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## I. GENERAL POLICY

The following recommendations are primarily based on our past experience in the field of asphalt modification. The purpose of this manual is to assist design professionals (architects, engineers, specification writers, building owners, and contractors) in addressing their roofing requirements. These specifications should not be construed as absolute. The proper selection and application of a roofing system is dependent on the roof design, climatic conditions, code requirements, building occupancy, and other factors specific to each individual project. Final responsibility for the design and suitability of any roofing system membrane lies with the design professional. Design professionals should be aware of all local building codes and regulations not presented in this guide.

MBTechnology assumes no responsibility for non-warranted roofs using MBTechnology's products. Warranties will not be given on projects where MBTechnology has no control over material application or conditions under which such roofs are applied. MBTechnology assumes no liability with respect to variations from specifications outlined in this manual unless set forth in writing and signed by MBTechnology's president. By publishing the specifications and design criteria herein, MBTechnology should not be construed as having created any warranty either implied or expressed, except what is outlined in our published warranty/guarantee forms.

With our continuing effort to update and improve this specification manual, we reserve the right to change or modify its contents with or without prior notice.

## II. PRODUCT INFORMATION

### SBS & Asphalt

Asphalt bitumen is the best-known waterproofing material; however, it is characteristically brittle in cold weather, fluid in hot weather, and has little resistance to fatigue. Elastomeric compounds such as styrene-butadiene-styrene (SBS) substantially improve these properties, giving asphalt enhanced performance. SBS rubber is flexible and has memory, allowing it to return to its original form. SBS forms a rubber matrix of butadiene when blended with asphalt. The styrene end blocks act as links holding the elastomeric matrix together. The SBS mix increases the flow properties and improves the low-temperature flexibility quality of asphalt

### II.1 MBTechnology's Product Line

MBTechnology's philosophy lies in producing products geared towards the needs of design professionals. This fundamental principle is reflected in our entire line of roofing products and systems. MBTechnology produces 7 families of roofing products. .

### II.2 Layflat SBS

Layflat SBS is MBTechnology's line of SBS modified base/interply sheets. Layflat SBS is available in 3 weights, LF-25 @28 lb., LF-40@ 45 lb., and LF-60@ 70 lb. per square. Some of the interply products are available with high-tensile fiberglass scrim or polyester reinforcements (refer to specific product data sheets located on our website).

### II.3 Fireguard SBS

Fireguard SBS cap membranes are manufactured with a specially formulated fire resistant agent. The membrane, when use in an approved system, has a UL Class A/B fire rating over combustible/non-combustible decks, without the need for gravel, emulsion, or rock. The weight of the installed system can be as low as 150 lb. per 100 square feet compared to over 500 lb. per square foot for a Class A-rated BUR system requiring gravel. Fireguard SBS membranes can be applied in hot asphalt, cold adhesive, or heat-welded applications. Fireguard SBS membranes are available with various reinforcements, including puncture-resistant polyester, high-tensile fiberglass scrim, fiberglass, or a dual reinforcement of polyester and glass mat.

### II.4 Fastorch SBS

The Fastorch SBS membrane is an elastomeric, granulated- or smooth-surface membrane specifically designed for torch applications. The mineral surface is available in several granule colors. Fastorch SBS membranes are available with various reinforcements, including puncture-resistant polyester, high-tensile fiberglass scrim, fiberglass mat, or a dual reinforcement of polyester and glass mat. The combination of the elastomeric SBS-modified asphalt and the puncture resistance of the polyester mat creates a roofing membrane far superior to any existing single-ply or APP membrane.

### II.5 Supercap SBS

Supercap SBS cap sheets are economical, SBS-modified cap sheets Supercap used in combination with

2 or more layers of Layflat or Layfast SBS membranes. The cap sheet is a premium alternative to conventional, non-modified BUR cap layers and when used in an approved system is Class A fire-rated over combustible decks with no need for gravel, rock, or emulsion. The warranty for Supercap SBS cap sheets is limited to 10 years.

Supercap SBS SC85GWH cap sheets are available in 15 different colors ideal for color blending with shingles and offer a superior alternative to traditional 90# mineral-surfaced roll roofing.

### **II.6 Superflex SBS**

Superflex SBS is a highly elastic, polyester-reinforced membrane. The flexibility of the product makes it ideal for flashing and single-ply applications. Superflex membranes can be applied over one layer of Layflat SBS/Layfast SBS base and qualify for a 10-year warranty. Since only one application of asphalt/adhesive is needed, there is tremendous savings in labor and asphalt/adhesive costs. Superflex membranes are available in smooth and granulated surfacing.

Various reinforcement options are available, including polyester and dual-reinforced (polyester and glass) membranes. Superflex SBS offers versatility of application with hot asphalt or cold adhesive.

### **II.7 Metallflex SBS**

Metallflex SBS membranes are manufactured with an embossed foil surface and reinforced with a high-tensile, woven fiberglass mat. Metallflex SBS membranes are available with standard aluminum-colored, aluminum and copper foil surfacing. The aluminum top surface offers unparalleled reflectivity and weather ability. It is Class A fire-rated over combustible deck (systems) with no slope restrictions. Metallflex SBS membranes are applied via heat welding or hot asphalt application, with heat welding being the preferred application method.

To address the on-going demand for energy-efficient roofing systems, MBTechnology has made available a Metallflex SBS membrane featuring a white, reflective aluminum surface.

The unique foil-faced surface absorbs much less heat than does a conventional roofing system, thus resulting in reduction of the building's energy consumption. In most cases, this allows the building owner to use a smaller air conditioning unit.

Metallflex SBS Cool White 24 has reflectivity characteristics that exceed the initial requirements set forth by the United States Environmental Protection Agency Energy Star standard and by the Energy Efficiency Standards for Residential and Nonresidential Buildings Title 24 of the California Code of Regulations.

### **II.8 Layfast SBS (Steep Slope Underlayment)**

Layfast SBS is a superior, elastomeric-modified, asphalt underlayment for tile, shingle, and metal roofs.

Layfast SBS is available in three weights: TU-35-35 lb., TU-43-43 lb., and TU-70-70 lb. /square foot. It can be used in lieu of 30 lb. and 40 lb. felt as an underlayment under shingle, tile, and metal roofs. *Layfast* is mechanically fastened, thus allowing the system to breathe. *Layfast* SBS is ICC-approved and complies with ASTM D226 standards.

### **II.9 CO24 Coating**

CO24 Elastomeric High Performance Coating is a premium, highly flexible, white acrylic latex roof coating, to be used in conjunction with MBTs or other SBS/BUR cap membranes that are required to achieve compliance with CA-Title 24 or that offer increased reflectivity.

CO24 BASE and CO24 TOP Coating may be applied with sprayer, brush, or roller at an average of 1.5 gal. per 100 square feet for base and top.

It is available in a 5-gallon pail and a 55-gallon drum.

### **II.10 Cold Adhesive**

MB Adhesive is an asbestos-free, specially formulated cold process adhesive that contains a special blend of enhancing modifiers to meet California VOC requirements.

MB Adhesive is available in a 5-gallon pail and a 55-gallon drum.

MB Adhesive is used with MBTechnology cold process systems. It can be applied with a brush, roller, squeegee, or sprayer.

## **III. ROOFING SYSTEMS**

MBTechnology has assembled a series of 5 separate roof systems based on the needs of contractors, specifiers, and architects and on our own experience in

modified bitumen roofing. All the roofing systems presented below are available in a variety of colors **except for the Metalflex system.**

### III.1 *Fireguard Series*

Fireguard SBS roofing systems are lightweight, multi-ply roofing systems with exceptional elasticity, puncture-resistance, and low-temperature flexibility. The components are made of a high-grade, SBS-modified bitumen blend. The top layer (cap sheet FG (FT) 160CWH) has two reinforcements consisting of a fiberglass and polyester mat and is also available with a single polyester mat.

The polyester reinforcement offers superior puncture and tear resistance, enabling the membrane to withstand roof movement and traffic. The fiberglass mat at the bottom of the membrane stabilizes the membrane during application.

Fireguard SBS cap sheet is manufactured with fine ceramic granules. This system doesn't require the application of gravel, resulting in a light installed weight of approximately 200–240 pounds/100 square feet. Granulated-surface membranes are easier to inspect and repair.

Fireguard SBS membranes are manufactured with fire-retardant chemicals. Assemblies for UL Class A/B fire rating over combustible and noncombustible deck are available. These systems are also listed with Factory Mutual (FM) to meet I-90 wind uplift and meet ASTM D 6162, 6163, and 6164 standards for SBS-modified bitumen membranes.

Fireguard SBS systems are applied in 2 to 3-ply applications ranging in thickness from 220 mils to 300 mils. The redundancy of multiple layers reduces the chance of workmanship error and increases the ability of the roofing system to withstand rooftop traffic. Fireguard SBS systems consist of a 3-ply base and cap membrane (over wood and lightweight concrete), and a 2-ply base and cap (over insulated substrate). The system weighs 200–240 lb./100 square feet, depending on the warranty length.

#### **APPLICATION**

Fireguard SBS roofing systems offer the flexibility of three different application methods to meet most job conditions.

**Heat welding:** Heat-welded application is used for areas where it is impractical to use hot asphalt (i.e., hospitals, schools, high-rises). The heat-welded systems offer the owner a 100% SBS system since the adhesive is built in. The heat-welding process minimizes fumes and odors during installation and can be applied in a wider range of climatic conditions.

**Cold Adhesive:** Minimizes odors during the project.

**Hot Asphalt:** Traditional method for installing modified bitumen membranes.

### III.2 *Metalflex Series*

#### **The Metal-clad System**

Metalflex SBS membranes are manufactured with embossed aluminum or copper foil surfacing. Metalflex SBS utilizes the waterproofing characteristics of SBS-modified asphalt and the protective, reflective qualities of aluminum. The aluminum surface offers enhanced reflectivity (Initial 89% ASTM C-1549) and also qualifies the approved assemblies for a Class A fire rating with no slope restriction. Select systems are listed with FM meeting 1-90 wind uplift and meet ASTM D6298 standards for SBS-modified bitumen membranes with foil surfacing.

Whether its energy-efficient aluminum or white surfacing with factory-applied paint finish is chosen, the Metalflex SBS foil-faced surface lends a dramatic, aesthetically pleasing look to any project.

#### **Surfacing**

Metalflex SBS is available in three grades: copper, plain aluminum and colored aluminum foil (white and beige). Custom colors available on request—contact us for minimum run and lead-time.

#### **Application**

Metalflex SBS systems are applied via heat welding and hot asphalt, with heat welding being the preferred application method.

### III.3 *Supercap Series*

The Supercap series is a superior alternative to conventional BUR systems. MBTechnology's Supercap system can achieve a Class A fire rating without the need for additional coatings. This system can be applied with cold adhesives or hot asphalt. The cap membrane has less SBS content than our fully modified

system and offers the owners an SBS-modified system with minimal cost differential over a traditional 4-ply BUR. The warranty for the Supercap system is limited to 10 years.

### III.4 60/90 Series

The 60/90 series incorporates Layflat LF-60 and the Fireguard FG90GWH to achieve the industry standard of a 2 or 3-ply, SBS-modified roofing system. The 60/90 series is Class A /B rated over combustible decks. It combines the elasticity, weather ability, and thermal shock resistance of SBS-modified asphalt in a 2 to 3-ply configuration. The special fire rating achieved by the 60/90 series makes the use of gravel or rock obsolete. The result is a system weighing about 200 lb. per square foot as opposed to a BUR roof weighing over 600 lb. per square foot. The 60/90 system is very versatile since the reinforcements in the interply and the cap sheet can be varied by the specifier to match project requirements. The base membrane can be high-tensile scrim, polyester, or standard fiberglass mat. The Fireguard series offers the contractor and the architect the flexibility of 2 application methods: hot asphalt or cold adhesive.

For projects in seismic areas or susceptible to deck movement, we recommend the use of Fireguard series membrane, which has a polyester mat for enhanced elongation and tear resistance.

### III.5 Fastorch Series

The Fastorch SBS roofing system is ideal for projects where it is impractical to use hot asphalt or cold adhesive. It's the best way to apply SBS-modified bitumen systems since it offers a 100% SBS-modified asphalt without need for any adhesive or asphalt. It's available with various reinforcements that include dual reinforcement of both polyester and fiberglass mat or single reinforcement of either polyester or fiberglass. The Fastorch series is perfect for cool-weather applications since all components can be installed in temperatures down to 45° F. MBTechnology recommends torching as the preferred application method in cooler weather.

### III.6 MA Mechanically Attached

MBTechnology's MA (Mechanically Attached System) offers contractors and building owners a cost-effective system whereby the first layer (Fastorch SBS

FT120PSA) is loose-laid and mechanically fastened to the insulation (in accordance with FM approval). All side and end laps are then heat-welded. The cap layer is a polyester-reinforced membrane (Fireguard SBS FG(FT)160PWH) that is fully adhered to the base layer via heat welding or cold adhesive. The end result is a cost-effective system that eliminates the use of protection board and can be eligible for a 10-15-20-year warranty.

## IV. ROOF DECK DESIGN CRITERIA

Proper deck design is a major consideration in assuring a long-lasting roofing system. Correct structural design of the roof is the sole responsibility of the architect, designer, and design professional. Acceptance of the deck for roofing, including considerations of deck structure, substrate condition, use of vapor retarders, and moisture content of deck insulation, expansion joints, and area dividers is the responsibility of the professional designer.

Roof decks shall provide positive drainage to prevent ponding water. A minimum slope of ¼" per foot is recommended by Asphalt Roofing Manufacturers Association (ARMA) and Uniform Building Code (UBC), section 3207.A. Drains and outlets should be installed to remove water completely from the roof surface. All roofing systems are adversely affected by inadequate drainage, resulting in ponding. Industry standards require water to evaporate within 48 hours after precipitation has occurred. MBTechnology does not warrant areas of roof that have ponding water or inadequate drainage.

Roof decks must be constructed according to the manufacturer's specifications and should comply with all state and local building codes. Roofing decks must provide sufficient strength to sustain anticipated live and dead loads during and after construction without excessive deflections detrimental to the roofing system. Recommendations provided in the specifications manual are minimal. The designer must refer to the deck manufacturer's technical manuals, making certain that the planned design meets all drainage and strength requirements. **MBTechnology's acceptance of a roof deck solely refers to the condition of the surface of the roof deck.** The roofing system warranty could be voided by problems created from improper deck design or incorrect construction.

All decks must be firm, solid, and free of sharp edges or depressions, free of moisture or effects of freezing, free

of dust or debris, and capable of supporting all anticipated deck loads.

NOTE: For deck types not listed, contact MBTechnology's manager of technical services.

#### IV.1 Wood Decks

Wood decks must be a minimum of 1" nominal thickness and constructed of dry, tongue-and-groove lumber. Boards should have a bearing on rafters at each end and be securely nailed in place. Knot holes with a diameter of 1/2" and cracks larger than 1/4" must be repaired or, if feasible, covered with an inverted cap sheet, rolled metal, heavy membrane and nailed in place. Wood decks must be securely fastened and must be totally cured before the application of any waterproofing membranes. Wood plank lumber and plywood panels should be protected from the weather both on the job site and after installation.

#### IV.2 Plywood & OSB decks

Plywood must be American Plywood Association (APA)-approved and must meet U.S. Product Standards 1 (PS-1) requirements. All plywood panels must be clearly identified with APA grade trademarks. All plywood must be a minimum 1/2"(15/32") thick, exterior grade, with all sides securely nailed to joists or cross blockings, a maximum of 2" apart. All joints must be blocked. Non-veneer panels like particleboards are not acceptable surfaces for application of any waterproofing membranes.

#### IV.3 Structural Wood Fiber Decks

Structural wood fiber decks are not an approved deck for any of MBTechnology's roofing membrane systems. No MBTechnology warranties will be issued on these decks.

#### IV.4 Poured Concrete Decks

Concrete curing guidelines must be strictly followed. Concrete must be fully cured, smooth, and level. All protuberances and sharp ridges must be leveled prior to the application of any roofing membranes. Wet or frozen concrete decks are not suitable surfaces for roofing application. Concrete decks must be tested for proper adhesion of asphalt and primer prior to start of the job.

Here are 2 simple tests to see if the deck will accept the asphalt. The architect or structural engineer will need to determine the best test.

#### Tests for moisture in concrete:

- **Plastic sheeting test:**

1. Cut clear plastic sheeting into a 24" by 24" square.
2. Make sure that the concrete where you intend to place the plastic is free of standing water.
3. Tape the plastic firmly to the concrete with duct or masking tape. All sides must be secured.
4. Wait 48 hours.
5. Check the plastic to see if any moisture has beaded up on the inside of the plastic.

- **Asphalt Pour Test (traditional roofing method):** A pint of hot asphalt is poured onto the deck at the specified temperature to determine if a bond is formed between the asphalt and the concrete deck. If the asphalt begins to froth or the cooled asphalt can easily be peeled from the deck, it is not, at the time of testing, suitable for asphalt application.

There are tests, including the calcium chloride test and the impedance test, which vary in their thoroughness.

The deck surface must be primed with an asphalt primer at the nominal rate of 1 gallon per square and allowed to dry before installation of roofing membrane.

**Direct application to poured concrete is only allowed if concrete is over 2 years old and dry. (In such cases, spot mop or spot weld the first layer. Do not solid mop or fully torch directly to primed concrete.)**

#### IV.5 Precast Concrete Decks

Precast concrete sections must be installed in accordance with the manufacturer's installation guidelines. Sections must be securely fastened to the structural frame to prevent lateral or transverse movements. All joints must be properly aligned and grouted. The surface must be even and smooth before an application of primer. Deformed slabs must be addressed by the following: removal, leveled with masonry fill, or a leveling course of insulation to eliminate potential ponding water areas. Spaces between slabs shall not exceed 1/8". It is recommended that joints be taped to avoid bitumen flow between slabs.

The deck surface must be primed with asphalt primer (ASTM D-41) at the nominal rate of 1 gallon per square and allowed to dry before installation of the roofing membrane. The deck must be covered with appropriate roof insulation before application of the roofing membrane.

#### **IV.6 Prestressed Concrete Decks**

Roofing membrane shall not be applied directly to these decks. A leveling course shall be installed prior to application of roofing membrane. It is recommended that a minimum of 2" of lightweight concrete be installed over the prestressed concrete sections per manufacturers' recommendations. It is imperative that the fill surface be smooth and fully cured. The roof system should be properly vented to remove excess moisture. The proper spacing of the roof vents is the sole responsibility of the designer or the architect.

#### **IV.7 Lightweight Insulating Concrete Decks (Perlite, Vermiculite)**

All lightweight insulating concrete decks must be installed by a contractor approved by the deck manufacturer. Lightweight concrete decks must be fully cured and dry prior to application of any waterproofing membranes. Provisions should be provided for venting both the underside and topside of such decks. Deck design must allow for roof vents spaced a minimum of 30 ft. o.c. The high moisture content of lightweight concrete could be detrimental to any applied roofing system. MBTechnology is not responsible for inadequate venting design of such roofs. MBTechnology recommends that architects and specifiers obtain a performance guarantee from the lightweight manufacturer for the duration of the system warranty.

Lightweight concrete must be a minimum of 2" fill with maximum 1"/ft slope. Perlite or similar type decks must be of a density greater than 1:6 with compressive strength greater than 130 psi and fastener pull out of no less than 40 lb. per square foot. Uncured and wet decks will create blistering and system deterioration. Installing any roofing system prior to receipt of a written approval from the deck manufacturer will void our warranty. Prior to application of the roofing system, a layer of Layflat SBS base sheet must be mechanically fastened to the roof deck. Fasteners are listed in the fastener section.

#### **IV.8 Poured Gypsum Decks**

Poured gypsum decks can contain a high percentage of moisture. It is imperative that proper venting be provided to avoid moisture buildup under the roofing system. Gypsum decks must be at least 2" in thickness and poured over a vented deck system. Provisions must be made for venting, expansion, and contraction of such decks. Proper design of roof vents and expansion joints are the sole responsibility of the architect and designer.

Prior to installation of the roofing materials, precautions must be taken to insure that the deck is smooth, free from projections and ridges, dry, and frost-free. All depressions must be filled with materials approved by the deck manufacturer. Prior to application of the roofing system, a layer of Layflat SBS base sheet must be mechanically fastened to the roof deck. Fasteners are listed in the fasteners section. Fastener pull-out resistance shall be a minimum of 40 lb.

#### **IV.9 Steel Decks**

Steel deck construction must meet UL, FM Class 1 and Steel Deck Institute structural guidelines. The deck must be constructed of minimum 22-gauge steel, galvanized, welded or mechanically fastened to form a rigid unit. For additional deck and insulation requirements professional designers should consult FM's Loss Prevention Data Sheet 1-28. Insulation is required; it must be installed per manufacturer's specifications and span all rib openings.

#### **IV.10 Asphalt and Aggregate Decks**

Asphalt and aggregate roofs are not acceptable substrates. The deck must be completely isolated before the installation of a new roofing system.

For an MBT roofing system to be installed:

1. Remove all aggregate to the membrane layer
2. Install recover board (such as primed Dens-deck)
3. Have deck inspected by MBTechnology before installation of membrane

Written approval from MBTechnology's manager of technical services is required for all warranted systems prior to start of any job over these decks.

### **V. GENERAL DESIGN REQUIREMENTS**

Special consideration must be given by the designer to the following items:

#### **V.1 Cant Strips**

Cant strips are required at all points of intersection for the roof deck (or insulation surface) and the parapet wall. Cant strips must be approximately 4" in vertical and horizontal dimension with a roof incline of not more than 45 degrees. Wherever feasible, install cants on insulation or insulation stops by nailing cant strips to the deck and the adjoining parapet walls. If nailing is not possible, cant strips can be secured in mastic or hot asphalt. Perlite cant strips are recommended in all hot asphalt or cold adhesive and torch-applied system applications. Masonry cants shall be so constructed as to provide a vertical offset equal to the thickness of the roof insulation. Metal cants are not acceptable.

## V.2 Drainage

Adequate roof drainage allowing complete water run-off is critical. Decks must be free from ponding within 48 hours after precipitation has occurred. Regular inspections and efforts to keep drains free from debris or ice is an essential element of owner maintenance. Areas of inadequate drainage are excluded from warranty coverage.

## V.3 Expansion Joints

Expansion joint design as to the location and number of joints remains the responsibility of the architect and the designer. Field experience has shown, however, that expansion joints should be provided in the following conditions to protect the roofing membrane from expansion/contraction of the substructure:

- a) When the roof deck changes direction such as in "L", "T" or "U" wing designs.
- b) Whenever additions are made to existing buildings.
- c) Where decking, or steel framing change direction.
- d) When two adjoining decks are constructed of dissimilar structural materials.
- e) At every 200 feet of continuous deck span.
- f) Wherever designer deems necessary.

*NOTE: Designers should also bear in mind that extreme climatic conditions will cause excessive structural movements. Such conditions may warrant the need for additional expansion joints.*

## V.4 Freezer Plants, High-humidity Facilities

Cold-storage facilities require complete separation of the "freezer section" and the roof deck. High-humidity interiors such as swimming pools, laundries, breweries, and shower facilities also require complete separation of the high-humidity interior and the roof deck. In all

cases, adequate ventilation between the two sections must be provided. MBTechnology assumes no responsibility for membranes directly applied to roofs on such facilities.

Roofing projects over such facilities will be reviewed by MBTechnology's manager of technical services on a case-by-case basis. Approvals or exceptions will be considered only after receipt of a written notice from the designer indicating the design suitability and the readiness of the deck to receive roofing material. Written approvals are required before the start of any project.

## V.5 Cooling Towers

Circulating water in cooling towers is usually chemically treated to stop excess residue buildups. MBTechnology does not warranty roof damage resulting from such chemical attacks.

## V.6 Metal Flashings (Consolidate Flashing Section V6-V10)

Metal flashings and counter flashings, as recommended by NRCA and SMACNA, while not part of the membrane roofing system, should be installed to provide proper membrane protection where appropriate, such as at the top of parapets and along vertical walls where added support is required (Section V.10 Termination Bar). All metal flashings must be a minimum 24-gauge galvanized or stainless steel, 16 oz. copper or 3 lb. lead, and firmly secured to the deck.

## V.7 Nailing Strips

Pressure-treated wood nailing strips 4" in width must be provided on non-nailable decks with slopes exceeding 1" per foot. Strips shall be set flush to the surface and parallel to the slope throughout the span of the deck. Strips are to be installed at all perimeter and roof penetration areas. If insulation is specified, strips must be the same thickness as the insulation. Spacing of nailers must be in accordance with the insulation manufacturer's recommendation. On slopes over 2" per foot, strips have to be installed flush with the insulation and at right angles to the slope.

## V.8 Pitch Pockets/Pitch Pocket Sealants

Pitch pans are not recommended and are not to be used on MBTechnology warranted projects if other alternatives are available. However, in cases where the

use of a pitch pan is unavoidable, a small pitch pocket filled with elastomeric pitch pan filler and self-leveling non-shrink sealants is acceptable in lieu of the membrane flashing. A metal crown must be installed over the pitch pan and secured to the pipe with an adjustable metal strap. A continuous bead of urethane caulking will be applied to the upper edge of the clamp. Pitch pans are considered maintenance items and must be maintained by the owner. All pitch pan construction shall be in full compliance with NRCA and SMACNA approved application standards. Please refer to "Section XIII. FLASHING DETAILS."

### **V.9 Roof Vents**

Roof vents are not recommended as a means for drying out wet insulation (ASTM Publication Code No. 04-789000-10). NRCA venting recommendations indicate limited use only with concrete fill decks where vapors or gases can cause substrate pressure on the membrane.

### **V.10 Termination Bars**

Metal termination devices are highly recommended on vertical walls and in areas where the membrane cannot be secured on top of a horizontal surface. Caulking the top edge of the termination bar assembly is acceptable. All membranes must be totally sealed at the top of the termination bar.

### **V.11 Vapor Retarders**

The use of vapor barriers or vapor retarders is based upon indoor and outdoor temperatures, building usage, occupancy, and relative humidity. Vapor retarders are not part of the roofing system. The need for a vapor barrier to eliminate condensation in the roofing system requires special study by a professional designer and remains the responsibility of the engineer, architect, and design professional.

Heated buildings in regions where outside winter temperatures average below 45° F and internal relative humidity exceeds 45 percent usually have vapor retarders incorporated into their designs.

### **V.12 Walkways**

Protective walk pads are required for roof areas where equipment maintenance is necessary and areas where pedestrian traffic is expected. MBTechnology approves

the use of any of our polyester-reinforced membranes as walk pads.

### **V.13 Water Cutoffs**

Temporary water cutoffs are required during breaks in application of the roofing membranes. All exposed edges must be covered to keep moisture from invading the system. Water cutoffs are temporary and therefore must be removed prior to resumption of work. Warranty coverage will be voided if the roofing material becomes wet during application; all affected material is removed and replaced. Water cutoffs consisting of one layer of glazed Layflat SBS LF-25 or 2 plies of felt are acceptable.

## **VI. INSULATION**

This section outlines certain guidelines in the application and usage of insulation materials in connection with MBTechnology's roofing systems. Insulation manufacturers' technical manuals contain detailed specification on fastening, joint staggering, taping, mitering, multi-layer application, mopping, torching, etc. Insulation manufacturers' installation procedures must be followed. MBTechnology is not responsible for damage to the roofing system caused by faulty fastening procedures. Design specifications must include R-value, thickness, number and spacing of nailing strips, number of layers, and method of attachment to the substrate. MBTechnology highly recommends double-layer installation of insulation in systems so that the first layer of insulation is mechanically fastened to the deck and subsequent layers are adhered via adhesives.

Our roofing systems are compatible with the following insulation boards when insulation is applied in strict accordance with the insulation manufacturer's and FM guidelines. MBTechnology is not responsible for riding, blow-off problems, or system failures caused by insulation that is damaged, incorrectly installed, or improperly fastened. Insulation must be kept completely dry prior to and during application of a roofing system (Section V.9 Roof Vents). Water cutoffs are essential at exposed edges of insulation at the close of each workday (Section V.13 Water Cutoffs). For insulation types not listed below, please contact MBTechnology's manager of technical services.

Fiberglass-ASTM C-726  
Federal Specification HH-I-526

Perlite-ASTM C-728,  
Federal Specification HH-I-529

Polyisocyanurate-FM-4450,  
Federal Specification HH-I-1972/Gen.

Wood Fiberboard-ASTM C-208,  
Federal Specification HH-I-535

Polyisocyanurate Composites-Contact manager of  
technical services

Polyisocyanurate and fiberglass are not suitable  
insulations for direct applications. They should be  
covered with ¾” perlite board, for mop or cold adhesive  
applied systems. Use ½” primed Dens Deck for heat-  
welding application. .

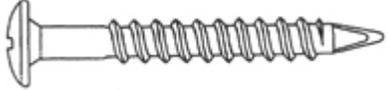
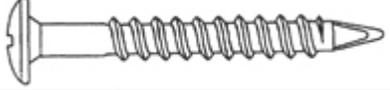
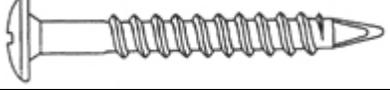
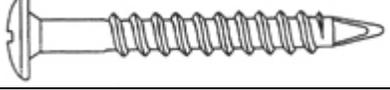
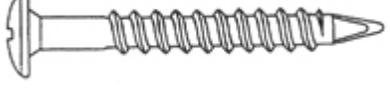
**MBTechnology does not approve the use of our  
systems with expanded polystyrene (EPS)  
insulation boards). MBTechnology UL listings  
include these insulations; however, they are not  
acceptable to MBTechnology and not warrantable.**

**VI.1 Fasteners**

Proper attachment of all membrane underlayment  
(insulation, recover boards, base or ply sheets) is  
essential. Design of roofing systems requiring insulation  
should take into consideration all FM guidelines (1-7, 1-  
28, 1-49, 1-60, 1-90, 4470) and local codes for  
mechanical and/or asphalt attachments. MBTechnology  
assumes no responsibility for system problems that  
result from fastener failures or improper fastener design  
and installation. Following is a data guide on  
mechanical fasteners available to the industry

Deck Type	Fastener Type	Manufacturer	Image
<b>Lightweight Insulating Concrete</b>	Olympic CR Base Sheet Fasteners	Olympic Fasteners	
	FM 90 Fasteners	ES Products	
	Rawl Speed-Lock	Rawl plug Company	
<b>Concrete</b>	Dekfast #14-#15	Construction Fasteners	
	CD-10 used with (3” Plate)	Olympic Fasteners	
	Rawl T-spike used with (3” Plate)	Rawl Plug Company	
<b>Poured Gypsum</b>	Nail Tite Type A	ES Products	

<b>Poured Gypsum</b>	NTB-1H	Olympic Fasteners	
	Olympic CR Base Sheet Fasteners	Olympic Fasteners	
	Polymer Gyptec	ITW Buildex Corp.	
All fasteners to be used with minimum 3" plate			
<b>Wood/ Plywood</b>	1" Annular Grooved (Base Sheet)	Simplex Nails	
	11-gauge Annular Thread Roofing Nail	Independence Nail Company	
	Dekfast #12 or #14	Construction Fasteners	

<b>Wood/Plywood</b>	CD-10 (3" Plates)	Olympic Fasteners	
	14-10 Roofgrip Woodie /Rawl #14	ITW Buildex Corp Rawl Plug Company	
<b>Steel</b>	Perlok Fasteners	Performance Building Products	
	Deckfast #12 or #14	Construction Fasteners	
	Standard Fasteners	Olympic Fasteners	
	14-10 Roofgrip Rawl #14	ITW Buildex Corp Rawl Plug Company	

## VI.2 Application

Extreme caution should be taken in ensuring that the deck and insulation is completely dry before the installation of the roofing membranes. Wet insulation should never be installed. The insulation must present a smooth, clean, and dry surface before application of any roofing membranes. Installation must be according to the manufacturer's published guidelines. The first layer of rigid insulation must be mechanically fastened to the roof deck with appropriate fasteners. There are certain adhesives in the market approved for adhering insulation to structural concrete decks. Consult the insulation and adhesive manufacturers' requirements. Hot mopping of the first layer of insulation board is not acceptable, as the application does not meet FM's wind uplift requirements. Hot mopping a second layer of insulation is only recommended for panels of 4'x4' maximum size.

## VII. GENERAL RECOMMENDATIONS

### VII.1 Material Storage and Handling

All MBTechnology roofing membranes must be kept dry and away from direct exposure to adverse elements prior to and during application process. If material is kept outdoors, it must be covered with opaque tarps. Rolls must be stored in a vertical position off the ground and on a solid surface to avoid end damage. Pallets shall not be stacked more than two high without supporting racks. Use of protective plywood between stacked pallets is recommended. Materials should not be stored outside in temperatures above 90° F. In cooler weather, all materials must be kept above 50° F prior to application.

**UNDER NO CIRCUMSTANCES SHOULD WET MATERIAL BE APPLIED.**

### VII.2 Safety Precautions

Safe roofing requires an ongoing safety training and awareness program for all contractor personnel. Failure to observe OSHA regulations or local safety codes may result in injury and excessive damage to the building. All workers must be instructed on the proper method of using a fire extinguisher. Torch equipment must be periodically checked for gas leaks, and worn-out hoses and faulty regulators must be replaced immediately.

MBTechnology highly recommends that crew members handling torches shall be trained by an Authorized Certified Roofing Torch Applicator (CERTA) Trainer, be certified according to CERTA torch safety guidelines as published by the National Roofing Contractor's Association (NRCA), and follow torch safety practices as required by the contractor's insurance carrier. Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas during roof construction activity and for the minimum period required by CERTA guidelines after roofing material application has been suspended for the day.

### VII.3 Maintenance

MBTechnology's SBS mineral-surfaced roofing systems are relatively maintenance-free. Regardless of the roofing system, the owner should have a maintenance program in place. It is strongly recommended that a competent roofing contractor be selected to perform annual roof inspections to identify and correct problems that can lead to roof system material deterioration and premature failure. An in-house maintenance program must be performed by individuals who are trained to identify early warning signs of conditions leading to potential roof system failures. The maintenance program must include the following:

- Periodic removal of dirt and all foreign articles from the roof surface.
- Cleaning of drainpipes and roof drains.
- Coated roof surfaces require on-going attention to maintain original coverage at all times (Section VIII.8 Surfacing). Areas that are peeling or wearing off must be serviced immediately.
- Replacement of damaged caulking around skylights, metal work details, and termination bars.
- Inspection can identify areas where drainage patterns were altered due to structural movements or construction work on the building. Areas that pond water should be corrected as the additional water weight can cause roof deflections and over a period of time result in structural and roofing system damage.
- Periodic inspection of perimeter flashings and roof surfaces to confirm the membrane is fully adhered and has not been damaged by system movement or work activity on the roof.

### VII.4 Repair

This section refers to the repair of small areas of the roofing membrane. We strongly recommend that an MBTechnology eligible roofing contractor do repairs on MBTechnology's warranted system. This section does not address repairs to large sections of the roof. MBTechnology SBS-modified bitumen products are ideal for repairing existing asphalt roofing systems. The ease of application makes repair work possible with in-house maintenance personnel, provided they have been properly trained in roofing safety procedures and the application of modified bitumen systems. Only MBTechnology polyester (P), or combination (C) (polyester/fiberglass) reinforced membranes can be used for repair work. On projects where UL fire ratings are mandated, 160-mil Fireguard SBS or Metalflex SBS must be used for all repairs. On projects where UL fire ratings are not required, repairs can be performed with Fastorch SBS or Superflex SBS membranes. The specifications and conditions outlined in this manual. Apply to all repairs.

Emergency use of mastic on warranted jobs is acceptable as a temporary measure. Temporary repairs must be replaced with a permanent repair as soon as weather conditions allow.

## VIII AUXILIARY MATERIALS

### VIII.1 Application Equipment

The following is a partial list of required application equipment. Consult NRCA and your local code agencies for additional equipments.

#### General

- Minimum of 4 fire extinguishers of 4A60BC classification
- Hooked blade knives
- Chalk line
- Restraining gear

#### Torch Applications

- 4"-6" round-nose trowels
- DOT-approved tanks
- UL-rated regulators adjustable from 0-60 psi
- 350-psi-rated hose with a 1750-psi burst-resistance rating
- 45-psi single or twin torch
- 20-psi detail torch
- 45- to 60-psi torching wagon

#### Hot Applications

- Kettle with accurate, fully readable thermometers
- Mops
- Felt layer
- Mop carts with pneumatic wheels

#### Cold Applications

- Spray rig
- ¼ "serrated squeegees
- ¼ "serrated trowel

### VIII.2 Asphalt

Asphalt shall be certified to full compliance with the requirements for Type IV asphalt, per ASTM D-312. Mexican asphalt is not allowed on any MBTechnology warranted projects. Each container or bulk shipping ticket shall indicate the equiviscous temperature (EVT), the finished blowing temperature (FBT), and the flash point temperature (FPT).

Heating oxidized asphalt above its published finished blowing temperature for over 4 hours can cause asphalt degradation and result in a change of softening point. A reduced softening point causes poor membrane adhesion due to a decrease in viscosity and holding power of the asphalt. Asphalt should never be heated beyond its flash point. The ideal application temperature is the EVT temperature printed on the package. A deviation of 25° F above or below the EVT is acceptable. If the EVT is not provided, MBTechnology recommends:

Slope	Asphalt Type	Softening Point Temperature	Application Temperature
¼"-2"	Type IV	210°-225°F	425°-475°F
Type IV asphalt must be used on all projects			

For cold-weather applications, special care should be taken to insure proper application temperatures at the point of mopping. Asphalt must not be overheated to compensate for cold conditions. MBTechnology will not accept responsibility for problems caused by slippage. MBTechnology does not approve the use of San Joaquin asphalt.

### VIII.3 Cold Adhesive

Cold adhesives or roofing cements should comply with ASTM D3019 Type III. Cold adhesives should be

applied at ambient temperatures above 50° F. SBS-modified bitumen adhesives are preferred over standard-grade adhesives. Special precautions should be taken for applications in cooler climates to insure even distribution of the adhesives. Avoid flames in presence of cold-adhesive fumes. Do not apply more than one layer within a 15-hour period. MBTechnology requires the use of its adhesive (IAC 7MBT) for projects requiring NDL guarantee.

#### **VIII.4 Coal Tar**

Coal tar or its derivatives are incompatible with SBS-modified bitumen and should not be used in combination with any of MBTechnology's product lines. Under no circumstances shall coal tar or its derivatives come in contact with the roof membrane.

#### **VIII.5 Mastics**

SBS-modified bitumen membranes are compatible with most modified Type 9 mastics and adhesives. Mastics with excessive cutback content can damage the SBS membrane. Electrometric mastics, adhesives, and caulking products are required over standard-grade adhesives and mastics. Wet-surface plastic roof cements are not compatible with SBS-modified membranes and are therefore not allowed on any project. All mastics must conform to Federal Specifications SS-C-153 Type I. Specific recommendations are available from MBTechnology's manager of technical services.

#### **VIII.6 Membrane Base Flashing**

Close attention must be paid to membrane flashing details (Section XIII. FLASHING DETAILS). Flashing areas are often the source of leaks and the start of system failures. Deviation from flashing detail recommendations will be sufficient grounds for voiding the system warranty. Only polyester, combination polyester/fiberglass-reinforced or scrim-reinforced Metalflex SBS membranes are allowed as flashing materials.

#### **VIII.7 Primer Asphalt**

Primer asphalt must conform to ASTM D-41 or Federal Specifications SS-A-701. Diluted primer is not acceptable.

#### **VIII.8 Surfacing**

Asphaltic roof surfaces can be "coated" or covered with mineral granules, gravel, or slag to increase system

longevity. Once the system surface has been coated, it is required that the coating be maintained at its original application level. The following is a list of acceptable roof surfacing materials.

**Mineral Granules** MBTechnology products are produced with a granulated mineral surface available in a variety of solid and blended colors. Factory-applied granulated surfacing does not require on-going recoating of the roof surface. Application of an acrylic or aluminum emulsion coating over the granules is acceptable. Visit our web site [www.mbtechnology.com](http://www.mbtechnology.com) for a list of color granules.

**Emulsion and Aluminum** Coatings may be helpful in extending system life. However, to meet the original purpose of their application, the surfacing must be kept at the original application level during the warranty period. Use of such coatings can involve an ongoing maintenance program to recoat the deck surface every few years as prescribed by the coating manufacturer. MBTechnology accepts no responsibility for problems associated with performance of field-applied coatings, such as peeling and flaking. Fiberated aluminum coatings must meet ASTM D2824 Type III (non-asbestos) standards. Emulsions must meet ASTM D1227 standards.

**Gravel or Slag** Clean, dry gravel (400 lb.) or slag (300 lb.) meeting ASTM D-1863 is required. Apply with asphalt flood coat at a rate of 60 lb. per square foot. Gravel surfacing on slopes greater than 1" is not recommended due to the potential for slipping of the flood coat. Under such circumstances, MBTechnology proposes the use of other surfacing materials (such as mineral-surfaced cap sheet).

#### **VIII.9 Lead Flashings**

All lead flashings shall be primed with asphalt primer ASTM D-41 and allowed to cure/dry prior to application of the flashings. When primer has cured, set flashings in elastomeric mastic on top of the cap sheet. The flashing will be subsequently stripped in with project-specific membranes. The stripping target must extend 6" beyond the edge of the flashing.

#### **VIII.10 Plastic Roof Cement**

Roof cement is used for sealing concrete, roof slabs, and around edges in very small quantities. Roof cement is not allowed as a repair item on warranted roofs. All roof cements must meet ASTM D4586 Type II (non-asbestos grade).

## IX. APPLICATION

This section outlines general guidelines and constraints on torching, mopping, and cold adhesive applications. All layer base, interply and cap materials shall be fully (100%) adhered to each other and to the approved substrate such as Den-deck or wood fiberboard. For more specific application guidelines, please refer to Section XIV. SPECIFICATIONS. Two very important topics, flashing detail application and cool-weather applications, are also reviewed in this section. Please note that the items presented here are guidelines to applications of MBTechnology products; however, NRCA procedures apply in all cases not addressed within this section.

### IX.1 Base, Ply, and Cap Sheet Fastening & Length Requirements

LAYFLAT SBS BASE SHEETS ARE REQUIRED ON MOST WARRANTED JOBS. The use of unmodified base sheets meeting ASTM D4601 Type II is acceptable to MBTechnology. Written approval for such a substitution must be obtained beforehand from the corporate office. All base sheets must be fastened to meet local wind uplift codes. Base sheets may be mechanically fastened, hot mopped, or applied with cold adhesive. To assure a flat unwrinkled surface, specifically in cooler weather, the base sheet may be relaxed for a few minutes prior to application. Proper application is critical in avoiding system failure or wind uplift. Base sheet application must start at the low point of the roof, proceeding upwards in shingle fashion. Application of a base sheet in excess of what can be covered during the day (phasing) is not acceptable.

On nailable decks with slopes less than  $\frac{1}{2}$ " per foot, the base sheet must be applied in shingle fashion, staggering at the low point of the roof and proceeding upwards. Base sheets shall be lapped 2" on the sides and 4" at the ends, with all end laps staggered. On nailable decks with slopes greater than  $\frac{1}{2}$ " per foot, in addition to the above requirements the end laps shall also be staggered not less than 3' apart. Sheets will be nailed at 9" intervals along the edges. The second row of fasteners will be nailed 12" from each edge, 18" apart and staggered.

On decks with slope exceeding 1" per foot, all cap membranes must be applied parallel to the slope and back-nailed to the deck. Back-nail all head laps 2" from the edge and staggered 3" OC in 6" intervals. All side laps will be nailed at 8" intervals. Treated wood nailers must be provided on non-nailable decks or on decks with applied insulation.

### ROLL LENGTH:

Rolls of cap shall never be put down in full-length rolls. They should be cut to the following lengths. In cold weather below 60° F and cloudy or overcast conditions, all cap membranes shall be cut to 11-foot lengths maximum.

#### A. CAP SHEET

Slopes of	$\frac{1}{4}$ " up to $1\frac{1}{2}$ "	17-foot max (1/2 roll) <sup>above 60°</sup>
Slopes of	$1\frac{1}{2}$ " to 2"	11-foot max (1/3 Roll)

Metalflex SBS membranes shall only be applied in 11-foot lengths.

#### B. PLY SHEET

Slopes of	$\frac{1}{4}$ " up to $1\frac{1}{2}$ "	97-foot max (LF25 only)
		64-foot max (LF40 only)
		49-foot max (LF60 only)

Slopes of  $1\frac{1}{2}$ " to 2" will be 35-foot max (for all grades of Layflat and Layfast used as interply).

### IX.2 Flashings

Proper application of flashing details is critical, and in many cases it is the determining factor in roof performance. It is therefore imperative that the contractor strictly adhere to the detailed flashing drawings presented in this manual.

**Field and Base Plies:** All field and base plies shall extend a minimum of 2" above the cants and shall be fully adhered to adjoining walls, curbs, and nailers.

**Base Flashings:** All base flashings shall extend a minimum of 8" above the roof surface (a maximum of 24" if supported by a termination bar or metal counter flashing) and shall extend a minimum of 6" on to the roof deck. For walls over 24" in height, all base flashings must be torch-applied in stages and nailed approximately 6" o.c. at the top.

**Parapet Walls:** Non-nailable parapets must be primed with asphalt primer ASTM D-41 according to the manufacturer's application instructions. Wood surfaces shall first receive a layer of Layflat SBS base sheet nailed 12" o.c. in all directions. Torch application of parapet walls is highly recommended and is required for parapets over 2' high. Application must start at the base of the parapet wall and proceed upwards. Each parapet membrane-flashing piece is pre-cut to a maximum length of 4' before application. If the parapet is higher than 2',

the wall membrane shall be strapped over the horizontal surface of the parapet. Metal counter-flashing (coping) or a modified bitumen crown counter-flashing can be welded over the parapet top. Parapet flashings terminating on a vertical surface more than 18" off the deck must be reinforced with a termination bar, properly caulked, and protected with metal counter-flashing.

**Drains:** Please refer to Section XIII. FLASHING DETAILS for application guidelines. In addition, all drains require the installation of a lead sheet primed and set in elastomeric mastic over the base sheet. The lead surfacing is subsequently stripped in with stripping plies and the cap sheet applied.

**Penetrations:** The roof penetration flashing can be applied by torch, hot mopped or cold processes. A detail torch is recommended for use on smaller flashings, assuring far more precise work without scorching adjoining membrane surfaces. Through-roof penetrations including equipment supports, pipes, conduits, and sign supports shall have lead flashing applied over the cap membrane. All metal flanges designed to receive SBS flashing membranes shall have a minimum 4" width and shall be properly primed with asphalt primer ASTM D-41 prior to installation. All metal flanges shall be stripped in a minimum of 6" onto the roof in all directions beyond the primed areas. Sleeves and hoods must be welded or strapped to form a cap flashing. Pitch pans are not recommended. Please refer to Section V.8 for specifics.

Cold adhesive application is not recommended. Torch application is preferred. In projects where cold adhesive is used, all flashings must be adhered with trowel-grade adhesive or via detail torch. Hot asphalt application is satisfactory where flashing is properly anchored by nails, termination bar, and clamp ring (as appropriate) to avoid slipping in extremely hot weather. Metallflex SBS MF160WAL flashings have different application procedures.

### **IX.3 Heat-welding Application**

Torch application is not approved when ambient temperature is below 45° F. Residual moisture in the substrate and roofing materials can be trapped in the system and cause blistering. Do not apply roofing during precipitation or when decks are wet from water, snow, or frost. In cooler climates, membranes must be relaxed and slightly heated before commencement of membrane installation.

SBS-modified bitumen membranes are different from typical APP torch membranes, having advantages over

such products. Overheating of the underside of the membrane will cause excessive softness of the top and can cause the granule surface to run. The factory-applied burn-off film on the underside of all MBTechnology's Fastorch SBS grades will easily guide the applicator through a smooth application process. Contractors are encouraged to contact MBTechnology for information on all Fastorch SBS products.

### ***Metallflex Application***

#### **Guidelines**

Application of foil-faced membrane is different than that of granulated membranes. Following are application points for proper application of foil-faced membrane. They are a requirement for warranted projects. The preferred application method for Metallflex SBS membranes is heat welding. In some instances, we will allow hot asphalt for field application only.

It is very important not to deform the waffle pattern on the surface metal; this will reduce the life expectancy of the membrane. To avoid this, you should use a damp sponge (for flashing) or a wet mop (for field) to broom the membrane into place. **Do not walk on the membrane.** For field of roof, do not walk on the membrane and always pull the membrane when heat welding. This can easily be done with a torch-hook.

For flashing application, always torch-apply the membrane into place using three-foot widths (cut off the ends of the rolls), always lapping the factory selvage edge. Extend the flashing a minimum of 6" beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the minimum 8" height.

End-lap application requires peeling off 8" of the foil. This is done by scoring the foil with a sharp utility knife, but care must be taken to score the foil and not penetrate the underlying SBS asphalt and reinforcement. Lightly heat the scored foil surface to facilitate removal. Cover the asphalt bleed out using aluminum paint or MBTechnology coating.

#### **Slopes 2" and higher:**

For slopes of 2:12 and higher, the only acceptable method of application is heat welding. For slopes up to 2" per foot, application will be in strict accordance with the applicable MBTechnology specification number. For slopes of 2:12 and higher, all membranes will be applied parallel to the slope with minimum side and end laps of 4" and 6", respectively. All end laps will be staggered a

minimum of 36". All side laps must be staggered 18" between successive plies.

**2" - 3.5" per foot:**

Application of base sheet must be installed parallel to the incline and fastened with two evenly spaced rows at 18" on center, staggered 12" from each membrane edge and 9" on center along the edge laps, with sheet length not to exceed 11'. The interply will be then heat-welded to the base sheet and back-nailed. Spacing of the fasteners on the side laps should not exceed 8". End laps should be fastened using a total of 9 fasteners in a double row in an evenly spaced configuration. All fasteners will be covered by cap sheet. The cap sheet will be heat-welded to the interply and back-nailed alongside end laps. The fastening pattern will be similar to that of the interply. All fasteners should be covered by a succeeding ply extending a minimum of 2" beyond the lowermost row of the fastener caps. Application of the cap will be similar to the above with the exception of roll lengths, which should be reduced to 11'.

**IX.4 Hot Asphalt Application**

Interply mopping of asphalt must be at the rate of 25 lb. per 100 square feet. MBTechnology accepts a deviation of 4 lb. from the nominal amount. Spot mopping shall be applied in a 9"-diameter circle 24" apart at the rate of 15 lb. per square foot. Asphalt should be applied with a maximum mop lead of about 8 feet (2.4 m), and an SBS-modified bitumen sheet should be placed in the asphalt as soon as possible. Consideration should be given to using mops with relatively short handles and lightweight head sizes; this will minimize the potential for over-extending mop lead. Hot asphalt application is not acceptable when ambient temperature is below 50° F, as asphalt temperature can quickly drop below the minimum point-of-application temperature. Residual moisture in the substrate and roofing materials can be trapped in the system and cause blistering. Do not apply roofing during precipitation, or when decks are wet from water, snow, or frost. Do not kick out rolls into hot asphalt. Temperature permitting, base sheets and light interply layers can be rolled and broomed into the asphalt. Asphalt should be applied in a continuous manner without voids. All air pockets must be rectified at the point of application when the asphalt is hot. Poor ply adhesion due to improper mopping procedures or incorrect asphalt temperature is unacceptable. See Section VIII.2 Asphalt.

**GUIDELINES FOR HOT ASPHALT APPLICATION ON SLOPES OVER ½" PER FOOT**

Hot asphalt application shall only be used for slopes up to 2.0" per foot. TYPE IV asphalt shall be used for all applications with slopes of ½" per foot and greater.

**Non-nailable Decks:** On decks with a slope over ½" per foot, the roofing felts must be installed parallel to the incline and nailed. Pressure-treated wood nailers shall be attached to the deck, run perpendicular to the incline, be capable of retaining the nails securing the roofing felts, have the same thickness as the insulation, and be at least 3 ½" wide. Wood nailers shall be provided at the ridge and at the following approximate intermediate points:

<u>INCLINE</u>	<u>NAILER SPACING</u>
½" –1"	36"
1" –2"	18"

Nailers may also be laid out to conform to the roll length being used. For slopes between ½'-2" per foot, nailers should be spaced to accommodate 16-foot-length rolls. For slopes between 2"-2.5" per foot, the nailers should be spaced to accommodate 11-foot-length rolls.

Cut the modified bitumen membranes (base, ply, and cap) to conform to the nailer spacing. Nail the end lap across the width of the sheet, with the first nail spaced ¾" from the leading edge of the sheet and the remaining nails spaced approximately 8" o.c. The nails shall be staggered across the width of the nailer to reduce the risk of the sheet tearing along the nail line. Nails must have an integral 1"-diameter cap. Where cap nails are not used, fasteners must be driven through caps having a 1" diameter.

Nailers must also be used around perimeters, openings, and penetrations to facilitate the securement of felts, gravel stops, roof fixtures, and fascia systems.

**Nailable and Lightweight Concrete Decks:** On decks with a slope of ½" and over per foot, roofing felts must be installed parallel to the incline. Nail the end laps of the membrane across the width of sheet on 8" centers. All nails are to be mopped over and covered by the lap of the next sheet.

- For slopes from ½"-1" per foot, 17' lengths can be used.
- For slope of 1"-2" per foot, 11' lengths should be used.

### IX.5 Mechanically Attached Application

Install the base sheet dry and in parallel courses. Fasten the membrane in accordance with FM approvals, incorporating approved mechanical fasteners.

Seal all the laps by heat welding. Heat-weld the base flashing membrane over primed substrate. Adhere the cap sheet onto the base sheet by heat welding, cold adhesive or hot asphalt. Install the cap sheet flashing membrane via heat welding.

### IX.6 Cold Adhesive Application

Cold adhesive application requires special precautions. Cold process application is NOT allowed when ambient temperature is below 50° F, as lap cure time can exceed 15 hours. Temperatures above 60° F are ideal for expediting lap-cure time. Roofing should not be applied if precipitation is anticipated prior to completion of lap cure, or when water, snow, or frost is present. Keep open flames of torches away from adhesive fumes. Keep roof traffic to a minimum of 7 days until the adhesive sets and system surface firms. **Caution** should be exercised by other trades to avoid damaging the membrane as they proceed with their work. Cold adhesives must be applied at a rate of 1 ½ gallons per square foot. Excessive cold adhesive will damage the SBS membrane.

### IX.7 Re-roofing

MBTechnology recommends a complete tear-off for all reroofing projects. In cases where a complete tear-off is either too costly or impractical, reroofing over existing system is permitted under conditions outlined below.

MBTechnology SBS-modified bitumen membranes are ideal for roofing over existing structures; however, each reroofing application is unique must be individually considered. The final decision on all reroofing matters lies with the designer, architect, or owner. Prior to reroofing, the existing roof must be thoroughly inspected and prepared for reroofing application. The inspection should determine whether:

*The deck is structurally sound and is capable of withstanding the additional weight of the new roof.*

*The existing drainage system is adequate and will provide complete removal of water from the deck.*

*Areas are affected by moisture. Damaged and wet areas must be completely replaced and dried out before application of the new roofing. Test cuts or*

*use of moisture-detecting devices may be required in determining the location and the extent of water damage.*

*Damaged and old flashing details must be removed and repaired or replaced to conform to flashing requirements detailed in this publication.*

*Areas exhibiting ponding water must be corrected*

*Areas exhibiting blistering and buckling must be corrected.*

*Project must be in full compliance with local codes and FM wind uplift requirements regarding reroofing.*

A reroofing project with an existing gravel surface meeting the above conditions must be swept clean of all loose aggregates before the application of any membranes. A ½" recover board must be mechanically fastened to the deck before proceeding with the application of the new roof.

MBTechnology does not issue warranties if more than two roofs are in place. Warranties do not cover leaks caused by defects in the old roofing system.

### IX.8 Cool-weather Application

Hot asphalt application is not allowed in cold weather under 50° F, even though SBS membranes remain flexible. MBTechnology recommends torch application as the preferred method in cooler temperatures down to 45° F.

Special measures must be taken in cool-weather roof applications. In the event of cooler weather, especially where ambient temperatures are near 50° F, and when it is essential the mopping process continue, the following conditions must be met:

- *Materials must be stored in a location where the ambient temperature is above 50° F.*
- *Utilize an insulated 2-pipe circulatory pump as the asphalt carrier.*
- *All asphalt handling equipment must be properly insulated. Cut membranes in shorter lengths of 11' to 17' in length.*
- *Prior to application, relax all membranes with top or granulated side down.*

- *Mopper shall be no further than 3'–4' in front of the roof.*
- *Do not over-compensate by heating the asphalt above the EVT, as it will permanently damage the asphalt.*
- *Fly-in material into the asphalt. This includes all cap and medium to heavyweight interply sheets.*
- *Torch application may require that the material be unrolled slowly and slightly heated with a propane torch before application.*

UNDER NO CIRCUMSTANCES SHOULD MATERIAL BE MOPPED IN TEMPERATURES UNDER 50° F OR TORCH-APPLIED IN TEMPERATURES UNDER 45° F.

### **IX.9 Phased Application**

Phased application of MBTechnology products is not acceptable under any conditions. Roofing systems applied in such a manner are subject to blistering and poor interply adhesion from entrapment of moisture and accumulation of debris on the exposed layer. Install only as much roofing material as can be completed and covered in one day. No section of the roof should be left exposed and unfinished.

## **X. SERVICES**

### **X.1 Eligible Roofing Contractor Program**

MBTechnology selects eligible roofing contractors to install its systems. Only systems applied by our eligible roofing contractors are qualified for workmanship warranties.

Forms are online to apply for eligible contractor status at [www.mbtechnology.com](http://www.mbtechnology.com).

### **X.2 Warranties**

MBTechnology offers both a material warranty and a roof system guarantee covering workmanship and materials. MBTechnology has workmanship warranties available for roof systems when applied by MBTechnology eligible roofing contractors, performed according to specifications and MBTechnology's workmanship guarantee process. The material and workmanship guarantee requires a work in progress and final inspection by an MBTechnology inspector. MBTechnology offers standard warranties from 10 to 20 years, depending on the substrate and the materials used. Contact MBTechnology for details.

All specifications presented in this publication are eligible for a 10-15-20-year warranty.

### **X.3. MB Care-free Roof Inspection Program**

A systematic roof inspection and maintenance program is essential to the satisfactory long-term performance of any roof. Through such a program, potential problems can be discovered in their initial stages or prevented altogether.

Once the roofing system is installed, most manufacturers return to the roof in case of leakage. We inspect the roof every 3–5 years at no charge to the owner and prepare a comprehensive report describing the condition of the roof. This report can alert the building owner to areas that require maintenance. In case of minor problems on the roof (e.g., loose flashing), we repair at no charge regardless of whether leakage has occurred. The MBCare program requires the use of the following products for projects installed in California:

**Heat Weld Application:** Cap sheet shall be FGFT160CWH.

**Cold/Hot Asphalt Application:** Cap sheet shall be Fireguard SBS/SEBS FG160CWH.

To receive your free sample copy of such report, please contact us at [info@mbtechnology.com](mailto:info@mbtechnology.com).

## **XI. APPROVALS**

MBTechnology systems are UL fire-rated as Class A, B, or C and Warnock Hersey and Class 1 (wind) by FM. Products have also been tested to various applicable ASTM standards. In addition, our systems have approvals from numerous local and regional governments. Please contact MBTechnology for more details.

## **XII. COOL ROOF (California Title 24)**

The State of California requires a "cool roof" when installing a new roof or when re-roofing if the following criteria apply:

- The roof covers non-residential building, high-rise residential, or hotel/motel occupancy.
- The slope of the roof is less than 2:12.
- It is over air-conditioned space.
- A permit is required.

To qualify as a cool roof, the material must meet the following criteria:

- Minimum reflectivity of 70%
- Minimum thermal emittance of 0.75
- Products are labeled with CRRC label.

Granulated SBS-modified bitumen roofing systems can achieve this by the application of an elastomeric coating system. Our CSI-formatted specifications address the application of the coating. Additional information about “cool roofs” and Title 24 can be obtained at:

[www.consumerenergycenter.org/coolroof](http://www.consumerenergycenter.org/coolroof)

We have a unique coating that enables our systems to achieve the California Title 24 requirement for a “cool roof.” This exclusive coating is a multipurpose, 100% acrylic elastomeric coating for use over SBS-modified bitumen membranes. The base coat is applied at a rate of 1.5 gallons/square foot followed by the topcoat at a rate of 1.5 gallons/square foot, for a total coverage of 3 gallons/square foot.

Metalflex SBS MF160WAL Cool White 24 is manufactured with a factory embossed white aluminum foil which meets the “cool roof” requirement.

#### XIV. SPECIFICATIONS

Specification templates presented in the following pages are to be used in connection with the requirements and criteria previously outlined.

The slope requirements referenced in the templates are performance-based and not associated with UL or any other independent testing agencies’ slope restrictions on fire ratings. MBTechnology is continually reviewing and improving its fire ratings; please contact us for specific roof assembly fire ratings.

The general requirements, material requirements, and the application procedures within each template highlight areas that specifically apply to that section. Other sections of the manual are still valid and should be taken into consideration when reviewing each template.

#### DECK TYPE-NUMBER OF PLIES-APPLICATION METHOD-CAP SHEET

Possible values for each portion are as follows:

#### DECK TYPE:

W	Wood
L	Lightweight Concrete, Poured Gypsum
I	Insulated
C	Non-nailable

#### NUMBER OF PLES

2–4

#### METHOD OF APPLICATION

H	Hot Asphalt
C	Cold Adhesive
T	Torch Application

#### CAP MEMBRANE

Any of our granulated or foil-surfaced cap membranes.

*Example: I2T-FGFT160CWH in the Fastorch series refers to a 2-layer, heat-welded Fastorch specification over an insulated deck. The cap membrane is Fireguard SBS FGFT160CWH. If the roof system requires additional surfacing, it will be reflected at the end of the specification numbering system. As an example, I2T-FGFT160CWH-white coating refers to a 2-ply, torch-applied system over an insulated deck coated with a white coating system.*

#### XV. LEED

**LEED, or Leadership in Energy and Environmental Design, is an internationally-recognized green building certification system.** Developed by the [U.S. Green Building Council \(USGBC\)](http://www.usgbc.org) in March 2000, LEED provides building owners and operators with a framework for identifying and implementing practical and measurable green building design and construction, and operations and maintenance solutions.

**LEED promotes sustainable building and development practices through a suite of rating systems** that recognize projects that implement strategies for better environmental and health performance. The LEED rating systems are developed through an open, consensus-based process led by [LEED committees](http://www.usgbc.org), diverse groups of volunteers representing a cross-section of the building and construction industry. Key elements of the process include a balanced and transparent committee structure, technical advisory groups that

ensure scientific consistency and rigor, opportunities for stakeholder comment and review, member ballot of new rating systems, and fair and open appeals.

**LEED is flexible enough to apply to all building types—commercial as well as residential.** It works throughout the building lifecycle—design and construction, operations and maintenance, tenant fit out, and significant retrofit. And LEED for Neighborhood Development extends the benefits of LEED beyond the building footprint into the neighborhood it serves.