
 - 8. Rooftop Penetrations

9. Completed Roof Protection
10. Employee parking

1.10 **JOB CONDITIONS**

A. Safety

1. Take all necessary precautions regarding worker health and safety when using solvents, adhesives and hot asphalt.
2. Store flammable liquid and materials away from open sparks, flames and extreme heat.
3. Take necessary precautions when using solvents and adhesives near fresh air intakes.
4. Comply with all OSHA requirements for construction. It is the roofing contractor's responsibility to comply with all state, federal and local codes, guidelines and safety requirements.
5. Daily site cleanup shall be performed to minimize debris and hazardous congestion.
6. Roof work involves handling combustible and heavy materials at height, on some occasions directly over other trades working below the roof deck or in cases of occupied buildings, over building occupants. Extreme caution will be utilized when installing the roof to prevent injury to roofing personnel, other trades, building occupants and to property. Listed below is a partial list of safety requirements, additional requirements exist in order to comply with OSHA and jobsite regulations.
7. Material Safety Data Sheets (MSDS) shall be maintained on the jobsite for any and all roofing materials being stored or installed on the project.
8. Fire suppression equipment will be readily available on the roof top whenever combustible roofing material is being handled. Protect against fire and flame spread at all times.
9. Roofing contractor will establish a safety plan and rooftop evacuation procedures and brief his personnel on appropriate emergency actions.

B. Protection

1. Schedule installation sequence to limit access and utilization of the newly installed membrane for material storage, construction staging, mechanical and/or excessive foot traffic.
2. Provide proper protection on all newly completed roofing to avoid damage to the new roofing system.
3. Traffic should be minimized on a freshly laid roof.
4. Protect building walls, rooftop units, windows and other components during installation.

C. Additional Precautions

1. Adverse weather conditions e.g. extreme temperature, high winds, high humidity and moisture, could have a detrimental effect on adhesives, general production efforts and/or the quality of the finished installation. Contact FTCS for recommendations and acceptable tolerances.
2. Daily production schedules of new roofing shall be limited to only that which can be made 100% watertight at the end of the day, including all flashing and night seals.
3. All surfaces to receive new roof system, including insulation and flashing, shall be free from all dirt, debris and be thoroughly dry.
4. Comply with local EPA requirements as published by Local, State and Federal authorities.
5. All construction debris shall be removed from the construction site and legally dispose of off site.
6. If a condition is discovered that is not covered by the project drawings and specifications notify the general contractor and owner's representative immediately and resolve the conflict. Take appropriate steps to prevent water intrusion into the roof system until such conflict is resolved and roofing operations are continued.

1.11 **WARRANTY**

- A. Provide manufacturer's 20 Year NDL System Warranty. The maximum warranted wind speed as measured 30' (10 m) above ground level shall be 90 mph.
- B. Provide contractor's warranty covering leaks caused by material defects and or installation workmanship for a period of two years.

2.0 **PRODUCTS**

2.1 **GENERAL**

- A. All roofing system components shall be manufactured or supplied by approved MRSM.
- B. Unless approved otherwise prior to project bid, all roofing components are to be manufactured or supplied through approved MRSM and be included in the warranty coverage.
- C. For purposes of designating type and quality, drawings and specifications are based upon FiberTite Roofing Systems as manufactured and supplied by Seaman Corporation of Wooster, Ohio. For additional information, the roofing contractor shall refer to FiberTite General Guide Specifications.

2.2 **FIBERTITE MEMBRANE**

- A. FiberTite-XT50 FB - nominal 50-mil ketone ethylene ester (KEE) membrane,

reinforced with a 6.5-oz yd² knitted polyester fabric with a 4-oz yd² non-woven polyester fabric heat bonded to the backside, as manufactured by Seaman Corporation, under the trade name FiberTite-XT50 FB, conforming to the physical properties as outlined in the associated data sheet. FiberTite-XT50 FB greatly exceeds all requirements outlined ASTM D 6754 - 02 Standard Specification for Ketone Ethylene Ester (KEE) Sheet Roofing. Membrane color shall be DC196 Off-White

PHYSICAL PROPERTIES

<u>ASTM D 6754-02 Test Method(s)</u>	<u>ASTM D6754 Min. Req.</u>	<u>FiberTite-XT50 FB Typ. Values</u>
Thickness, mm (in.) <i>ASTM D 751</i>	0.79 (0.031)	1.27 (0.050) nom.
Thickness over Fiber mm (in) <i>Optical method (inches)</i>	0.15 (0.006)	0.38 (0.015)
Breaking Strength N (lbf) <i>ASTM D 751 proc. B – strip</i>	1175 (265)	1779 (400)
Elongation at Break % <i>ASTM D 751 - strip</i>	15	18
Tear Strength N (lbf) <i>ASTM D 751 proc. B. tongue tear</i>	335 (75)	556 (125)
Linear Dimensional Change % <i>ASTM D 1204 max %</i>	1.3	0.78
Fabric Adhesion N/m (lbf/in) <i>ASTM D 751</i>	225 (13)	No Peel
Low Temperature Bend <i>ASTM D 2136 (°F)</i>	-30	-40
Retention of Properties after Heat Aging <i>ASTM D 3045 – 176°F/156 days</i>		
Breaking Strength Strip % Original:	90	90
Elongation at Break Strip % Original:	90	90
Low Temperature Bend after Heat Aging	-30	-40
Change in Weight after Exposure in Water <i>ASTM D 471 158°F, 166h, one side only, max %</i>	0.0 +6.0	0.0, +3.7
Factory Seam Strength N (lbf) <i>ASTM D 751 Grab Method</i>	1780 (400)	> Fabric Strength
Hydrostatic Resistance Mpa (psi) <i>ASTM D 751</i>	3.5 (500)	5.9 (850)
Static Puncture Resistance <i>ASTM D 5602 (99lbf)</i>	Pass	Pass

Dynamic Puncture Resistance (J) <i>ASTM D 5635</i>	10	30
Accelerated Weathering <i>Practice G 155 / xenon</i>	5,000 hr.	10,000 hr.
Cracking or Crazing at 7x magnification	None	None
Accelerated Weathering <i>Practice G 154 / UVA</i>	5,000 hr.	10,000 hr.
Cracking or Crazing at 7x magnification	None	None
Fungi Resistance: <i>Practice G 21, 28 days</i>		
Sustained Growth	None	None
Fungi Resistance: Discoloration	None	None
Abrasion Test Cycles <i>ASTM D 3389 H-18 wheel / 1,000 g load</i>	1,500	> 2,000
Solar Reflective Index (SRI) <i>Color: DC 196 off white</i>	n/a	98.54

2.3 FLASHING MEMBRANE

- A. DC196 Off-White Nominal 50-mil FiberTite-XT membrane shall be used for all flashing requirements to match the field membrane and warranty expectations selected for the roofing system.

2.4 INSULATION

- A. Roof insulation shall be installed, where specified and/or required to provide a suitable surface for the membrane roofing system and/or meet desired thermal values.
- B. Whenever insulation thickness exceeds 2-inches install insulation in multi-layer assembly with all joints staggered the maximum amount possible to increase thermal efficiency.
- C. Minimum acceptable characteristics for polyisocyanurate insulation:
1. FM approved rigid insulation
 2. UL Classification: Class A
 3. Density: 2.0 pcf. Minimum
 4. Meet requirements of ASTM C1289

2.5 APPROVED INSULATION

- A. Not Applicable.

2.6 COVER BOARD

- A. Cover-board (insulation overlayment) shall be a water resistant gypsum core substrate conforming to the following:
 - 1. FM approved meeting Class A 1-90, for fire and wind.
 - 2. UL Classification: Class A Assembly.
 - 3. Meet requirements of ASTM C 473
- B. Approved Cover Board
 - 1. 1/4 in. DensPrime

2.7 VAPOR RETARDER

- A. The decision regarding the inclusion of a vapor retarder within the roof system shall fall within the responsibility of the design professional and is outside the scope of this specification. Consult N.R.C.A. or other technical resource for appropriate guidelines.
- B. Vapor retarder for use in a roof system shall comply with identifiable code and/or insurance requirements.
- C. The vapor retarder manufacturer shall certify, in writing, that the specified vapor retarder meets identifiable code requirements and is approved for its intended use.

2.8 ROOF ACCESSORIES

- A. Furnish accessories manufactured, marketed or approved by MRSM required to complete the roof installation to manufacturer's specification including (as applicable) but not limited to the items listed below.
 - 1. ADHESIVES; application technique and coverage rates will vary according to substrate and environmental conditions.
 - i FTR-190e Bonding Adhesive; a VOC compliant solvent borne, contact (two sided) bonding adhesive, designed for bonding non-fleece back FiberTite membrane / flashing to properly prepared and pre-authorized vertical substrates.
 - ii FTR-490 Adhesive; a polymeric water borne, VOC compliant bonding adhesive, one side application (substrate only), designed for bonding FiberTite-FB (fleece back) membranes to properly prepared and pre-authorized horizontal substrates
 - 2. FTR-601 Insulation Adhesive - Dual component, single bead (ribbon applied) urethane insulation adhesive.
 - 3. FTR-101 Sealant; a one-component gun-grade polyurethane sealant to seal flashing termination
 - 4. FTR-SL1 Sealant; a one-component *pourable*, self leveling, polyurethane sealant to fill "pitch pans"
 - 5. Fiber Clad Metal; to fabricate metal flashing, 4' x 10' sheets of 24 gauge hot dipped G-90 steel, or 0.040 thick 3003H14 aluminum, laminated with a 0.020 mil

polymeric coating.

6. FTR-Pre-Molded Flashing(s); injection molded vent stack and inside/outside corner flashing using FiberTite KEE compound.
7. FTR Non-Reinforced Membrane; field fabrication membrane, 0.060 mil non-reinforced KEE membrane
8. FTR-Tuff Track Walk Way & Protection Pads; high grade walk way/protection material with "slip resistant" design
9. FTR-Fasteners
 - i FiberTite MAGNUM Series; to secure FiberTite to steel, wood and structural concrete decks. A #15-13, buttress threaded, #3 Phillips head fastener constructed of case hardened carbon steel with a reduced diameter drill point and corrosion resistant coating.
 - ii FiberTite HD; to secure insulation to steel, wood and structural concrete decks. A #14-13, heavy duty threaded steel #3 Phillips truss, self tapping corrosion resistant fastener.
10. FTR-MAGNUM Series Barbed Stress Plates; used to anchor membrane.
11. FTR-Sand Dollar Insulation Stress Plates; used to secure insulation and/or cover-board to steel, wood and structural concrete decking. Manufactured from high density polyethylene, 3 inch in diameter, designed with a self locking mechanism to secure the head of the FTR fasteners into the plate.
12. FTR-Termination Bar; membrane flashing(s) restraint/termination seals, nominal 1/8 inch x 1 inch x 10' 6060-T5 extruded aluminum bar with pre-punched slots, 8 inch on center.
13. FiberTite Metal Fascia System; two piece "snap-on" pre-formed, architectural metal edge system
14. PHP –PIPE Supports: pipe supports that are injection molded high density, high Impact polypropylene bases with hot dipped galvanized stainless steel rods and bolts. Designed to support conduits and plumbing pipes on roof tops.

2.9 **WOOD NAILERS**

A. Not Applicable.

3.0 **EXECUTION**

3.1 **GENERAL**

A. The latest manufacturer specifications and installation techniques are to be followed along with the following additional requirements. These specific minimum requirements must be accounted for in the contractors bid / proposal and shall not be altered.

- B. The roofing contractor is responsible for providing a suitable substrate surface for the proper installation of the Membrane Roofing System, roof insulation and specified components.
- C. The roofing contractor shall examine all areas and conditions where by work in this section is to be installed.
- D. Notify the Building Owner / Owner Representative of any and all conditions detrimental to the proper and timely execution of the work. Do not proceed until such conditions have been corrected to the satisfaction of the owner / owner's representative.
- E. Commencement of roofing operations indicates the roofing contractor's acceptance of the roofing substrate for roof application.

3.2 **SUBSTRATE PREPARATION**

- A. Surfaces scheduled to receive new membrane roofing shall be free of any standing water, dew, ice, loose debris or any other contaminate that could impair the quality of the installation.
- B. Substrate shall be smooth, clean and free of sharp edges and or projections and obvious depressions that would interfere with the installation of a high quality high performance
- C. Examine all the areas and conditions where by work in this section is to be installed. Correct any and all conditions detrimental to the proper and timely execution of the work. Do not proceed until such conditions have been corrected to the satisfaction of the owner / owner's representative.
- D. Remove all loose aggregate and debris by power broom and/or vacuum and legally dispose off site.
- E. Remove and replace all wet or deteriorated insulation and wood blocking.
- F. Clean all exposed metal surfaces such as pipes, pipe sleeves, drains, duct work, etc., by removing loose paint, rust and any asphalt or coal tar pitch of any kind. Remove and discard lead sleeves at soil stacks.
- G. If the existing roof is coal tar pitch, has been repaired with coal tar pitch or has been re-saturated with coal tar pitch, a minimum 10 mil polyethylene "pitch vapor" retarder shall be installed before recovering.
- H. All rotted and/or deteriorated decking shall be removed and replaced with like kind.
- I. Areas of structurally acceptable steel decking exhibiting slight surface rust shall be properly cleaned, primed and painted prior to installing the approved insulation.
- J. All decking shall be inspected for proper attachment and excessive deflection that would compromise the uplift performance of the new roofing system.
- K. Attachment and deflection deficiencies shall be repaired and brought into compliance with current, local building code requirements.

3.3 **INSTALLATION - GENERAL**

- A. Perform all related work specified in other sections of the contract documents necessary for the proper installation of the high performance high performance.
- B. Ensure mechanical fasteners do not penetrate items located within or secured to the bottom of the deck: i.e. electrical conduit, post tension cables or other miscellaneous items.
- C. Outside ambient air temperatures must be 40°F and rising during the use of any and all adhesives.

3.4 **INSTALLATION OF WOOD NAILERS**

- A. Not Applicable.

3.5 **INSTALLATION OF INSULATION AND/OR COVERBOARD**

- A. Roof insulation and/or coverboard shall be installed where by the long dimension of the board(s) run in parallel alignment and the short dimensions are staggered.
- B. Insulation and/or coverboard shall be installed with minimum joint dimensions and shall be tightly butted where possible. Maximum joint widths shall be 3/8 inch. Damaged corners shall be cut out and replaced with an insulation piece a minimum of 12 inch x 12 inch pieces which are cut from larger panels and are smaller than one square foot are not acceptable.
- C. Install no more than can be covered during the same working day.
- D. When a cover board and/or multiple layers of installation are installed each layer shall be offset from the previous layer a minimum of 12 inch on center.
- E. At the end of each working day, provide a watertight cover on all unused insulation as to avoid moisture penetration

3.6 **INSULATION SECUREMENT**

- A. Not Applicable.

3.7 **COVER BOARD SECUREMENT**

- A. Coverboard shall be applied to and installed over properly prepared and pre-approved substrates, free of any debris, dirt, grease, oil or moisture.
- B. All fasteners and stress plates for the mechanical attachment of coverboard materials shall be as provided by MRSM.
- C. All fasteners and stress plates shall be FM approved for mechanical attachment of coverboard and comply with FM Standard 4470 for corrosion resistance.
- D. Follow MRSM guidelines for mechanical attachment of coverboard in order to comply with design requirement specified in Section 1.3 A. 2. i.
- E. Perimeter areas require a 50% increase in the fastener density.
- F. Corner areas require a 100% increase in the fastener density.
- G. Coverboard shall be fastened in accordance with the MRSM recommendations.

- H. Adhered roof systems incorporating mechanically attached coverboards may also require mechanically fastened perimeter and corner membranes systems to comply with guidelines set forth articulated in FM LPD 1-29.
- I. Fasteners shall be installed in accordance with manufacturer's recommendations, complying with minimum penetration requirements for specific deck types.
- J. Fasteners shall be installed using depth sensing tool attachments to ensure proper installation.

3.8 MEMBRANE INSTALLATION

A. Quality Control

- 1. It will be the responsibility of the roofing contractor to initiate and maintain a QC program to govern all aspects of the installation of the Membrane Roofing System.
- 2. The project foreman and or supervisor will be responsible for the daily execution of the QC program which will include but is not limited to the supervision, inspection and probing of all heat welding incorporated within the Membrane Roofing System.
- 3. If inconsistencies in the quality of the application of the composite, membrane and/or welds are found, all work shall cease until corrective actions are taken to ensure the continuity the installation.

B. General

- 1. Work shall be coordinated to ensure that sequencing of the installation promotes a 100% watertight installation at the end of each day.
- 2. Restrictions regarding outside ambient air temperature are relative only to the exposure limits of the workers and/or adhesives.
- 3. When using adhesives outside ambient air temperature shall be above 40°. Curing or drying time of the adhesive will be affected by ambient temperatures and must be taken into consideration when determining flashing lengths.
- 4. Humidity can effect the drying time of solvent borne adhesives and/or cause condensation to form on the newly applied adhesive.
- 5. Moisture may not be present on the adhesive prior to mating or application of Membrane Roofing System.
- 6. New Membrane Roofing Systems shall only be installed over properly prepared and sound substrates, free from excessive surface roughness, dirt, debris and moisture.

3.9 MEMBRANE SECUREMENT

- A. Un-roll approximately 30 feet of the KEE-FB membrane and position the roll over the properly installed/prepared substrate. Pull the tail back over the roll to expose a workable area (approx. 30') of substrate. (Do not utilize the "butterfly method").

- B. Apply a 100% continuous coat of adhesive to the substrate
- C. The amount of substrate that can be coated with a workable amount of adhesive will be determined by application method, ambient temperature, humidity, and available manpower.
- D. To ensure proper application and curing of the adhesive, the outside air temperature shall be above 40°F and rising.
- E. FTR-490 adhesive is to be applied by spraying and "back" rolling or just rolling. (Do not "dump" adhesive or pour from the cans)
- F. Roller applied adhesive shall utilize a solvent resistant 3/8 inch nap roller.
- G. Adhesive must be rolled out to ensure a smooth, even 100% coverage of the substrate with no voids, skips, globs, puddles, or similar irregularities.
- H. Allow the adhesive to set up only to the point that the adhesive is slightly cured but still wet. Do not allow adhesive to skin "dry out".
- I. Water borne adhesives (FTR-490) can be directly affected by moisture. Water based adhesives shall not to be installed over/on substrates that are moist or wet or on systems or substrates that have residual moisture.
- J. Broom the adhered portion of the membrane to ensure full contact and complete the bonding process by firmly pressing the bonded membrane into place with a weighted, foam-covered, lawn roller.
- K. Repeat the process for the remaining un-bonded portion of the membrane, lapping subsequent, adjacent rolls of membrane a minimum of 3 inches, ensuring proper shingling of the membrane to shed water along the laps.
- L. No adhesive shall be applied to the lap "seam" areas of the membrane. Areas contaminated with adhesive are difficult to clean, will impair proper welding of the seams and require a membrane patch.
- M. Do not use bad or marginal adhesives. Contact FTCS if the quality of the adhesive is suspect.

3.10 **HOT AIR WELDING**

A. General

1. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
2. All field seams must be clean and dry prior to initiating any field welding.
3. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld.

B. Hand Welding

1. The lap or seam area of the membrane should be intermittently tack welded to hold the membrane in place.
2. Properly hand welded seams shall utilize a 1-1/2 inch wide nozzle, to create a

homogeneous weld, a nominal 1-1/2 inches in width.

C. Automatic Machine Welding

1. Follow all manufacturers' instructions for the safe operation of the automatic welder.
2. Follow local code requirements for electric supply, grounding and surge protection.
3. Properly Automatic Machine welded seams shall utilize a 1-1/2 inch wide nozzle, to create a homogeneous weld, a nominal 1-1/2 inches in width.

3.11 INSPECTION

- A. The job foreman and/or supervisor shall initiate daily inspections of all completed work which shall include, but is not limited to the probing of all field welding with a dull pointed instrument to assure the quality of the application and ensure that any equipment or operator deficiencies are immediately resolved.
- B. Ensure that all aspects of the installation (sheet layout, attachment, welding, flashing details, etc.) are in strict accordance with the most current MRSMS Specifications and Details.
- C. Excessive patching of field seams because of inexperienced or poor workmanship will not be accepted at time of FINAL INSPECTION FOR WARRANTY ACCEPTANCE.

3.12 FLASHING

- A. Clean all vents, pipes, conduits, tubes, walls, and stacks to bare metal. All protrusions must be properly secured to the roof deck with approved fasteners.
- B. Flash all curbs, parapets and interior walls in strict accordance with approved MRSMS details.
- C. The base flange of all membrane flashing shall extend out on to the plane of the deck, beyond the wood nailers to a maximum width of 8 inches.
- D. Vertical flashing shall be terminated no less than 8 inch above the plane of the deck with approved termination bar and counter-flashing or metal cap flashing.
- E. Complete all inside and outside corner flashing details with MRSMS pre-formed corners or an approved field fabrication detail.
- F. Probe all seams with a dull, pointed probe to ensure the weld has created a homogeneous bond.

3.13 METAL FLASHING

- A. All perimeter edge details are to be fabricated from Polymeric-Clad Metal or utilize a prefabricated Fascia System.
- B. Fasten all metal flashing to wood nailers or approved substrate with approved fasteners 8 inches on center.
- C. Install metal flashing in accordance with MRSMS Published Specifications and

Construction Details.

3.14 ROOF DRAINS

- A. Flash all roof drains in accordance with MRSM roof drain details.
- B. Minimum 60-mil non-reinforced membrane shall be used for flashing the drain assembly.
- C. The drain target sheet should be sized and installed to provide for a minimum of 12 inch of exposed 60-mil on all sides of the drain

3.15 PITCH PANS

- A. EVERY REASONABLE effort shall be made to eliminate the need for pitch pans including the removal of all existing pans.
- B. In the event of no alternative, fabricate pitch pans from Polymeric-Clad metal, installed in accordance with MRSM details.
- C. Pitch Pans and the sealant will require periodic maintenance by the building owner's maintenance personnel.

3.16 PIPE SUPPORTS

- A. All plumbing and electrical lines shall be supported off the finished roof surface with a pre-manufactured pipe support of high density high impact polypropylene bases and hot dipped galvanized metal components.

3.17 EXPANSION JOINTS

- A. Flash all expansion joints in accordance with authorized/approved details. Fasten all expansion joint material according to MRSM specifications. Ensure the expansion material has sufficient material to expand to the widest point in expansion without causing undue stress on the expansion joint material.
- B. If the expansion joint is a "pre-formed" system, the manufacturer, description and a drawing illustrating the method of installation must be included in the contractor's submittals.

3.18 SEALANTS

- A. Apply authorized sealant(s) to all surface mounted reglets and per project requirements. Sealant(s) are to shed water. Follow all manufacturer's instructions and installation guides.
- B. Use primer when recommended by the manufacturer.
- C. Sealants will require periodic maintenance by the building owner's maintenance personnel.

3.19 TEMPORARY SEALS

- A. At the end of each working day or at the sign of rain, install temporary, 100% watertight seal(s) where the completed new roofing adjoins the uncovered deck.
- B. If water is allowed to enter beneath the newly completed roofing, the affected area(s)

shall be removed and replaced at no additional expense to the building owner.

- C. Prior to the commencement of work, cut out and remove all contaminated membrane, insulation, roof cement or sealant and properly dispose off site.

3.20 **WALKWAYS**

- A. Walkways and protection pads shall be installed at staging areas for roof top equipment maintenance or areas subject to regular foot traffic as designated by contract and/or drawings.

3.21 **LIGHTNING PROTECTION**

- A. The installation of lightning protection must be coordinated with the authorized roofing contractor, certified lightning contractor and the building owner.
- B. The lightning protection must be installed in such a manner that base plates, air terminals and cables do not penetrate the roofing membrane without the use of pre-approved flashing details.

3.22 **COMPLETION**

- A. Remove any and all debris, excess materials and scrap of any kind from the roof and surrounding premises prior to demobilization.
- B. Inspect all field welds, detailing and terminations to ensure a 100% the watertight installation.

3.23 **WARRANTY INSPECTION**

- A. Upon completion of the project, the authorized roofing contractor shall complete and submit the MRSM Project Completion Notice.
- B. Upon receipt of the notice of completion, a Technical Representative of the MRSM shall schedule an inspection with a representative of the authorized roofing contractor to thoroughly review the installation and verify compliance with MRSM specifications.
- C. Any corrections or modifications necessary for compliance with the specifications and acceptance for warranty (punch list) will be noted on the Final Inspection for Warranty Form.
- D. Upon completion of all punch list items and final acceptance of the installation, a warranty as authorized by the MRSM will be issued.

Software requirement is a functional or non-functional need to be implemented in the system. Functional means providing particular service to the user. For example, in context to banking application the functional requirement will be when customer selects "View Balance" they must be able to look at their latest account balance. Software requirement can also be a non-functional, it can be a performance requirement. Requirement 1: Requirement 2: Install and maintain a firewall configuration to protect cardholder data Do not use vendor-supplied defaults for system passwords and other security parameters. Protect Cardholder Data.Â Limit storage amount and retention time to that which is required for business, legal, and/or regulatory purposes, as documented in the data retention policy. 3.2 Do not store sensitive authentication data subsequent to authorization (even if encrypted). 2. Breakdown of 4 Main L1 Visa Requirements. 3. Qualifying Relationship Between the Foreign Company and the US Company. 4. Continuous Employment with the Foreign Company for 1 Year. 5. Employment with the Foreign Company Must be in a Managerial, Executive, or Specialized Knowledge Capacity. 6. The Employeeâ€™s Work for the US Company Must be in a Managerial, Executive, or Specialized Knowledge Capacity. 7. Special Requirements for New Offices. 8. Conclusion. 1. Introduction to the L1 Visa.