

GENERAL REQUIREMENTS

SECTION 1.00

HANDLING AND STORAGE

All BITEC modified bitumen products in roll form must be stored on end to prevent damage to roll ends and prevent roll flattening. Rolls stored on their sides will flatten and stick together, making them very difficult to apply.

All BITEC membranes have protective surfacings such as mineral granules, films, sand or talc which act as a release. Mineral surfaced products must be stored on end with the selvage edge up away from supporting surfaces. Rolls stored with the selvage edge down will be difficult to apply due to crushing of the selvage edge.

BITEC modified bitumen membranes must be stored under cover with adequate ventilation until immediately before use, away from weather and the elements. Should membrane be stored on the job site, covering of the pallets is essential. Covering must be done with a tarpaulin or similar covering. **(Black or clear coverings are not acceptable).**

It may become necessary to split the protective shrink-wrap bag covering the rolls to provide ventilation in order to reduce the possibility of rolls sticking. It is advisable to store all materials in a shaded area at the job site, even if provisions for covering and ventilation have been performed.

Should any roofing material become wet or damaged, these materials must not be used; they must be replaced.

During cold weather, we suggest that membrane be stored inside a warm location until immediately before use. This will help in the ease of application, and

reduce the potential of membrane coatings cracking during their handling and application.

BITEC recommends that rolls be applied only when ambient temperatures are above 40°F for all APP modified bitumen products, and 30°F for all SBS modified bitumen products.

Nevertheless, application of membranes may be done below the recommended minimums, but certain minimum precautions must be taken.

When application of membrane occurs at lower ambient temperatures, the following precautions must be followed:

1) Never throw rolls of membrane on the deck or storage surface. Sudden impact of the roll can cause cracking of the modified bitumen coating.

2) When torching, unroll the membrane slowly to ensure proper flow of the coating. **(Adjust amount of heat coming from propane torch accordingly.)**

3) When mopping membrane, care must be taken to ensure that the mopping asphalt is of proper temperature for bonding membrane to substrate. **See SECTION 1.04 on Asphalt Temperatures.**

4) Should difficulty in application arise after following these instructions, discontinue application until ambient temperature is above minimums stated above for the respective products. It is the Roofing Contractor's responsibility to make this decision.

BITEC recommends that palletized units of material be stacked **one-high**. Double stacking is not recommended. However, if space is limited, APP products can be double stacked provided that a minimum $\frac{3}{8}$ " plywood sheet separates the units to prevent damage.

Under no circumstance should you double stack SBS modified bitumen products.

All necessary precautions have been taken to insure that BITEC products leave the plant in good condition. BITEC, INC. will not be responsible for damage to products due to circumstances and events beyond our control; including damage in transit, storage at distributors or contractors warehouses or on jobsites.

SECTION 1.01

PHASING

The practice of 'phasing' is **not recommended by BITEC** under any circumstance. It is best to install the roofing system as one unit.

If precipitation occurs before completion of the roofing system being installed, the Roofing Contractor is responsible for sealing the unfinished roofing system in a way to provide protection from water, and not to interfere with the successful completion of its installation.

The deck and roofing system must be completely dry before work commences after precipitation or dew. Installing membrane over wet surfaces will void warranty or disallow its issuance. Roofing over wet surfaces is not a good roofing practice.

SECTION 1.02

ASPHALT

Store all asphalt in such a way as to prevent leakage, moisture or other contamination and/or deterioration of the carton.

BITEC will only allow the use of ASTM D312 Type III or Type IV hot asphalt for mop application.

SECTION 1.03

ASPHALT APPLICATION

BITEC specifies solid interply asphalt mopping application at a rate of 25 lbs. per 100 sq. ft. All moppings shall be continuous and uninterrupted so as not to allow felt to touch felt at any point.

BITEC will allow a variance in weight of asphalt application of +/- 15% (21 lbs. to 29 lbs.), provided application is uniform, as previously noted.

It is required that the asphalt be maintained at its proper temperature for the specific products at the point of application.

For application of insulation, G2 base sheets and fiberglass ply sheets, follow EVT asphalt temperature guidelines.

Consult the respective asphalt manufacturer for this information, which should be provided on each carton or by certificates with each load of bulk asphalt.

Information should include manufacturer's name, batch number, heating temperature, flash point (FP), finished blowing temperature (FBT) and **equiviscous temperature** (EVT).

For modified bitumen membrane application follow the temperature guidelines set forth in the following SECTION 1.04, ASPHALT TEMPERATURES.

Spot mopping attachment of fiberglass base sheet should be performed by placing 9" diameter circles 18" o.c. in all directions at a rate of 15 lbs. per 100 sq. ft.

This is best accomplished with a spot mopping machine, otherwise the application gets very erratic and in many instances may not produce a truly spot mopped environment with small ribbons of asphalt between spots.

This could cause blistering at locations where voids occur and trap moisture.

SECTION 1.04

ASPHALT TEMPERATURES

Asphalt chills rapidly once it leaves its container on the roof and hits any substrate. Therefore it is important to maintain the temperature as long as possible for proper application purposes.

This asphalt serves the two-fold purpose of providing not only the waterproofing layers between reinforcing plies in BUR-MOD systems, but it must also provide a high enough temperature to properly bond the different plies at their interface. For this purpose, EVT temperature is adequate.

Hot asphalt application of ASTM Type IV or Type VI fiberglass ply sheets and ASTM D 4601 (UL Type G2) fiberglass base sheets requires careful attention to EVT temperatures. This information is usually provided on each carton of asphalt or with paperwork on each load. EVT temperatures may vary with each load or batch of asphalt.

Proper bonding of the SBS modified bitumen membranes to one another or to other surfaces requires a higher temperature than used with fiberglass ply sheets and therefore published EVT temperatures are not usually high enough to provide the proper bonding required. Asphalt used with SBS membranes not only provides an additional layer of waterproofing but it must also provide the heat necessary to properly bond the SBS surface to another surface. This type of bonding is an "adhesive" method as compared to "heat welding" or "torching" which is a "cohesive" method.

Proper application of SBS modified bitumen membranes requires the use of asphalt at higher temperatures, typically around 450°F to 470°F at the point of application, with the asphalt application not preceding the roll more than four to six feet, depending on the ambi-

ent air temperature and wind conditions. The upper temperature range of asphalt cools much faster than the lower temperature range.

If the asphalt is not at the proper temperature at the point of application, the membrane may appear to be stuck, but not actually be bonded together properly and could release some time in the future.

Proper asphalt application may take days to completely cure so that it cannot be peeled apart. DO NOT TEST the application by peeling it apart for at least two days.

The following recommendations for using and heating mopping asphalt should be followed:

1) **Type III** - For slopes from dead level up to 1" in 12" (1:12)

Application temperatures:

- Fiberglass base sheet and ply sheets 390°F to 425°F
- SBS modified bitumen membranes 435°F to 470°F

2) **Type IV** - For slopes from dead level - up.

Application temperatures:

- Fiberglass base sheets and ply sheets 400°F to 475°F
- SBS modified bitumen membranes 445°F to 485°F

Machine application of asphalt may require higher temperatures, as much as 25 degrees. Consult asphalt manufacturer for this information.

Asphalt should not be heated above its Flash Point (FP). Heating above the Finished Blowing Temperature (FBT) should be closely monitored and only be done for short periods of time, not to exceed four (4) hours. Otherwise, the asphalt could experience "fallback" and/or become degraded.

Close attention to asphalt temperature is also of utmost importance to provide the proper quantity of asphalt between plies. Job conditions and equipment uses

often make it hard to operate within the proper temperature window. However, this does not relieve the contractor of the responsibility for proper application.

The quantity of asphalt per mopping is critical for several reasons. Too much asphalt can cause slippage, while too little will not provide an adequate waterproofing layer.

Also, too little will not carry enough heat and will chill faster, resulting in lack of proper fusion of interfacing surfaces. In addition to causing slippage, too much asphalt will cause the waterproofing layers to be less flexible which can cause cracking of the asphalt layer which in turn can cause splitting of the entire membrane system.

SECTION 1.05

CUT BACKS, EMULSIONS AND REFLECTIVE COATINGS

The use of "cut back" cement, coatings, plastic cement or adhesives is **prohibited** when installing any BITEC modified bitumen membrane.

Emulsions may be used provided emulsion manufacturer's application instructions are strictly adhered to.

Any reflective coating used as a surfacing over BITEC membranes shall be one that is approved by BITEC. For a list of currently approved coatings, contact BITEC's Technical Services Department for details.

Allow membrane to weather a minimum 45 days before surfacing is applied.

SECTION 1.06

CANTS

Cant strips are required on all roofing installations. Fire retardant cant strips are recommended.

SECTION 2.00

ROOF MEMBRANE INSTALLATION

BITEC modified bitumen roofing systems should be applied in accordance with BITEC specifications and construction details provided herein, or as may be approved in writing as special conditions arise. Installation should be done without **phasing**.

SECTION 2.01

TEMPORARY ROOFS

When conditions exist in the field prohibiting the total completion of the system, the designer, general contractor, building owner, architect and roofing contractor should consider the use of a temporary roof.

The temporary roof should consist of a minimum two (2) plies of **fiberglass base sheet**. Fiberglass ply sheets are unacceptable for use in temporary roofs. Type and number of plies will depend upon length of time involved before the **permanent** system is installed.

BITEC reserves the right to accept or reject the use of a temporary roof as a vapor retarder in the permanent roofing system.

SECTION 2.02

BASE SHEET FASTENING REQUIREMENTS

First ply of the BITEC roofing membrane system must consist of at least one (1) ply UL listed Type G2 fiberglass base sheet.

The base sheet should be installed with minimum 2" side and 4" end laps. Base sheet should be mechanically fastened to nailable substrates 9" o.c. along the 2" side lap, and 18" o.c. in two rows, staggered, 12" in from each edge with approved fasteners.

Non-nailable or insulated substrates also require the use of a UL Listed G2 fiberglass base sheet, either solid or spot mopped with asphalt as required by BITEC roofing system specifications.

The roofing contractor should install base sheet in such a way as to maintain 6" minimum offset of end and side laps of the base and BITEC finishing membranes.

The base sheet must be smooth, completely dry, well adhered and free of debris prior to application of the modified bitumen membrane.

SECTION 2.03

BITEC MODIFIED BITUMEN MEMBRANES

Over the base sheet install one (1) ply of BITEC modified bitumen membrane with the specified side laps and minimum 6" end laps. End laps should be diagonally staggered and offset a minimum 3' from the preceding membrane end lap. Application of the membrane and base sheet should begin at the low end of the roof.

Layers of successive base sheet and membrane should be applied perpendicular to the slope on roofs below 2:12 slope for APP (1:12 for SBS) and parallel to the slope for roofs greater than 2:12 (1:12 for SBS).

For either membrane, parallel application requires backnailing. See section 3.01.

Torch Application:

BITEC modified bitumen membranes having "T" as an ending, (such as APS-4T), and their related flashing rolls are **designed for torch application only**.

Procedure for installing these membranes is as follows:

- 1) Unroll the membrane completely and align properly.
- 2) Re-roll one end of the roll tightly, about half way, maintaining

proper alignment.

3) Torch apply the re-wound portion of the roll. Heat should be applied evenly across the face of the roll, and up the previously installed membrane's top surface (where the side lap is formed) in an "L" configuration. While heating, unroll the roll with uniform downward pressure. An indication that the torchable surface has reached the desired welding temperature is the observance of the film burn-off sheet melting, leaving a glossy surface of modified coating to be bonded to the substrate. If flow of modified coating is observed before contact with the substrate, the welding temperature is too great. Welding temperature is correct when flow from all seams is $\frac{1}{8}$ " to $\frac{1}{2}$ ". Too much flow indicates too much heat; while no flow indicates too little heat.

4) Rewind the balance of the roll and proceed as described above. End laps should be a minimum 6" in coverage and staggered a minimum 3' from the preceding course.

5) During end lap application, the underlying membrane's lower outside corner, at the end of the roll, should be trimmed. Then, follow with the overlapping membrane. This is also known as the "T" joint. Corners should be trimmed at an angle $5\frac{1}{2}$ " long from end of roll to outside edge. Width of trim should be 3" for products requiring 3" side laps, and 4" for those requiring 4" side laps. Succeeding courses should completely cover all trimmed edges. Apply trimmed rolls to provide a full 6" end lap.

6) BITEC does not recommend the use of mechanical torching wagons for application of membrane.

7) All end and side laps should be checked at the end of the work day for proper bonding. Areas not having the proper bond, or required flow from seam, should be repaired by gently lifting the lap with a pre-

heated round nose roofer's trowel, re-heating the area with a torch and applying pressure to the lap forcing the molten bitumen out. **Never attempt to repair laps by heating the top surface of the membrane.**

Hot Mopped Application:

BITEC modified bitumen membranes having "H" as an ending, (such as SPS-3H) are designed for application with hot asphalt. The roofing contractor must not allow mopping asphalt temperatures to fall below the recommended application temperature, for the particular asphalt, at the point of application. The roofing contractor must not overheat the asphalt to compensate for rapid cooling.

1) Over the installed fiberglass base sheet, install BITEC hot applied modified bitumen membranes in a continuous and uninterrupted mopping of specified asphalt. Moppings should be a minimum of 25 lbs. per 100 sq. ft. The mopping asphalt must be applied uniformly across the full width of the roll, including the selva edge of preceding layers.

2) A small amount of asphalt should extend beyond the end and side laps to ensure full bonding.

3) Correcting unbonded laps is the same as for torch applied products, using a preheated trowel.

Cold applied adhesives are prohibited for the purpose of repairing laps or seams. Plastic cement is prohibited for use with any BITEC modified bitumen membrane system.

BITEC DOES NOT RECOMMEND "FLYING-IN" OR "MOP AND FLOP" METHODS OF APPLICATION.

SECTION 2.04

FIRE-RATED MEMBRANES SFM-3.5H-FR, SFM-4H-FR

These membranes are polymer

modified waterproofing membranes, composed of carefully selected asphalts with superior modifying characteristics and blended with high-quality SBS rubber, reinforced with a high-strength fiberglass mat.

They are mineral surfaced and incorporate a smooth, even application of fine sand on the back surface to prevent blocking of rolls and to provide a smooth, acceptable application surface.

Special Formulation gives "FR" membranes a degree of fire resistance to effectively pass the UL Class "A" testing without the use of additional surfacings or protective coatings.

Systems require a minimum of one UL TYPE G2 fiberglass base sheet, such as BITEC Beta Base, for UL Class "A" rating, for both non-combustible and combustible decks.

These membranes can be applied by using hot asphalt or by using any BITEC approved elastomeric cold process adhesive. (When using cold adhesives, follow specific adhesive manufacturer's installation specifications.)

Refer to the most recent UL Roofing Materials & Systems Directory for fire classifications.

Packaging:

Palletized units contain 20 rolls of FR waterproofing membrane. Each unit is shrinkwrapped in a special polyethylene bag for stability and each pallet bears the UL Label. BITEC recommends that units of material be single stacked.

SECTION 2.05

BASE FLASHINGS

BITEC requires base flashings backed up by a fire retardant cant strip at all transitions from a flat roof to walls or curbs. Base flashings should be a minimum of 8" high, which has been an industry

standard for many years.

Metal Base Flashings are not acceptable.

Base flashings for all two-ply, 10 or 12 year systems should consist of at least one additional ply of the same material as the cap sheet membrane used. For wood wall or curb construction, an additional ply of base sheet is required also.

For multi-ply membrane systems, the base flashing must consist of at least an additional ply of both the interply membrane(s) and the cap sheet membranes being used.

Base flashings should be constructed with 6" vertical laps every 36" maximum. This makes the base flashings stronger and easier to install correctly.

If flashings are constructed with membranes installed parallel to the wall or curb surface, lengths of flashings should be cut to no longer than eight (8) feet.

Mop and flop installation of base flashings is not recommended. They should be either torched or mopped in place, or SBS flashings may be installed in SBS modified flashing mastic.

BITEC SPM-4.5T must be torch applied and may be used with any asphalt built up roof or BITEC SBS membrane.

BITEC does not issue a separate "flashing endorsement." On warranted projects, base flashings up to a maximum height of 24" are included in the warranty. Flashings over 24" high are considered wall flashings and are not covered by the membrane warranty for that project, unless specifically covered by a special agreement.

More information about flashing installation is available in the supplementary pocket size publication, "Flashing and Application Guide".

SECTION 2.06

CONSTRUCTION DETAILS

BITEC flashing rolls are specifically designed for use with full rolls of the same type. Flashing rolls come in 1/2 and 1/4 roll widths. Application is the same for flashing rolls as it is for full rolls of the same type.

Prior to flashing roll application, vertical concrete or masonry surfaces require preparation. Prepare these surfaces by applying asphalt primer, conforming to ASTM D41, at a rate of 1/2 gallon per 100 sq. ft.

Primer must completely dry before application of flashing membrane commences.

Wood surfaces should receive one ply fiberglass base sheet nailed 8" o.c. with capped nails.

All flashings should extend a minimum of 8" above the roof deck, and be nailed 8" o.c. with capped nails, along the top edge.

Pipe flashings, flashing pans and other metal flashings must have a minimum 4" continuous flange. All metal flanges must be cleaned to remove residual oils and lightly primed with asphalt primer, conforming to ASTM D41, prior to installation.

Primer must completely dry before application of flashing membrane commences. (See construction details 1 thru 32 on pages 32-53.)

SECTION 2.07

COATINGS AND SURFACINGS

It is considered a good roofing practice to coat all smooth surface roofing membranes.

With mineral surfaced membranes, protective coatings are not necessary unless it is required by code or through testing with inde-

pendent laboratories such as Underwriters Laboratories, Inc.

Refer to UL and FM publications to ensure system meets requirements as specified by code requirements. Roof coatings should be applied in two (2) even applications, except when specified otherwise by coating manufacturer.

BITEC SPS-3H will require a BITEC Approved Coating, or flood coat and gravel for UV protection. Roof coating should be maintained through the life of the system.

When design requirements call for additional surfacing to satisfy particular aesthetic or fire resistance properties, BITEC recommends the use of the following guidelines:

Gravel or Slag:

Surfacing should be opaque, clean, with moisture content of 2% or less and conform to ASTM 1863-93. Slag or gravel should be 1/4" to 5/8" in diameter applied in a flood coat of ASTM D312 Type III asphalt.

Asphalt flood coat should be applied at a rate of 60 lbs. per 100 sq. ft. Uniform application of flood coat is mandatory. Slag or gravel should be applied at a rate of 400 lbs. per 100 sq. ft., or as may be required for adequate coverage.

Consideration must be given to ensure that roof load does not exceed building's structural capacity.

Asphalt Emulsions:

Following surface preparation, apply one coat of asphalt emulsion to the entire membrane and vertical surfaces, at a rate of 3 gallons per square, unless otherwise indicated by the specific emulsion manufacturer's installation specifications.

Apply emulsion using a brush or spray applicator, brushing or spraying towards laps. **A minimum of 45 days must elapse before the emulsion is applied.**

Aluminum Coatings:

For best results, the BITEC approved reflective coating should be applied in two uniform applications. However, BITEC recommends that the specific coating manufacturer's installation procedures be strictly followed.

When considering UL Fire-Rated systems and products, consult the *UL Roofing Materials and Systems Directory* for individual system requirements.

A minimum of 45 days must elapse before the reflective coating is applied.

SECTION 3.00**NAILABLE SUBSTRATE DATA**

It shall be the designer's responsibility, not BITEC, INC.'s responsibility, to consider wind conditions in the roofing projects' geographical area.

Current Factory Mutual Loss Prevention Data Sheets 1-7; 1-28; 1-28R; 1-29; 1-29R and 1-49, etc., give information and requirements on proper fasteners and methods of installation.

We recommend that the designer conduct jobsite fastener "pull-out" tests in order to determine the most suitable fastener for a specific application.

Responsibility rests with the designer, and not BITEC, for this determination, and for determining which fastener to use. Where nails are used as fasteners, they must be capped nails with either spiral or annular ring shanks. **Smooth shank nails are not acceptable.**

BITEC will not assume responsibility for failure or damage of the roof system resulting from either fastener or deck material failure, or assume any responsibility for their performance.

SECTION 3.01**STEEP SLOPE FASTENING REQUIREMENTS**

BITEC membranes applied on slopes exceeding 2:12 for APP membranes and 1:12 for SBS membranes should be installed parallel to the slope and fastened as followed:

Nailable Substrates:

Base ply should be mechanically fastened as specified in selected BITEC roof system specifications. Install BITEC modified bitumen membrane as specified, blind nailing end laps 2" in from top edge and 6" o.c. with capped nails or other suitable fasteners.

Insulated Substrates:

Fiberglass base sheet should be applied to the insulation in accordance with insulation manufacturer's specifications provided it does not conflict with application statements set forth herein.

Base ply should be fastened to wood nailers or through the insulation to the deck, 8" o.c.. Installation of the modified bitumen membrane should proceed as specified, blind fastening end laps 2" in from top edge and 6" o.c. through suitable fasteners. Maintain 6" end lap seal beyond fastener plates.

SECTION 4.00**GENERAL DESIGN CRITERIA FOR ROOF DECKS**

All substrates which are scheduled to receive BITEC modified bitumen membranes and roofing systems shall be **smooth, clean, completely dry and free of sharp projections and depressions.**

Roof decks shall be constructed in accordance with the deck manufacturer's specifications, or applicable industry practices, local codes,

and shall be designed to support live and dead loads, both during and after construction, without excessive deflection or movement between deck components.

Decks should also be designed and constructed to resist wind uplift forces anticipated in the area, and provide satisfactory base to which the roofing can be attached.

It is not the responsibility of BITEC to insure that the deck provides a proper substrate for the roof system.

All decks must be prepared for retrofit as specified herein, before application of BITEC products.

The responsibility for roof deck system design and roofing system selection, including vapor retarder, roof insulation and expansion joints, lies with the architect, engineer, owner and not with the roofing contractor or roofing materials manufacturer.

BITEC personnel are available for consultation regarding substrate surface over which the membrane is to be applied.

Care should be taken to set drains and outlets in the roof's expected or designed low areas with consideration to structural supports positioning and anticipated building settling.

Drain flanges shall be recessed flush to deck surfaces to provide positive drainage and prevent water damming at rims.

A minimum slope after construction of 1/4" in 12" (1/4:12) is recommended. **Roof deck shall provide positive drainage, with outlets installed to completely remove water within 72 hours after the rain stops.**

Installation of conduits or piping above the deck and under the roofing membrane is prohibited. Conduit or piping should be placed under the roof deck or above the completed roofing sys-

tem, properly supported and flashed to prevent damage to the roof system.

All openings and projections through the deck should be completed prior to installation of the roofing system. Acceptance of a roof deck to receive the BITEC modified bitumen membrane system refers **only to deck surface**.

When reroofing, all existing base flashing and metal flashings must be replaced for acceptance and potential issuance of a BITEC Warranty.

SECTION 4.01

EXPANSION JOINTS

Expansion joints should be installed along the entire length of the expansion joint, continuing fully to the roof deck edge or perimeter. Low profile, preformed elastic expansion joints with sheet metal flanges should not be installed on a flat roof deck.

These expansion joints should be installed by fully fastening to wood nailers placed on each side of the expansion joint, with accompanying tapered edge strips to provide smooth transition onto the field of the roof.

Conventional wood curb expansion joints should extend a minimum 8" above the roof surface.

Criteria which dictates the use of expansion joints are as follows:

1. Where the structural design and/or deck changes direction.
2. Where deck types change: steel deck to concrete deck, or light gauge steel on short spans to heavy gauge steel on long spans.
3. Where the design configuration creates separate wings, such as: "T", "L", or "U" configurations.
4. At building additions, canopies, and exposed overhangs.
5. At adjacent building sections that are kept at drastically different

temperatures.

6. In reroofing; at the obvious areas of stress concentrations which have caused splits in existing situations.

7. Drainage design factors.

Area dividers should not be considered as replacements for expansion joints. **The designer** should always consider the effects of expansion joints and area dividers on roof drainage as required.

The architect or engineer is responsible for determining location, number and type of required roof deck expansion joints and/or roof area dividers.

SECTION 4.02

VAPOR RETARDERS

A vapor retarder is not considered part of the roofing membrane. The decision to use a vapor retarder rests with the designer, architect or engineer, after careful consideration of design and environmental criteria, including relative interior humidity, interior temperature, type of construction, building occupancy and exterior cold weather temperature variables.

As a guide, vapor retarders are generally used where average January temperatures are 40°F or below and winter season interior humidity is 45% or greater. The temperature at the vapor retarder must be warmer than the dew point temperature to prevent condensation from occurring.

Constructions having insulated ceilings below the deck require special attention to design and dew point calculations.

If a vapor retarder is incorporated into a roof system, **one-way pressure release vents** should be installed at the rate of one (1) vent per 1000 sq. ft. of roof area to improve venting of water vapor which may become entrapped after the construction of the roof system.

Remove insulation from the area directly under the vent opening and refill with loose insulation prior to the vent placement and subsequent flashing.

The following **guidelines** are important to the satisfactory performance of the vapor retarder, and total roofing system:

1) Application techniques and all components of the vapor retarder used must be compatible with selected roofing system.

2) Vapor retarder should provide a permeability rating close to 0 perms.

3) Adequate adhesion properties, to meet design requirements for wind uplift resistance, must be provided by the vapor retarder; especially in the absence of mechanically fastened insulations.

4) Vapor retarders should be fully sealed at all end and side laps, securely flashed to roof top penetrations, and folded on top of roof insulation a minimum of 6" at the perimeters.

5) Designers of the roofing system should consult with Factory Mutual and Underwriters Laboratories for fire resistance and wind uplift ratings. BITEC, INC., expressly states that the company will not accept any responsibility for damage to, or failure of the roofing system caused by the use, or the absence of a vapor retarder.

Note: Fiberglass roof insulations should not be used as a venting strata over known wet or damp substrates; whether new construction, or retrofit.

Note: Items in systems which may require vapor retarders are:

- a) Lightweight insulating concrete
- b) Gypsum fills
- c) Wood decks
- d) Pressurized plenums
- e) Concrete

SECTION 4.03**PRESSURIZED PLENUMS**

Consideration for a vapor retarder is necessary here. This will prevent induced vapor transmission through a vented substrate into the roof system.

SECTION 4.04**CONSTRUCTION DETAILS**

Selection and design of roof top flashings is critical to the total roof system's performance as well as the flashings application. Vertical surfaces, metal and wood curbs, mechanical equipment platforms and supports, roof top accessories and other penetrations must be structurally sound, firmly attached and prepared to receive the BITEC modified bitumen membrane flashing system.

A pressure treated wood nailer, having a minimum width of 4½", should be installed at all eaves, gable ends, and deck openings in the roof for securement of the roofing membrane, roof fixtures and metal flashings. Wood nailers should be the same thickness when roof insulation and/or tapered edge strip is specified.

BITEC does not recommend the use of pre-formed metal curbs having horizontal metal flange of less than 4" in width when built into the roof membrane.

All metal roof flanges must be primed, both top and bottom, with an asphalt primer that conforms to ASTM D41 criteria. Primer must be allowed to dry thoroughly before installation. Roof flange must be securely fastened.

Mechanical equipment should be installed before application of the roofing membrane is performed to reduce the potential of damaging the membrane.

Roof edge metal flashings

should be installed in accordance with FM Loss Prevention Data Bulletin 1-49 as a minimum, for protection from wind damage or loss.

Base flashings should only be adhered to walls, curbs or nailers which are supported by the same structure as the roof membrane. Otherwise, differential movement between structures can cause splitting or deterioration of the membrane flashing.

Some base and penetration flashings shown in this manual are for 2-ply systems only. Other multiply systems require additional plies commensurate with system being installed. Refer to section 2.05.

SECTION 4.05**OTHER DESIGN CRITERIA**

BITEC recommends that the roof installation be delayed until such time that all other trades have completed work which requires additional traffic across the deck or membrane.

Roofing contractors should monitor newly installed roofs for damage when it is known or suspected that other trades have performed work over completed roofs.

Specifiers, designers and contractors should consider the use of a temporary roof membrane when active traffic during roofing system installation is inevitable.

The installation of any type of mechanical equipment on the roof should be avoided whenever possible. However, when equipment is mounted on the roof, it should be mounted in accordance to NRCA designs, but not limited to those included in this manual.

Walkways

Whenever roof mounted equipment will require frequent traffic for inspection or servicing, an addi-

tional protective layer of BITEC mineral surface membrane is required. It should be installed so as to denote, a walkway and/or work area.

When walkway materials other than BITEC membrane are specified for use, an additional protective layer of BITEC membrane is also required. Other materials should not be loose laid or adhered to the BITEC main roof membrane.

Walkway materials should be installed in short sections not over 6' long with minimum 6" spaces to permit proper drainage.

BITEC recommends the use of a contrasting color for walkway materials to promote the use of the designated walkway to keep roof traffic to a minimum in unprotected areas.

When elevated walkways are installed on wood blocking or other materials, an additional protective ply of BITEC membrane must be used at each support location for the elevated walkway.

SECTION 5.00**ROOF DECKS**

An acceptable roof deck surface is considered as being one which is clean and free of debris, smooth, completely dry and structurally sound. All penetrations, curbs, walls and other flashing details should be in place, ready to receive the roofing system before installation commences. Roof accessories should be available before the roofing contractor begins work.

SECTION 5.01**STEEL DECKS**

Steel decks should be 22 gauge minimum, and comply with gauge and span requirements as set forth by deck manufacturer, and installed in accordance with all other industry standards and current *FM Loss*

Prevention Data Bulletin 1-28. Refer to FM 1-29 for minimum thickness requirements for various types of roof insulation. Refer to BITEC Insulation Section for proper attachment of insulation and roof membrane.

Steel deck side laps should be mechanically fastened with self tapping screws at mid-span between bar joists or supports. Spans exceeding 6' should receive two (2) fasteners at the side lap. End laps should be staggered to prevent buildup of side laps at corners, therefore preventing high spots over which insulations are to be laid.

All fasteners should be checked before installation of roofing membrane to ensure functionality. BITEC recommends use of non-corrosive fasteners approved by Factory Mutual, and/or the insulation manufacturer, when insulation is installed over steel decks. (Refer to "Fasteners" page 31.)

All steel decks should be covered with a mechanically fastened, acceptable roof insulation board.

SECTION 5.02

POURED STRUCTURAL CONCRETE

All surfaces shall be smooth and visibly dry. Wood nailers shall be installed into the deck to provide for securement of the roofing membrane flashings at perimeters, penetrations and other deck openings.

The deck is then prepared by priming with an asphalt primer conforming to ASTM D41 criteria, which is allowed to **completely** dry before application of the roofing system insulation or fiberglass base sheet.

BITEC does not allow single ply modified bitumen membrane application directly over concrete decks. Fiberglass base sheet should be installed to the concrete deck by

mechanical attachment, spot mopping or strip mopping. **Fully adhering base sheet to the concrete deck is prohibited.**

One way vents are required over all concrete type decks.

SECTION 5.03

PRE-STRESSED OR "T" SECTIONS

Set or camber should not allow ponding of water. Offsets between units should not exceed $\frac{1}{8}$ ". **Surfaces which are uneven are deemed unacceptable.** Suitable fill should be given to all uneven fits, and sections leveled before roofing system is applied.

A leveling course of roof insulation should be installed prior to application of membrane system. To prevent bitumen drippage, deck joints must be taped prior to application of roofing system. Refer to Insulation Section for proper attachment of insulation and roofing membrane.

SECTION 5.04

LIGHTWEIGHT INSULATING CONCRETE

Caution - This deck contains a large percentage of moisture, therefore adequate precautions must be taken to avoid any entrapment of moisture under the roof system.

The following guidelines are recommended by BITEC concerning the lightweight insulating concrete deck acceptance before installing membrane:

- 1) Decks having a density of less than 22 lbs. PCF, 1:6 mixture (min. compressive strength of 125 psi) are unacceptable.
- 2) A minimum of 2" top surfacing fill is recommended.
- 3) Deck **must** provide a minimum 40 lbs. withdrawal resistance

for the selected approved mechanical fastener at the time the roofing system is installed. It is the responsibility of the roofing contractor, architect or engineer to request and review testing for fastener withdrawal strength. BITEC merely recommends withdrawal tests be done; it's good roofing practice.

4) During curing or application, the deck must not be subjected to temperatures below 40°F. **Frozen decks must be replaced.**

5) Drying time shall be as per deck manufacturer's specifications.

6) Lower moisture, quick drying lightweight fills may require less drying time.

7) Surface must be smooth, visibly dry, free of debris, sharp projections and depressions.

DECK MANUFACTURER AND AUTHORIZED APPLICATOR MUST PROVIDE ALL PARTIES CONCERNED WITH A LETTER OF CERTIFICATION STATING THE DECK IS READY TO RECEIVE ROOFING SYSTEM AND THAT DECK COMPLIES WITH THE ABOVE MINIMUM REQUIREMENTS.

After installation of the roofing system, the General Contractor should provide ventilation to prevent interior moisture from infiltrating the deck during construction, until occupancy by owner.

Additional Insulation

When additional insulation is to be installed over lightweight decks, a UL Type G2 or G3 fiberglass base sheet must be mechanically fastened to the deck. **BITEC does not recommend direct attachment of roof insulation boards to this type of deck.** Additional insulation may be hot mopped to the fastened fiberglass base sheet.

Installation of the Roofing System

Fiberglass base sheet should be

installed with mechanical fasteners **only**, over this nailable substrate. Fasteners must be of a type and size approved by BITEC, and the deck manufacturer. Refer to FM publications for type and installations requirements in order to obtain proper wind uplift resistance requirements.

Pressure Relief Vents

A 4" minimum diameter pressure relief vent, with 4" minimum flanges and weather resistant hood, shall be installed 20 ft. in from perimeter edges. **Pressure relief vents must be of a one-way design.** Thereafter, pressure relief vents shall be installed 30 ft. o.c. located directly over 4" diameter openings cut through the roof system and down to insulating fill.

Caution: Insulating concrete fills over existing roofs, concrete decks or decks without venting are not acceptable. Lightweight deck fills installed incorporating the use of Insulperm or other EPS insulations full of holes and using the new low moisture content deck mixes over unvented steel decks or concrete decks will qualify as a deck suitable for installing a BITEC membrane to be warranted. BITEC does not recommend installing these decks over existing roof membranes.

BITEC will not accept any responsibility for damage or failure of the roofing system caused in any way by the lightweight insulating concrete deck or fill, or failure to follow instructions set forth within this publication.

SECTION 5.05

WOOD PLANK DECKS

On wood decks, to prevent bitumen drippage, install dry sheathing paper. A nominal thickness of 1" is required for the wood planks. Knotholes shall be covered with mechanically fastened sheet metal.

SECTION 5.06

PLYWOOD DECKS

Plywood decks should have a nominal thickness of ½" and be a min. 4-ply plywood, APA marked, exterior grade.

All four sides of each piece should bear on and be securely nailed, or fastened to joist and cross blocking. In the absence of cross blocking, two-ply clips per 24" max. joist spacing, should be used.

Only wolmanized lumber shall be used for blocking. **The use of petroleum treated lumber is strictly prohibited.**

A divorcing layer of rosin paper or sheathing paper is optional. One ply of UL Type G2 fiberglass base sheet is required to be secured by mechanical fasteners.

BITEC will not be responsible in any way for damage to the roofing system should this deck fail.

NOTE: For warranty periods beyond 10 years, a minimal layer of ½" insulation may be required.

SECTION 5.07

POURED GYPSUM DECKS

To accommodate approved fasteners used to attach base ply or insulation to this type of deck, refer to Factory Mutual publications for specific fastener and fastener applicability.

Do not apply any roofing system by adhesion with hot asphalt, cold applied adhesives or by heat welding to this type of deck.

Deck surface must be smooth, clean and visibly dry, free of projections and free of depressions.

Poured Gypsum decks require one-way vents.

SECTION 5.08

STRUCTURAL WOOD FIBER DECKS

Before roofing system application on this type of deck, the deck must be in proper condition.

Where elevation of deck joints vary, the deck erector must level the joints with screed coat material as recommended by deck manufacturer.

The deck erector must furnish written certification that the deck meets job specification and deck manufacturer's requirements.

Each joint or tongue and groove, should be stripped according to the following steps:

Apply a bead of plastic cement over the joint, then cover the joint with a 6" wide strip of fiberglass base sheet, centered over the joint and adhered to the plastic cement.

Apply fiberglass base sheet in lengths not to exceed 18', with 2" side laps, and 4" end laps, end laps not less than 3' apart, diagonally staggered.

Mechanically attach fiberglass base sheet 9" o.c. along the 2" side lap; 18" o.c. in two staggered rows 12" in from both sides.

A layer of roof insulation over this base sheet is required. Then, install the membrane system as specified.

BITEC assumes no responsibility for failure of the roofing system or damage caused in any way by structural wood fiber decks, or failure to follow instructions set forth herein.

SECTION 5.09

OPEN BEAM CEILINGS

Over open-beam ceilings, the insulation shall be covered with ½" thick mechanically attached plywood.

SECTION 5.10

WOOD NAILERS

Pressure treated wood nailers of 4½" minimum width should be installed by others at all eaves, gable ends and openings in the roof for securing of roof plies, gravel stops, edging and roof fixtures. **The use of petroleum treated lumber is strictly prohibited.**

Solid wood blocking of treated lumber is required for all insulation stops, metal edge flashings, and all other metal flanges built into the roof membrane.

SECTION 6.00

REROOFING PREPARATION AND FIELD CONDITIONS

The following requirements shall be used in conjunction with good roofing practices to qualify the assembly for issuance of any BITEC workmanship and material warranty:

1) Test cuts shall always be taken from an existing roof system for determination of deck type and vapor retarder, insulation type, condition and attachment; number of membranes installed, their type and condition; and for presence of moisture within the system.

2) Deck shall be **completely dry** and structurally sound.

3) Parapet walls, perimeter edges, equipment or other load bearing supports, platforms, curbs, etc., shall be structurally sound.

4) Additional weight of selected roof systems shall not exceed safe load design.

5) Existing plywood decking not having continuous solid end blocking, and decking less than nominal ½" thick, is not an acceptable deck. Depending on deck rigidity, an additional layer of roof insulation may be required.

6) Surface to receive new roofing system shall provide for **positive drainage**.

7) Existing roof insulation shall be **dry** and firmly attached.

8) Existing roof system shall be **compatible** with the new roofing system.

9) Existing membrane shall be completely dry, clean and free of debris, with all surface defects repaired.

10) Existing roof system with aggregate surfacing should be torn off. When gravel is removed for recovering, a mechanically attached ½" min. thickness recover board shall be installed.

11) Replace all existing metal flashings which build into the roof membrane.

12) All existing metal counter-flashing or coping should be replaced **to match existing**, as a condition of Warranty compliance.

13) Expose entire metal flange of all drains. Sheet metal drains unsuitable for reuse shall be removed and replaced **to match existing**. Clean and save clamp rings for re-use; broken clamp rings must be replaced. Stripped or broken bolt holes shall be drilled and retapped.

14) Abandoned equipment shall be removed and decking required shall be installed **to match existing decking**.

15) Height and/or clearance of flashings at membrane terminations shall be in accordance with construction details.

16) Base and wall flashings shall be removed when loose, or with insufficient clearance under counterflashing to receive new roof system.

17) All roof penetrations should have metal flashings.

18) Joints in masonry copings should be recaulked and/or re-grouted as needed.

19) Equipment vibration must be corrected.

20) Membrane to receive wood blocking pipe support shall be reinforced with an additional ply of modified bitumen membrane, identical to the membrane used as the cap sheet.

21) Condensate lines shall extend to the drains.

22) **BITEC recommends that when retrofitting any existing coal tar pitch roof, a divorcing or separation layer of either plywood or insulation of ½" minimum thickness be installed over the existing roof prior to application of fiberglass base sheet and finishing membrane.**

WARNING: coal tar pitch is not compatible with any BITEC modified bitumen membrane.

23) The divorcing layer shall be mechanically attached. Refer to FM publications for mechanical attachment to meet FM wind uplift requirements.

Since all field conditions cannot be covered in this specification book, and due to the complexity of preparing reroofing specifications, BITEC offers assistance in specification selection and preparation.

Reroofing projects may qualify for Warranty when all installation and procedural criteria are met.

NOTE: SUBSTRATES WITH TWO (2) OR MORE ROOFS ARE NOT ELIGIBLE FOR CERTAIN WARRANTIES.

SECTION 6.01

ADDITIONAL PRECAUTIONS

Existing roof surface - Over an existing roof surface proper preparation of the surface is essential. Blisters, splits, undulations, etc., must be repaired in accordance with **good roofing practices**.

Note: Direct application of any BITEC waterproofing membrane

to the existing deck or membrane is **not recommended**.

Defects in the existing roof system such as cracks, crazing, deteriorated bitumen, and moisture can cause failure or damage to the membrane system. Conditions arising from the above will result in nullification of the Warranty.

All existing metal flashing must be replaced if existing metal is found to be damaged or deteriorating. Metal flashings must be primed with an asphalt primer, conforming to ASTM D41 criteria, before membrane is applied.

SECTION 6.02

INSULATION

Insulation used in re-roofing any existing system must be installed in accordance with the insulation manufacturer's guidelines for the specific insulation used. BITEC **does not** consider any roof insulation as being a part of the membrane system and will not warranty the same.

Most forms of insulation are compatible with BITEC membrane systems, however, a prefaced insulation is recommended. Insulation must be installed with hot asphalt and/or mechanically fastened according to the insulation manufacturer's guidelines.

BITEC reserves the right to accept or reject any form of roof insulation as a suitable substrate for the attachment of BITEC membranes.

Performance of any manufacturer's insulation is not warranted by BITEC, nor will BITEC accept responsibility for failures or damages to the roof system or membrane caused by the specific insulation used.

Complete removal of spray urethane foam is required before installation of any BITEC roofing membrane system.

BITEC waterproofing membranes installed over low melt point, or high heat sensitive insulation (i.e. polystyrene) require a divorcing layer of ½" minimum perlite insulation. The divorcing layer **must** be mechanically attached through the heat sensitive insulation, followed by the installation of a UL Type G2 fiberglass base sheet, hot applied. See Section 6.05.

Note: If at all possible, it is recommended that a Type G2 fiberglass base sheet be installed with hot asphalt to an insulation/divorcing layer that has been mechanically attached. Metal stress plates become extremely hot during the torching process, and can harm the polyester core of the modified bitumen membrane. **Plastic stress plates are not recommended for use with torch applied products.**

SECTION 6.03

ROOF INSULATION, DOUBLE LAYER APPLICATION

BITEC strongly recommends double layer application of roof insulation, where design of FM specifications require mechanical attachment of the first layer, to reduce membrane stress and thermal loss at insulation joints and prevent thermal bridging between mechanical fasteners and the roofing membrane.

When using rigid urethane or polyisocyanurate insulations, where the first layer is mechanically attached with fasteners containing metal stress plates, BITEC recommends the application of insulation be in double layers.

SECTION 6.04

ROOF INSULATION, MECHANICAL ATTACHMENT

When design requirements call for mechanically fastening roof insulation, the architect, engineer,

owner, or roofing contractor should consult the insulation manufacturer and/or FM regarding the proper number, size, spacing and type of FM Approved Fasteners.

BITEC recommends the following minimum number of fasteners for each board size:

2' x 4' – 4 fasteners

3' x 4' – 6 fasteners

4' x 4' – 9 fasteners

4' x 8' – 15 fasteners

First layer of insulation should be mechanically attached, and the second layer, where applicable, installed in asphalt with all joints staggered and offset from the preceding layer.

Consult the FM publications for approved fasteners and fastener patterns for wind uplift requirements in the project's geographical area.

SECTION 6.05

INSULATION & ROOF SYSTEM APPLICATION

A UL Listed G2, fiberglass base sheet **must** be installed over insulated assemblies in accordance with the following guidelines:

Urethane and Polyisocyanurate Insulations

A divorcing layer of wood fiber, perlite or fiberglass roof insulation shall be installed prior to the application of the BUR-MOD or modified bitumen roof membrane system.

Follow specifications for application of the BUR-MOD or modified bitumen membrane system over the above divorcing layer.

A separation layer is required over all rigid foam insulation. Blistering can result if base sheet or membrane is directly adhered to this type of insulation.

Perlite, Wood Fiber or Fiberglass

Install these insulations by mechanical attachment or by appli-

cation in hot asphalt.

Install fiberglass base sheet in hot asphalt before commencing the modified bitumen membrane application.

Half inch (1/2") perlite insulation should not be encapsulated in hot asphalt.

When 1/2" wood fiber insulation is to be encapsulated in hot asphalt, **only high density wood fiber should be used.**

Expanded - Extruded Polystyrene (EPS)

Requires a divorcing layer of 1/2" minimum thickness of high density wood fiber or 3/4" minimum perlite insulation. All joints shall be taped.

Half inch (1/2") perlite may be mechanically fastened over these insulations. Fiberglass base sheet shall be installed in hot asphalt, fully mopped.

Consult insulation manufacturer for specific application instructions and restrictions.

SECTION 6.06

BASE SHEET REQUIREMENTS (ASTM D 4601, Type II)

BITEC recommends the use of a UL-Listed, Type G2 fiberglass base sheet, or a BITEC **COMPABASE** modified bitumen base sheet in all systems using BITEC cap sheet membranes.

Please consult **Section 2.02** for base sheet fastening pattern where FM requirements are not used.

Over insulated or non-nailable prepared, primed existing membrane, spot mop an approved venting base sheet or inverted UL G3 fiberglass cap sheet (buffer sheet) with ASTM D312 Type III asphalt. Never fully adhere buffer sheet to the existing membrane.

BETA BASE is required on all systems for 15 and 20-year, NDL and Full System warranties.

SECTION 6.07

UL LISTINGS

BITEC maintains an extensive listing of UL approved roofing assemblies, which is continually being updated and is published annually in the "*UL Roofing Materials and Systems Directory*".

BITEC also participates in UL's follow-up program and labels each pallet of product.

For specific UL Classification information, contact our Technical Services Department.

SECTION 6.08

FM SYSTEMS APPROVAL

Reroofing applications requiring assemblies that are FM Approved, using BITEC waterproofing membranes, can be found within FM publication, *Approval Guide*. Information concerning these assemblies can also be obtained through the BITEC Technical Services Department, or by calling your local representative.

SECTION 7.00

RE-ROOFING (RETROFIT)

It is the responsibility of the architect, engineer, and owner's representative to determine whether an existing roof is structurally sound, firmly attached, dry and suitable for recover. **Complete examination** is required to determine what repairs, if any, are necessary to effectively prepare the deck for re-roofing.

All wet insulation, defective materials and areas not suitable for application of the retrofit roof system must be repaired or replaced.

BITEC accepts no responsibility for failure of the roof system due to improper preparation

of deck prior to reroofing (retrofitting), or subsequent damages caused thereof.

SECTION 7.01

RE-ROOFING SPECIFICATION RGS-01 Over Gravel Surfaces

Procedure:

These BITEC General Requirements and any supplement thereto are considered part of this procedure and specification, and must be followed.

Application:

Before application of membrane begins, consult **Section 8.00** "Application Safety". Do not begin application of membrane until you have fully read and completely understand all procedures and precautions detailed.

1) All gravel must be removed by spudding, power brooming and vacuuming.

2) Follow with application of recovery board (divorcing layer) insulation, mechanically fastened, according to insulation manufacturer's recommendations, over the existing roof. Hot apply, or mechanically attach the UL Type G2 fiberglass base sheet over the insulation.

3) Install BITEC modified bitumen membrane as specified.

Coating:

Any roof coatings used with BITEC waterproofing membranes must be those which have been approved by BITEC's Technical Services Department.

Roof coating must be applied in accordance with the coating manufacturer's application instructions.

BITEC does not warranty roof coating, nor does BITEC warranty any failure of the roof membrane or system arising from either substance or application of the roof coating.

SECTION 7.02

REROOFING SPECIFICATION RSS-02 Over Smooth Surfaces

For reroofing over existing smooth surfaces, contact BITEC Technical Services Department.

SECTION 7.03

STATEMENT OF ACCEPTANCE

In order for warranty to be in effect when recover situations are called for, BITEC must be contacted for instructions.

Reroofing scenarios vary considerably from project to project. BITEC recommends that the roofing contractor consult the BITEC Technical Services Department for details and approval before starting any re-roofing project.

Failure to do so can prevent issuance of Warranty.

SECTION 7.04

PRESSURE RELIEF VENTS

BITEC requires one-way pressure relief vents on all recover situations whether or not a Retrofit Board or other recover or overlay insulation of any type is used.

These vents are also required over all types of concrete decks, insulating fills of all types and various combinations of both, for new or existing construction.

BITEC will not issue warranties for new wet fill decks installed over existing roof assemblies or any type of concrete decks or other non-vented decks.

One-way vents are required to relieve at least some of the below membrane pressure.

This pressure may develop from degassing of foamed plastic type

insulations or trapped vapor pressure created by moisture from any source heated by the membrane installation, interior heat drive or by solar energy. These vents are not intended to dry out wet situations.

BITEC recommends the use of spun aluminum vents with one-way valves. Flanges of these units must be primed, top and bottom, and dry before installation.

Installation should be done in accordance with Detail #29 of this book or other methods approved by BITEC.

Metal vents are recommended and preferred, however plastic type vents may be acceptable depending on project conditions. **Plastic type vents are not acceptable with torch applied membranes.**

BITEC will not accept any responsibility for damage or failure of the roofing system caused in any way by the omission of or use of vents on recover situations.

SECTION 8.00

APPLICATION SAFETY

Modified bitumen roofing membranes represent the latest in the evolution of bituminous roofing and waterproofing systems. Their ease of application and strength characteristics make them an excellent choice for waterproofing commercial and industrial roofs.

However, most systems require the use of hot asphalt or open flame propane torches to adhere the membrane.

Whenever working with an open flame, applicators must always use extreme caution to prevent accidents from happening.

Improper and/or unsafe application of waterproofing membranes can result in severe burns, physical injury, property damage and loss of property or life.

Your complete understanding of application safety is essential to the successful completion of any waterproofing project.

SECTION 8.01

PERSONNEL

Proper clothing should be worn while applying membrane. Long sleeve shirt, long pants, leather or durable shoes with **flat soles** and gloves.

Workmen, other than the torch operator, should be no closer than three feet from open flame.

SECTION 8.02

FIRE PREVENTION

It is the Contractor's responsibility to observe all fire prevention policies and practices; to train, instruct and warn employees on the use of torch equipment, and any other equipment used in the application of membrane systems.

Follow OSHA and NRCA provisions for fire protection, including, but not limited to those listed in OSHA 1910.151, 155, 156, 157 and 1910.110 which apply to torch application.

The Contractor should be familiar with NFPA 58 "Standard for the Storage and Handling of Liquefied Petroleum Gas", and any other appropriate publications of the National LP Gas Association.

SECTION 8.03

CODE AUTHORITY

The Contractor should be familiar with all local codes and design guides affecting his service area and should obtain any permits necessary before work commences.

In some areas, torch application is prohibited by local and/or state regulations.

SECTION 8.04

EQUIPMENT DO'S

- Do use an adjustable pilot with complete shut off valve.
- Do use a torch stand to direct flame upwards when not in use.
- Do use an adjustable, UL Listed, regulator with the torch.
- Do be sure that the torching equipment is in proper working order at all times.
- Do keep propane tanks in an upright position at least 10' from open flame.
- Do check all torching equipment for wear and tear. Replace or renew all worn or faulty equipment.
- Do use soap solution to check for gas leaks before lighting.
- Do use a pressure gauge on every regulator.
- Do have an ABC dry fire extinguisher on hand at all times while torching. One extinguisher per torch.
- Do stop work if the scent of unburned propane is detected. Make necessary repairs.
- Do close the propane cylinder valve first, and allow the residual propane to burn before closing the torch valve.
- Do instruct all workers on proper method of using fire extinguisher.
- Do use well built products having safety features, and that are listed by UL or FM.
- Do keep vent pressure regulator clear at all times.
- Do work safely at all times.
- Do ignite torch with flint or electric lighter. Matches or butane lighters are unsafe substitutes.
- Do treat a torch as if it is **always burning**.

NEVER LEAVE A TORCH UNATTENDED

SECTION 8.05

EQUIPMENT DON'TS

- Don't use more than 50' of hose at one time.
- Don't use an adjustable regulator with higher pressure range than that which came with the torch.
- Don't operate any pressure gauge beyond the top of its scale, or near excessive heat (150°F) or where there is vibration.
- Don't use equipment without an operating pressure gauge.
- Don't turn a vapor cylinder on its side to increase pressure. LP Gas can escape.
- Don't put out a cylinder fire if it cannot be done without tipping the cylinder. Let it burn, and call the fire department immediately.
- Don't use a cigarette lighter or matches to test for leaks.
- Don't keep fire extinguisher next to LP tank. If fire starts at tank, you may not be able to get to the extinguisher!
- Don't fill cylinders that are in need of repair.
- Don't use a trowel or other tools as a torch stand.
- Don't play with the torch.
- Don't use damaged or faulty equipment.

WHEN IN DOUBT... DON'T USE!

SECTION 8.06

BUILDING DO'S

- Do use perlite or non-combustible cant strips.
- Do use fiberglass base sheet on plywood decks and on cant strips.
- Do use tight fitting felt collar on all penetrations and metal flashings before torching.
- At the completion of each day's work, walk the jobsite

for at least one (1) hour after the last torch is put out, to check for smoldering fire.

- Do use a small torch when flashing near details.
- Do heat roofing away from air conditioning units, fans, soil pipes and all other protrusions - set in place while hot. Care must be taken to prevent flame from entering or being pulled down into the building interior.
- Do use fiberglass base sheet on all torching applications, over all substrates.

SECTION 8.07

BUILDING DON'TS

- Don't torch anything that you cannot see.
- Don't torch over combustible cants or to wood fiber insulation.
- Don't torch near gas lines, electrical wires or flammable vents.
- Don't point the torch under roof top equipment.
- Don't point torch into open roof top penetrations.
- Don't use a torch to dry out roof surfaces or as a pre-heater torch.
- Don't torch in an enclosed area.
- Don't lay operating torch on an open penetration on the roof surface. Flame can be sucked into the opening.
- Don't lay torch on the roof surface or membrane.

WORK SAFELY BY WORKING SMART!