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# Chapter 1.

## SITURA Waterproof Expansion Joints



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# Chapter 1.

## SITURA Waterproof Expansion Joints

### SITURA EXPANSION JOINT MATERIAL



Waterproofing an expansion joint or any joint, as a matter of fact, is not an easy or simple task. Many a solution has been sought to solve this problem. Each method has drawbacks or problems associated with it. A properly designed expansion joint should remain waterproof and weather tight for the service life of a building.

The SITURA joint waterproofing system solves the dilemma. From the most simple; waterproofing straight joints, to the most complex; incorporating curved shapes, material and plane changes. SITURA is a flat zero profile expansion joint waterproofing system that can be used on both vertical and horizontal surfaces. SITURA joints can be installed in any asphalt/bitumen (hot or cold) or modified bitumen waterproofing system above or below grade, in addition they can be used with Spray Polyurethane Foam and Epoxy ResinS. A SITURA expansion joint is installed in a matter of minutes, and incorporates site specific prefabricated details. Cost savings to the contractor are very significant, as no wood curb or metal flashing fabrication is required, in addition the flat profile of the expansion joint does not obstruct the flow of water.

A main advantages of the SITURA expansion joint system is that it is installed on the surface of the building expansion joint and waterproofs the joint from a position of access. The SITURA system can be installed on a wide variety of substrates not only concrete, although this is the most common, other substrates can include wood, metal, glass or even plastic.

### SITURA VULCANIZATION



Building joints can be very long and conform to very different shapes and configurations. To waterproof such joints the waterproofing material has to be joined at intervals. The method of joining the waterproofing material is very critical, as this is the weakest link in the waterproofing barrier. The most common methods of joining or seaming two pieces of joint waterproofing materials are; solvent adhesives, caulking, taping or hot air welding. These methods, although initially waterproof, soon become a source of leaks. Adhesives rely on solvents with a high Volatile Organic Content (VOC's)

to provide the bond. These adhesives not only are environmentally unfriendly, but also are very unreliable in application. Caulking is considered a maintenance item and must be periodically replaced. Adhesive apes are materials that when exposed to the elements frequently fail as result of weathering, leaving voids in the seams, through which water can enter. The method of hot air welding is another alternative, however its use changes the chemical composition of the base material and is limited to rigid thermoplastic materials.

The largest drawback, of all of the above outlined seaming methods is the loss of material elasticity at the seam, which is extremely crucial in an expansion joint. As movement takes place the material that is unable to elongate will be stressed and ultimately fracture, creating a void in the seam for water infiltration.



*SITURA material being vulcanized on site.*

The SITURA joint waterproofing system has an alternative solution for joining, which is vulcanization. Vulcanization is the cross linking of rubber under constant temperature and pressure. The vulcanized material is molecularly linked to the base material and therefore, exhibits the same elongation and physical characteristics. This method of joining not only ensures a watertight seam but also allows for expansion to take place during movement at the seam location. The SITURA joint is vulcanized together by the use of a special vulcanizing press.

Vulcanization takes place under the influence of temperature and pressure generated by the press. After a short while, two pieces are joined by the vulcanization process, forming material at the joint location that has identical tensile and elongation properties as the base material.

## BUILDING EXPANSION JOINTS AND OTHER JOINTS

Buildings move due to the contraction and expansion of their components as a result of changes in temperature. The amount of movement is dependent upon the type of material they are constructed out of. The extent of the contraction and expansion of a building is dependent upon its size and the ambient temperature change.

In order for a building and its components to accommodate these movements, the contraction and expansion is usually limited to a maximum of 1" [25 mm]. Any movement that is larger than 1" [25 mm] within a building, will result in damage to the building and its external finishes (cracking, dislodgment of exterior panels). A building's designer (architect or structural engineer) incorporates an intentional and periodic break in the building structure to allow for this expansion and contraction. These breaks or gaps are usually referred to as expansion joints. The concept provides a "space" for the building to move. To further clarify this terminology, when reference is made to an expansion joint this refers to the actual gap in the building structure. **The SITURA expansion joint material provides the waterproofing of the joint or gap, and simultaneously accommodates the expansion movement taking place at the joint.**

The presence of an expansion joint poses some very unique problems in building envelope design, simultaneously keeping the elements out and allowing for the building's movement. The primary concern is the infiltration of water and moisture, as this causes the most damage to a building's interior and roof components. Water can enter the building's interior through the expansion joint at either above or below grade level.

## LOCATION OF EXPANSION JOINTS

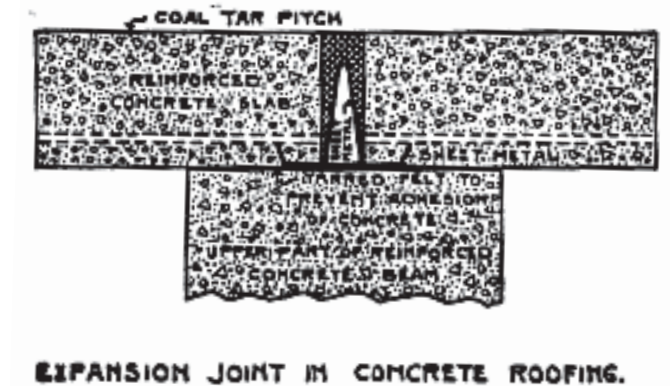
Expansion joints are found above and below grade, typically at:

- Changes in deck direction
- Changes in deck type e.g. a concrete deck abutting a steel deck
- Re-entrant building corners
- Large buildings exceeding 200 feet [61 m] or more in length or width
- Additions built abutting to existing structures
- Areas requiring isolation from vibration

## HISTORY OF EXPANSION/CONTRACTION JOINTS

The need of expansion joints arose as a result of the advent of steel and concrete structures in latter part of the 19<sup>th</sup> century. As buildings got longer and taller they began to exhibit movement. This movement was generated as result of an external force acting on the building, typically as a result of thermal differences or wind effects. To reduce the effect of these movements architects and engineers began to introduce intentional breaks in the building superstructure. These breaks or gaps became known as expansion (or contraction) joints.

### THE COAL TAR PITCH SELF SEALING EXPANSION JOINT - circa 1880



*Early Type of an Expansion Joint circa 1880.*

The above illustration shows an early type of an expansion (contraction) joint. This type of joint construction was used in early reinforced concrete structures. A bond breaker separates the slab and supporting beam, usually a bond breaker such as felt paper, a thin metal hat section is inserted into the concrete slab, at the location of the joint. The joint is then made waterproof by pouring pitch. Pitch being amorphous (free flowing) fills in the joint gap as it moves, making it watertight. This type of joint worked very well for small and gradual building movements.

### THE CANT STRIP EXPANSION JOINT - circa 1920

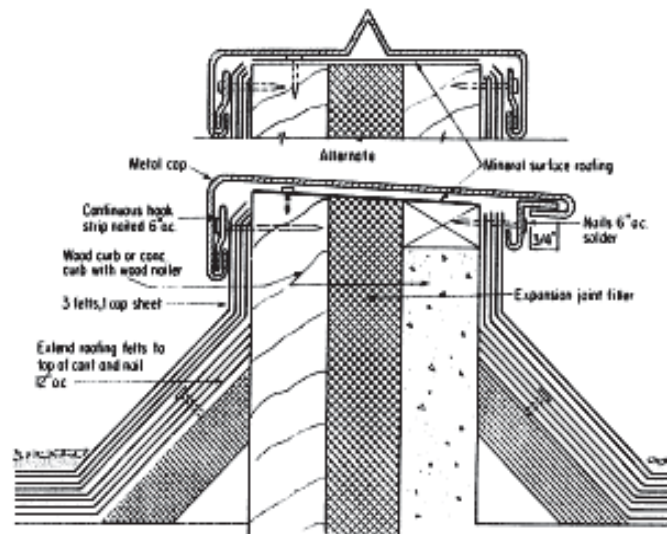


*The Cant Strip Joint circa 1920.*

The cant strip joint is the forerunner of today's idea of an elevated expansion joint. With buildings ever increasing in size and new roofing materials coming onto the market, the construction of expansion joints had to change. The use of felt plies and asphalt required that joints be elevated, the underlying reason for this was the fact that the felt plies would rip if subjected to movement. Early felt plies, were manufactured from organic materials, with little or no tensile strength.

To prevent water leakage from a ripped felt ply over a joint, the joint was raised. The cant strips on either side of the joint aided to this by raising the roofing felts above the plane of the roof. The result was a raised expansion joint. Even if the felt plies rip, they would be out of the water plane, minimizing the possibility of water leakage. The drawback was that water now had the possibility of ponding, with no obvious egress. Ponding water has a well-documented history of damaging felt plies.

## THE RAISED EXPANSION JOINT - circa 1960



*The Raised Expansion Joint circa 1960.*

The continual improvement in roof material technology and increasing complexity of roofs, expansion joint details became more elaborate with cant strips, wooden nailers, metal flashing and strip in plies. As a result of detailing failures in previous years, a metal cover was placed on top of the joint; this was a replacement to the roof felt plies detailed in previous years. This change benefited the detail, as a metal flashing cover was more durable and easier to repair than a roofing ply. The joint detailed was not waterproof and continued to rely on the fact that it was elevated above the plane of the roof for water tightness, it provided no building envelope continuity.

## THE FLAT PROFILE EXPANSION JOINT - circa 1990



Rapid advancements in polymer and elastomer chemistry, made it possible to manufacture an expansion joint that could be waterproof and allow movement at the same time and yet be compatible with most roofing and waterproofing material. This gave rise to the flat profile expansion joint. The flat profile expansion joint is on the cutting edge of roofing and waterproofing technology offering a reliable and durable solution to waterproofing expansion joints. An advantage of flat expansion joints is the ability to allow the free drainage of water across the joint.

◀ *Flat Profile Expansion Joint.*



## CLASSIFICATION OF EXPANSION JOINTS

There is a wide variety of different types of expansion joints made from a plethora of materials. Here are some of the more common types encountered:

### BELLOWS TYPE JOINTS



Product consists of two flanges, typically metal, for attachment and flashing, a flexible elastomeric bellows to accommodate movement, and a foam material designed for support. The elastomeric bellows and foam are constructed between the two nailing flanges. Some nailing flanges are designed to be concealed under the membrane. The joint closure is installed above the plane of the roof on cants or curbs or in combination with vertical surfaces.

### FLAT EXPANSION TYPE JOINTS



A continuous elastomeric material that is installed in the plane of the roofing system and is essentially an extension of it. This joint is connected directly to the roofing system on both sides of the opening. This type of joint is considered to be flat profile, allowing for water flow across it. The joint is capable of accommodating a wide variety of movements and is monolithic for its entire length.

### COMPRESSION TYPE SEALING JOINTS



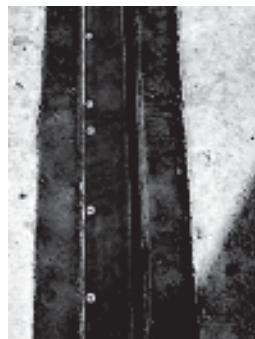
Compression sealing systems are designed to be installed into a joint in a compressed configuration and then be available to expand or compress to accommodate the movement of the joint. The pressure exerted by the compressed seal against the sides of the joint is responsible at least in part, for preventing water from passing through the joint. Some systems rely entirely on pressure to keep the seal in place, others have mechanical anchoring systems, or may be adhered in to place.

### METAL EXPANSION TYPE JOINTS



Metal expansion joints may be designed to allow components to slide or to flex, to accommodate movement. The joint closure is installed above the plane of the roof on cants or curbs or in combination with vertical surfaces. The metal "S" lock is not watertight.

### ARMORED TYPE JOINTS

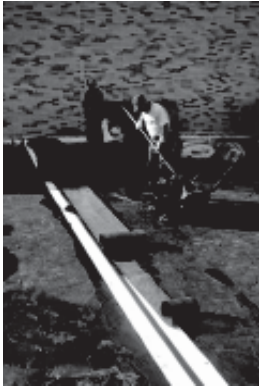


Armored joint systems are specially designed to withstand vehicular traffic, typically installed in parking structures.

## TYPES OF JOINTS IN BUILDINGS

Joints in general can be classed into several types, based on function, here are the most common, in order of abundance.

### BUILDING EXPANSION JOINT



A building expansion joint is a purposely designed opening between adjacent parts of a structure that allows for relative movement. An expansion joint is continuous throughout the building and traverses from below to above grade. It is integral to the structural framing system. This is the most typical type of joint.

### ROOF CONTROL JOINT



A roof control joint relieves stresses in the roof system. The joint does not extend into the building's structural system; it is entirely confined to the roof assembly above the structural deck. This is the next most common type of joint, its use and popularity is very much regional in scope.

### SEISMIC JOINT



A seismic joint is designed to allow structural movement during an earthquake. This type of joint is found in regions of seismic activity.

### BUILDING ENVELOPE OPENINGS



Designed openings in the building envelope resulting from structural transitions, i.e. when differential movement does occur between roof decks and vertical surfaces. Joint are designed to provide building envelope continuity.

## HISTORY OF DESIGN METHODOLOGY FOR WATERPROOFING EXPANSION JOINTS

Expansion joints, by their very nature, interrupt the building envelope and compromise the waterproofing integrity. Frequently, expansion joint waterproofing is overlooked in the design process and considered to be an appendage listed in specifications as “*to suit site conditions*” or at worst being an after thought during installation. The fact is that expansion joints are a leading cause of water infiltration and leakage. Lack of proper consideration and detail will result in compromising the waterproofing integrity of a roof or waterproofing membrane either immediately after installation or during the service life of the building.

### ROOF APPLICATIONS



*A typical raised expansion joint, preventing water drainage,*

Approaches to the design of waterproofing the expansion joints are many, ranging from the crude to the sophisticated. The most simple approach is to provide additional roof membrane material at the expansion joint specifically to accommodate the movement. There are a number of “off the shelf” expansion joint solutions. These usually are comprised of a variety of rigid plastic membrane sheets preformed into a bellows type shape (the bellows allowing for material movement). The more sophisticated systems are also bellows type manufactured to site specific conditions to accommodate predetermined movements, these require complex mathematical computations for a correct fit.

All of the various solutions require that expandable materials be raised above the roof level on a curb. Once the expansion joint is elevated above the roof level, the roof membrane is then flashed around the base of the curb to waterproof the expansion joint gap. The entire expansion joint detail is usually capped with metal flashing as the only protection from the elements and mechanical damage.

The approach described has been used in roofing for a long time, in fact if one were to look back at a building roofed in the 1960's this was the “*modus operandi*”. This approach, elevating the expansion joint assembly above the roof membrane, has a number of disadvantages which are detrimental to the roof membrane and the roof assembly.

Primarily, the elevated curb obstructs water flow across the roof and in fact has a damming effect. Water cannot flow to the drains when located on the other side of the expansion joint, as is frequently the case. The roof owner is then left to make modifications to the expansion joint by installing scuppers through the expansion joint in an attempt to allow water flow. Ponded water on a roof, as conventional wisdom dictates, is not a good thing and every effort has to be made to remove standing water. In addition, a raised expansion joint on a curb is also exposed to roof traffic and damage. This is an important consideration especially when there is no metal coping or cap flashing on the expansion joint curb.

A problem associated with expansion joints that is even more fundamental to their function, is that of expansion and contraction. The materials used to waterproof expansion joints today are rigid or allow for very little material elongation. The movement of these materials is accomplished through the provision of extra material (e.g. bellows, folds). This in itself has disadvantages. The material does not always return to its original shape and position, and folded material can also suffer physical damage during the movement, from fatigue.

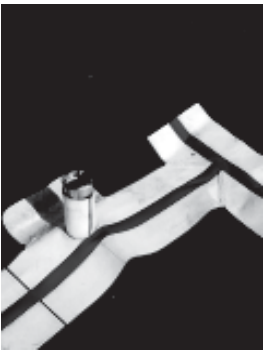
## WALL & FOUNDATION APPLICATIONS



Waterproofing of joints is not confined to expansion joints only on roofs. Joints continue below grade and require waterproofing. A joint below grade can experience hydrostatic pressure and is even more prone to leakage. Other areas where joints have to be waterproofed are within the interior of a building, areas such as sumps, basements, water reservoirs which have joints frequently traversing through them. The traditional method of waterproofing such joints was to insert water stops when pouring concrete. A water stop is a piece of extruded rubber tape with ribbing to enhance its mechanical fixation. The water stop, although made of flexible material is limited in performance by a number of factors. They can include; poor positioning of the water stop during construction, limited elongation capability, premature material deterioration and mechanical damage.

The more critical aspect in waterproofing an expansion joint is the material's ability to be joined or seamed together. Even straight expansion joint runs cannot be manufactured from one piece of material, multiple pieces have to be joined together to make up the length required. The two most common methods used for joining material pieces are adhesives or caulking. Though providing an initially water tight connection, the material at the actual joint does not always exhibit the same mechanical properties (elongation, tensile) as the rest of the expansion joint material and cannot take the stress from the joint movement over time. These issues can be of critical significance to the performance of waterproofing of an expansion joint especially when a complex shape or configuration is encountered.

## ADVANTAGES OF USING SITURA EXPANSION JOINTS



The SITURA joint waterproofing system has a number of distinct advantages, over current existing types of expansion joints such as bellows type joints, prefabricated metal joints, bunched up membrane or membrane over a backup rod type joints.

The advantages of the SITURA waterproofing over these and other systems can be grouped broadly into two categories **Economic** and **Technical**.

### ECONOMIC ADVANTAGES:

1. Eliminates the need for building expensive wood curbs and metal flashings in roofing applications.
2. The SITURA system is laid down and installed in minutes, with minimal preparation time and skill required, resulting in significant labor savings to the contractor.
3. The SITURA joint waterproofing system is supplied in one piece for the entire project, and is ready to be installed immediately.



## TECHNICAL ADVANTAGES:

1. Provides a flat zero profile waterproofed joint, without obstructing the flow of water across the joint.
2. The expansion joint system is custom tailored to specific site conditions, including difficult areas to detail and waterproof such as; inside and outside corners, "T" joints, "X" joint intersections, curved joints, multilevel joints, etc.
3. Flat expansion joint system has the capacity to move in all three planes simultaneously, i.e. horizontally, vertically and transversely, while remaining flat.
4. No complicated calculations required since the joint is flat and in the plane of expansion. Only measurements required are center to center distances between fixed points.
5. In roofing, flat expansion joint material is installed between the roofing plies. Result is that the waterproofed joint is an extension of the actual roof membrane, with no flashing plies or special detailing required.
6. Flat expansion joint system forms a continuous uninterrupted waterproofing solution from the start of the expansion joint to its termination, which can be in a different part of a building, for example underground. Zero profile of SITURA expansion joints allows it to traverse across any building surface from inside to outside, above or below grade.
7. Expansion joint waterproofing is made continuous with the same expansion capability along its entire length. Any seaming in the SITURA joint waterproofing is as flexible and has the same elongation as the base expansion joint material itself.
8. Seams found in the expansion joint system are all vulcanized under factory controlled conditions, (site seaming is possible through the use of a special portable vulcanizing press system). Vulcanization process provides the best method of joining pieces of joint waterproofing material. No adhesive, tape or caulking is used, therefore a watertight, maintenance free waterproofing solution.
9. Being flat, expansion joint end termination accommodates movement in all three directions there is no warping, curling or wrinkling at the joint termination end.
10. Flat expansion joint is laid down at the roof membrane level over insulation leaving no void space for condensation to form.
11. No metal parts or fasteners are used, therefore no possibility of thermal bridging or additional thermal heat losses. Metal corrosion is also eliminated.
12. Expansion joint's zero profile is not a trip hazard on the roof.
13. Versatility of the SITURA system allows it to change installation substrate types easily (e.g. from a modified bitumen surface to a concrete substrate) with no interruptions in the joints waterproofing barrier.

## TECHNICAL SERVICE AND SUPPORT

The SITURA product line offers a comprehensive solution to joint waterproofing problems. Please contact SITURA INC., toll free **1-888-4-SITURA** (1-888-474-8872) or by E-mail at **situra@situra.com** for assistance in specifying, detailing and installing a SITURA waterproof expansion joint.

# Chapter 2.

## SITURA Expansion Joints

### Product Technical Data



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# Chapter 2.

## Product Technical Data

### MATERIAL QUALITY AND DURABILITY

Today's building envelope waterproofing materials are expected to perform under environmentally hostile conditions. A waterproofing material must be able to withstand temperature extremes, possess excellent ultraviolet resistance, be unaffected by environmental pollutants, remain inert and dimensionally stable, and maintain its physical properties over time.

Additional characteristics for joint waterproofing materials include excellent puncture resistance and flexural fatigue resistance, high tear strength and abrasion resistance, low water absorption and permeance. **All SITURA Expansion Joints exceed the standard requirements of industry tests that measure these important physical properties.**

### FORMULATION

The base resin material used in manufacturing is specially formulated to provide for long-term performance. RedLINE®, FlamLINE® and AquaLINE® are all comprised of a continuous material strip compounded from a specially formulated high grade rubber based elastomer. During the manufacturing process, a reinforcing fabric is embedded into the gelling elastomer matrix in the selvage edge on both sides of the joint. The reinforcing fabric is external for RedLINE products and internal for FlamLINE and AquaLINE. All SITURA joint types have no reinforcing over the expanding section, i.e. the joint gland.

The unique elastomer formulation utilized in SITURA expansion joints has a number of chemical properties specifically suited to their applications. The joint material is resistant to the effects of UV, ozone, high temperatures and chemicals such as alkalis, acids, saline solutions, alcohol and ketones. The high quality and purity of the elastomer allows for seam vulcanization. This enables the incorporation of any unique detailing required, while remaining watertight. **There is no limitation to joint length or shelf life of the product.**

### HOW TO CHOOSE A SITURA EXPANSION JOINT

When deciding on the type of expansion joint three critical factors are considered, in order, namely:-

1. The waterproofing membrane material used
2. The movement (expansion and contraction) range of the joint
3. The joint cavity gap width

The process of selecting the expansion joint type is best described in two key steps, the first step is to determine the type of waterproofing membrane material being used. Table 2.1 is a matrix table showing the various types of waterproofing materials and the appropriately compatible SITURA joint types i.e. RedLINE, FlamLINE or AquaLINE. This table must be used to select the appropriate SITURA expansion **joint type**. Once the joint type is selected the **expansion joint grade** needs to be determined, i.e. 20, 40, 100 or 240 this is done by referring to Table 2.2 which is a nomograph relating the joint movement and joint gap size to the joint grade. The joint movement is read off the first scale and a line is drawn to a point corresponding to the joint gap on the next scale. The line is extended horizontally and is terminated in one of the fields describing the joint grade (see example on next page).

**Table 2.1 SITURA Expansion Joint Type Compatibility Matrix**

<b>Material Type ==&gt;</b>	<b>RedLINE®</b>							<b>FlamLINE®</b>				<b>AquaLINE®</b>
<b>Material Grade ==&gt;</b>	06	20	20G	40	40G	100	240	20	40	100	240	Potable Water
<b>Membrane Type</b>												
Built-Up-Roofing (BUR)												
Coal Tar Pitch (CTP)												
Epoxy Resin (ER)												
Hot Rubberized Asphalt (HRA)												
Cold Applied Adhesieve (CAA)												
Liquid Polyurethane/Urethanes (LP)												
Modified Bitumen - Mopped (MBM)												
Modified Bitumen - Torched (MBT)*												
Self Adhered Membranes (SAM)												
Spray Polyurethane Foam (SPF)												

\* RedLINE requires priming with a glaze coat of asphalt prior to torching.

**EXAMPLE HOW TO SELECT A JOINT:**

Determine the type and grade of SITURA Expansion Joint to meet the following criteria:

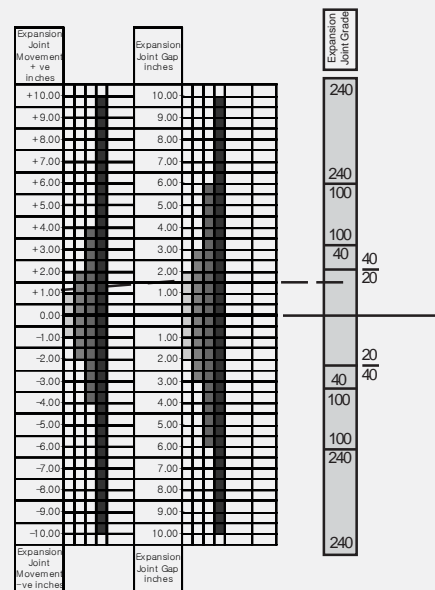
1. Roof Membrane - Built-Up-Roofing (BUR)
2. Joint movement of 1 inch [25 mm]
3. Joint Gap 1½ inch [38 mm]

Step 1. Consult table 2.1, for a BUR membrane  
**► Use RedLINE**

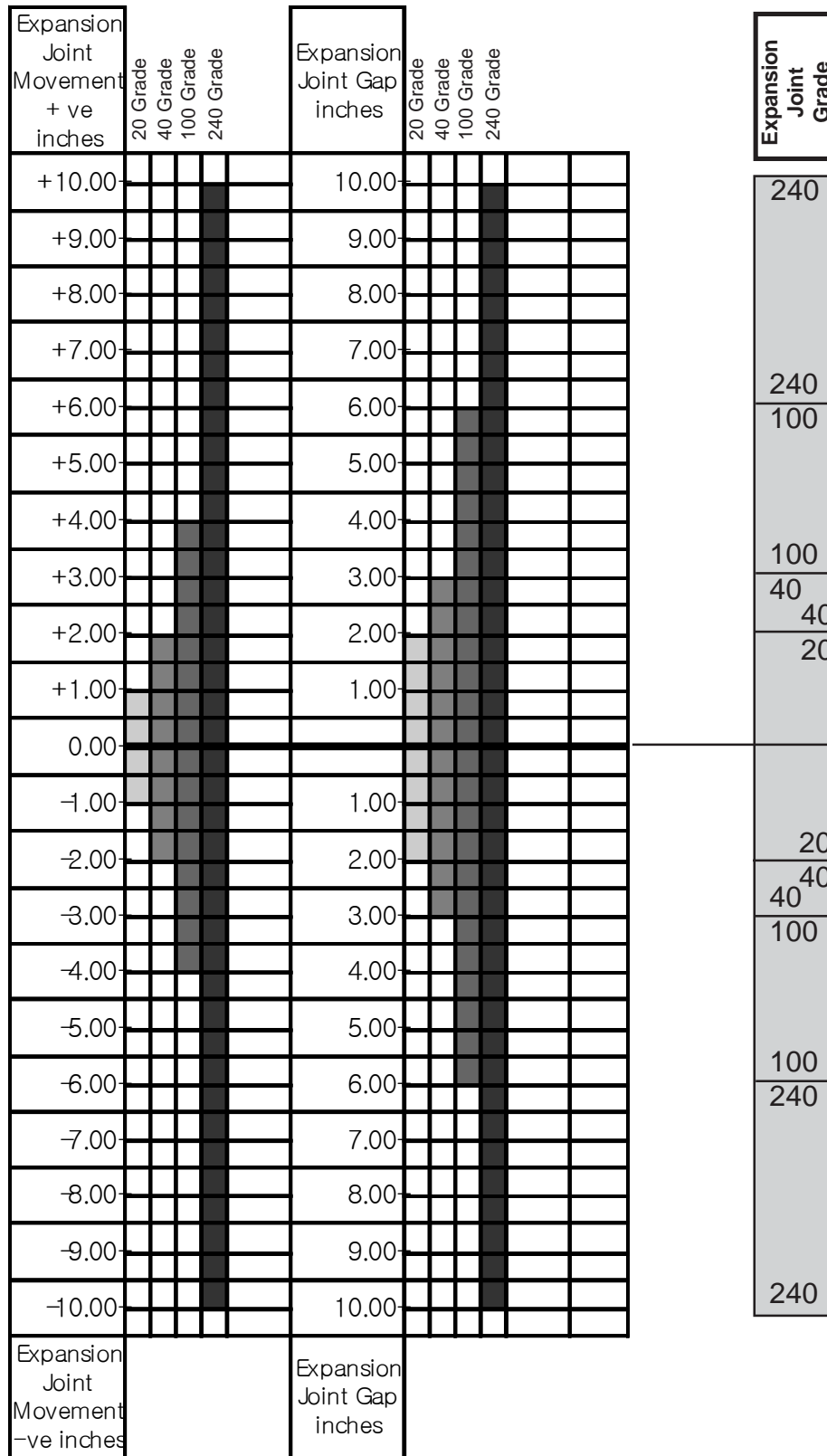
Step 2. Consult Table 2.2 to determine the grade of joint for 1 inch movement and 1½" joint gap.

Find 1.00 (1" movement) on the left scale draw a line to the point 1.5 (the 1½" gap) on the second scale and draw a **horizontal line** to the joint grade field on the right.

**► Use minimum RedLINE 20**



**Table 2.2 Nomograph for Joint Type Selection Based on Movement and Expansion Joint Gap**



## RedLINE EXPANSION JOINT FORMULATION

The SITURA RedLINE material is specially formulated to provide a long term performance solution to expansion joints. The RedLINE joint waterproofing system is comprised of a continuous material strip which is compounded of a specially formulated elastomer with polyester fleece embedded in each selvage edge (both surfaces). The expansion joint material is manufactured by a proprietary process from a high grade inert elastomer. During the manufacturing process the polyester fleece is embedded into the gelling elastomer matrix on both underside and top side surfaces, of the material. The joint material has no fleece material over the actual expanding joint section i.e. the joint gland. The elastomer used in the formulation is very unique as it has a number of specific chemical properties suited to its application. The material is resistant to the effects of UV, ozone, high temperatures, chemicals such as; alkalis, acids, saline solutions, alcohol and ketones. The high quality and purity of the elastomer allows the vulcanization of the joint, this makes the construction of details around unique shapes possible and watertight without the use of adhesive, caulking or joint tape. RedLINE is compatible with virtually all asphalt based and coal tar pitch materials.

## RedLINE COMPATIBILITY

RedLINE is compatible with many different roofing and waterproofing materials, these includes the following. The list below is by no means complete, RedLINE is compatible with many different products. If you would like a specific product tested with RedLINE please contact SITURA INC.

- Roofing Tars and Asphalts
- Asphaltic Saturants
- Built-Up-Roof (BUR)
- Coal Tar Pitch (CTP)
- Modified Bitumen (SBS/APP)
- Hot Rubberized Asphalt (HRA)
- Liquid Applied Membrane (LAM)
- Cold Adhesives (CAA)
- Spray Polyurethane Foam (SPF)
- Epoxy Resin (ER)
- EPDM Tie-in
- PVC/TPO Tie-in

## RedLINE TYPICAL USES

RedLINE can be used in a wide variety of applications and with different types of waterproofing and roofing materials:

- Roof Expansion/Control Joints
- Plaza Deck Expansion/Control Joints
- Parking Garage Expansion/Control Joints
- PMR Expansion/Control Joints
- Tunnel Expansion/Control Joints
- Vertical Wall Expansion/Control Joints
- Bridge Expansion Joints
- Seismic and Large Movement Joints
- Roof Split Repairs
- Thermoplastic/Thermoset Membrane Tie-in to Asphaltic or Coal Tar Pitch membranes



## RedLINE PHYSICAL PROPERTIES

The performance of RedLINE is measured through standard material performance tests such as elongation, hardness, tensile strength, which determine just some of the key material characteristics sought in joint waterproofing systems. RedLINE has exceeded the standard requirements of industry tests that measure these important physical properties. The RedLINE waterproof joint material is specially formulated with all of these performance characteristics in mind. Careful material selection and the use of only the highest quality raw materials ensures this in every piece of SITURA RedLINE manufactured and installed. The following table describes the key physical properties of typical RedLINE expansion joint material:

**Table 2.3 RedLINE Physical Properties Performance Data**

RedLINE® PHYSICAL PROPERTY TESTED	TEST RESULT
Hardness to ASTM D2240 (Durometer A)	45 ± 5
Elongation at break to ASTM D412	> 500 %
Low temperature flex to ASTM D746	- 70 ° F [- 56.7 ° C]
Tear resistance to ASTM D624 (Die C)	220 lbf/in [38.8 N/mm] min.
Resistance to heat aging, 7 days @ 121 °F [80 °C] change in hardness	± 10 % max.
Resistance to heat aging, 7 days @ 121 °F [80 °C] change in tensile strength	± 10 % max.
Resistance to heat aging, 7 days @ 121 °F [80 °C] change in elongation	± 10 % max.
Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]	± 10 % max.
Resistance to ozone, condition after exposure to 100 pphm ozone in air, with sample under 50% strain, 7 days @ 121 °F [80 °C] to ASTM D1149	+ 100 % max.
Minimum number of cycles of expansion and contraction with the RedLINE material encapsulated in a BUR roof membrane and type II asphalt	> 4500 cycles
Change in weight after immersion in water 7 days @ 121 °F [80 °C] to ASTM D471	< 2 %
Water vapor permeability to ASTM E 96 Method B	0.0020 perms [1.149 ng/Pa s m <sup>2</sup> ] max.
Seam tensile strength to ASTM D816	Same as base material
Puncture test - done to CGSB 37.56 M (1996)	10 lbs [44.5 N] min.
Embedment of fleece selvage edge in Type II / III Asphalt according to CGSB 37.56 M (1996)	23 lbs/in [4.0 N/mm] min.
5000 hours exposure to UV to ASTM G 53	No Cracks or Cracking

## EXPANSION JOINT STANDARD

To date there is no one single ASTM or CGSB standard for expansion joints. Performance and specification of expansion joints is solely based on individual material property test data. No limits of performance have ever been set.

*The information and specifications presented herein, represent the applicable information available at the time of publication. All information and statements herein are expressions of opinion, which by performance and testing are believed to be accurate and reliable.*

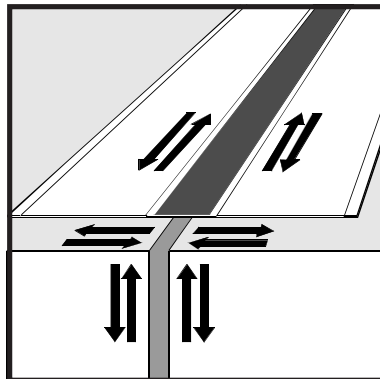
## RedLINE EXPANSION AND CONTRACTION RANGE

The amount of anticipated building movement can be found on architectural or structural drawings. The expansion joint gap dimension shown on drawings does not indicate the building movement. RedLINE product types have the following range of expansion and contraction.

**Table 2.4 RedLINE Waterproof Joint Expansion and Contraction Range**

RedLINE Type	Expansion and Contraction Range (see Fig. 1)			Typical Use
	Horizontal	Vertical	Shear	
<b>RedLINE 06</b>	± 1/4" [ ± 6 mm]	± 1/8" [ ± 3 mm]	± 3/16" [ ± 5 mm]	Small Joint Movement Roofing and Waterproofing
<b>RedLINE 20</b>	± 1" [ ± 25 mm]	± 5/8" [ ± 15 mm]	± 3/8" [ ± 10 mm]	Regular Roofing and Waterproofing
<b>RedLINE 20G</b>	± 1" [ ± 25 mm]	± 5/8" [ ± 15 mm]	± 3/8" [ ± 10 mm]	Sustains 134 ft. [41m] head of water at maximum expansion
<b>RedLINE 40</b>	± 2" [ ± 50 mm]	± 3/4" [ ± 20 mm]	± 3/4" [ ± 20 mm]	Regular Roofing and Waterproofing
<b>RedLINE 40G</b>	± 2½" [ ± 60 mm]	± 3/4" [ ± 20 mm]	± 3/4" [ ± 20 mm]	Sustains 134 ft. [41m] head of water at maximum expansion
<b>RedLINE 100</b>	± 4" [ ± 100 mm]	± 2" [ ± 50 mm]	± 2" [ ± 50 mm]	Regular Roofing and Waterproofing
<b>RedLINE 240</b>	± 10" [ ± 250 mm]	± 4" [ ± 100 mm]	± 4" [ ± 100 mm]	Large Joint Movement Roofing and Waterproofing

All movements are based on limit states design (LSD).  
“G” series material is used for hydrostatic application.



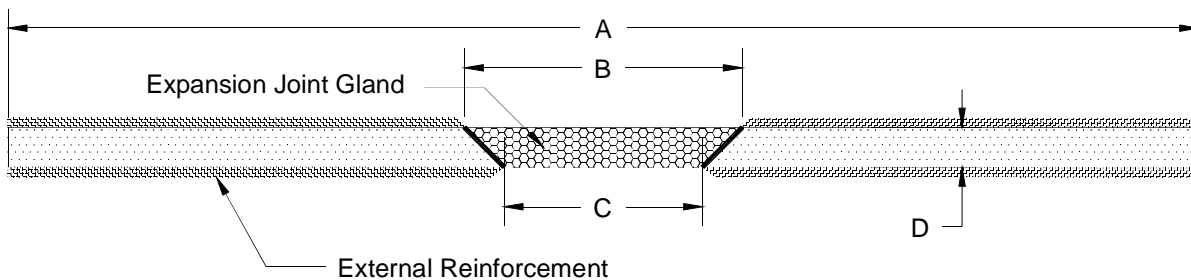
*Fig. 1: RedLINE Expansion and Contraction Movement in Horizontal, Vertical and Shear Directions.*

## RedLINE DIMENSIONS

RedLINE is built up of two selvage edges which have fleece for embedment into a roofing/waterproofing membrane and a center gland which is the expansion/contraction medium for the joint. The following table outlines the key RedLINE dimensions and geometry.

**Table 2.5 RedLINE Waterproof Joint Dimensions**

Property and Material	RedLINE Dimension Data (see Fig. 2)			
	A	B	C	D
<b>RedLINE 06</b>	7" [ 175 mm]	5/8" [ 15 mm]	5/8" [ 15 mm]	71 mil [ 1.8 mm]
<b>RedLINE 20</b>	10½" [ 270 mm]	1½" [ 35 mm]	1" [ 25 mm]	87 mil [ 2.2 mm]
<b>RedLINE 20G</b>	10½" [ 270 mm]	1½" [ 35 mm]	1" [ 25 mm]	118 mil [ 3.0 mm]
<b>RedLINE 40</b>	13½" [ 340 mm]	2¼" [ 55 mm]	1¾" [ 45 mm]	87 mil [ 2.2 mm]
<b>RedLINE 40G</b>	13½" [ 340 mm]	2¼" [ 55 mm]	1¾" [ 45 mm]	118 mil [ 3.0 mm]
<b>RedLINE 100</b>	16" [ 400 mm]	4¾" [ 120 mm]	4" [ 100 mm]	118 mil [ 3.0 mm]
<b>RedLINE 240</b>	22¼" [ 560 mm]	11" [ 280 mm]	10" [ 260 mm]	118 mil [ 3.0 mm]



*Fig. 2: RedLINE Dimension.*

## HYDROSTATIC PRESSURE RESISTANT JOINTS

Expansion joints underground or in holding tanks have to withstand hydrostatic pressure such as groundwater and fluid containment pressure. Hydrostatic pressure is the pressure exerted by water in the ground (ground water) - the more "head" or height of water, the higher the pressure.

**The RedLINE "G" series expansion joints are specifically designed for use when additional pressure or puncture resistance requirements are a factor.** The "G" series products have been tested to determine their performance when subjected to expansion of the joint and water pressure simultaneously. The following table summarizes the results:

**Table 2.6 "G" Series Waterproof Joint Pressure Ratings**

RedLINE "G" Series Type	Maximum Expansion	Hydrostatic Pressure at Maximum Expansion**	
	Expansion sustained for 60 days*	Pressure	Water Column (conventional)
<b>20G</b>	+ 1" [ + 25 mm]	58 psi [ 400 kPa]	134 ft [41 m]
<b>40G</b>	+ 2½" [ + 60 mm]	58 psi [ 400 kPa ]	134 ft [41 m]

\* The test was discontinued after 60 days as there was no water leakage.

\*\* Working Stress - unfactored

## USE OF JOINTS IN FIRE RATED ASSEMBLIES

Certain joint constructions require fireproof or time-rated fire assemblies. RedLINE, FlamLINE and AquaLINE do not support combustion, their primary function is joint waterproofing. However, these joints can be used in conjunction with specific commercially available fire stop systems to achieve a fire rated joint. To learn more, please contact SITURA for specific applications.

# RedLINE® 06 Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 06 waterproof expansion joint system is used for waterproofing expansion joints in structures, where there are small movements, typically building closure joints, concrete crack repair such as commercial and repair of splits in roofing and waterproofing membranes. RedLINE 06 is specifically designed to accommodate movements, up to 1/4" [6 mm]. RedLINE 06 is typically installed in an epoxy resin.

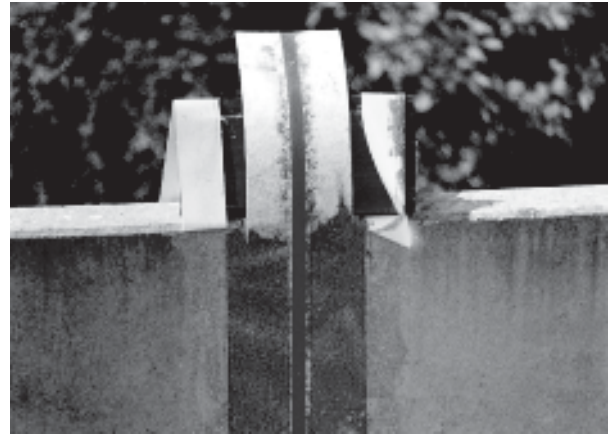
RedLINE 06 is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required.

The flat profile of the RedLINE 06 joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water as well as it's flat profile is unobtrusive to building finishes. RedLINE 06 is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

## TYPICAL USES

RedLINE 06 waterproof expansion joint system is designed to be used for:

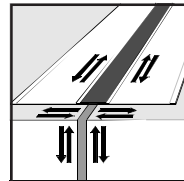
- Concrete Control Joints
- Prefabricated Panel Joints
- Repairing Roof Splits
- Waterproofing Concrete Saw Cut Joints
- Small Building Closure Joints
- Crack Control Joints
- Pavement Control Joints
- Precast Panel Joints
- Crack Control Joints



*RedLINE 06 being installed in epoxy.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 06 waterproof expansion joint system is designed to accommodate 3 way movements concurrently.



Movement	RedLINE 06
Horizontal	± 1/4" [± 6 mm]
Vertical	± 1/8" [± 3 mm]
Shear	± 3/16" [± 5 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	180 lbs/in [32.14 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	5 lbs [22 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 06
Thickness	0.071" [1.8 mm]
Roll Width	7" [175 mm]
Expansion Joint Gland Width	5/8" [15 mm]
Roll Length	Endless
Weight	0.15lb/ft [0.23kg/m]
Color	Red or grey

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 06 expansion joint fleece to get wet.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of RedLINE 06 waterproof expansion joint material. Roll out the RedLINE 06 and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation. Align the center line of the expansion joint gap or gap with the centre line of the RedLINE 06 waterproof expansion joint material, and verify the RedLINE 06 conformance to site details prior to the application. Below is a brief description of typical RedLINE applications.

### ***Installation in Epoxy Resin: (Recommended Application)***

RedLINE 06 is frequently installed on a concrete substrate. The preferred method is using a two part epoxy resin. The RedLINE material is laid down in a prepared bed of epoxy. The underside surface of the RedLINE is NOT coated. The RedLINE is pressed firmly into the epoxy, to wholly encapsulate the polyester fleece. Once the underside surface of the RedLINE has been laid into the epoxy resin bed, the top side fleece surface is coated. A uniform layer 1/16" [2 mm] thick is applied to the top side surface of the RedLINE, using a trowel. All the exposed fleece material must be covered. The epoxy must encapsulate wholly a minimum of 1¾" [40 mm] of the RedLINE fleece edging and extend a minimum of ¾" [20 mm] onto the substrate.

## ADDITIONAL PROTECTION COURSE

RedLINE 06 can be additionally protected from mechanical damage by the installation of a strip of light gauge metal flashing can be used.

# RedLINE® 20 Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 20 waterproof expansion joint system is used for waterproofing expansion joints in structures, such as commercial and industrial buildings, parking garages, tunnels, etc. RedLINE 20 is specifically designed to accommodate building movements, up to 1" [25 mm]. RedLINE 20 can be installed in variety of roofing and waterproofing membrane systems, these include Built-Up-Roofing, mopped Modified Bitumen, Hot Rubberized Asphalt, Spray Polyurethane Foam and Epoxy Resin.

RedLINE 20 is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required.

The advantages of using RedLINE 20 include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE expansion joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE 20 is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

## TYPICAL USES

RedLINE 20 waterproof expansion joint system is designed to be used for:

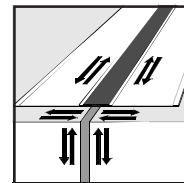
- Roof Expansion Joints
- Sub Grade (Waterproofing) Expansion Joints
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Protected Roof Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Building Closure Joints
- Roof Control Joints



*RedLINE 20 being installed in BUR.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 20 waterproof expansion joint system is designed to accommodate 3 way building movements concurrently.



Movement	RedLINE 20
Horizontal	± 1" [± 25 mm]
Vertical	± 5/8" [± 15 mm]
Shear	± 3/8" [± 10 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	220 lbs/in [38.52 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	10 lbs [45.35 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 20
Thickness	0.087" [2.2 mm]
Roll Width	10½" [270 mm]
Expansion Joint Gland Width	1½" [35 mm]
Roll Length	Endless
Weight	0.45 lb/ft [0.67 kg/m]
Color	Red



## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 20 expansion joint fleece to get wet.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of RedLINE 20 waterproof expansion joint material. Roll out the RedLINE 20 and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation. Align the center line of the expansion joint gap with the centre line of the RedLINE 20 waterproof expansion joint material, and verify the RedLINE 20 conformance to site details prior to the application.

### ***Installation in Asphalt:***

RedLINE 20 is installed typically in an asphaltic based medium. Apply the base coat of the asphaltic medium directly to the substrate and embed the RedLINE 20 waterproof expansion joint material, and making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 20 material into the hot asphalt material. Always lay the RedLINE 20 expansion joint material only in lengths of 10 feet [3 m] or less to allow for contact with the hot asphalt material. Do not lay the RedLINE 20 in cold asphalt. Spread an even coat of asphalt on the top surface of the RedLINE 20 expansion joint ensuring the top white polyester fleece is completely covered and strip in felt plies.

### ***Installation in Modified Bitumen:***

RedLINE 20 can be installed with a modified bitumen membrane either by mopping or torching. Mopping is preferred, however on occasion torching may be required.

#### ***Mopping Application:***

The bottom surface of the RedLINE is mopped to a modified bitumen base sheet with asphalt. The RedLINE can be stripped in by torching (see below) or by mopping in a modified bitumen cap sheet. Mopping of the cap sheet is done in the conventional manner of mopping in stripping plies.

#### ***Torching Application:***

The bottom surface of the RedLINE is rolled in to a torch liquefied modified bitumen base sheet. The RedLINE can be stripped by torching the modified bitumen cap sheet. For torching application the polyester fleece on the top surface of the RedLINE must be primed with a glaze coat of asphalt prior to the torching. When torching the modified cap sheet, the modified bitumen cap sheet must be torched to the asphalt primed RedLINE fleece, without directing the torching flame on to the RedLINE gland. The "torch and flop" technique is recommended.

### ***Installation in Hot Rubberized Asphalt:***

Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness, immediately embed the RedLINE 20 waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 20 material into the hot asphalt. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE 20 expansion joint ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh overlapping the edge of the RedLINE 20 by 2"-3" [50 mm to 75 mm] and ensuring full contact. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.

## ADDITIONAL PROTECTION COURSE

RedLINE 20 can be additionally protected from mechanical damage by the installation of a 12" [300 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# RedLINE® 20G Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 20G waterproof expansion joint system is used for waterproofing expansion joints in structures, such as commercial and industrial buildings, parking garages, tunnels, etc. RedLINE 20G is specifically designed to accommodate building movements, up to 1" [25 mm] under significant hydrostatic pressure. RedLINE 20G can be installed in variety of roofing and waterproofing membrane systems, these include Built-Up-Roofing, mopped Modified Bitumen, Hot Rubberized Asphalt, Spray Polyurethane Foam and Epoxy Resin.

RedLINE 20G is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required.

The advantages of using RedLINE 20G include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE expansion joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE 20G is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

## TYPICAL USES

RedLINE 20G waterproof expansion joint system is designed to be used for:

- Protected Roof Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Foundation Wall Expansion Joints
- Joints in Fluid Containment Structures
- Waterproofing Joints under Hydrostatic Pressure

## HYDROSTATIC HEAD

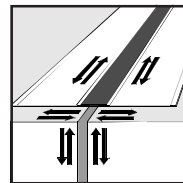
RedLINE 20G can withstand 134 ft [41 m] head of water while sustaining an expansion of 1" [25 mm].



*RedLINE 20G installed in Hot Rubberized Asphalt.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 20G waterproof expansion joint system is designed to accommodate 3 way building movements concurrently under a hydrostatic head.



Movement	RedLINE 20G
Horizontal	± 1" [± 25 mm]
Vertical	± 5/8" [± 15 mm]
Shear	± 3/8" [± 10 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	250 lbs/in [44.64 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	15 lbs [68.10 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 20G
Thickness	0.118" [3.0 mm]
Roll Width	10½" [270 mm]
Expansion Joint Gland Width	1½" [35 mm]
Roll Length	Endless
Weight	0.90 lb/ft [1.34 kg/m]
Color	Red

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 20G expansion joint fleece to get wet.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of RedLINE 20G waterproof expansion joint material. Roll out the RedLINE 20G and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation. Align the center line of the expansion joint gap with the centre line of the RedLINE 20G waterproof expansion joint material, and verify the RedLINE 20G conformance to site details prior to the application.

### ***Installation in Asphalt:***

RedLINE 20G is installed typically in an asphaltic based medium. Apply the base coat of the asphaltic medium directly to the substrate and embed the RedLINE 20G waterproof expansion joint material, and making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 20G material into the hot asphalt material. Always lay the RedLINE 20G expansion joint material only in lengths of 10 feet [3 m] or less to allow for contact with the hot asphalt material. Do not lay the RedLINE 20G in cold asphalt. Spread an even coat of asphalt on the top surface of the RedLINE 20G expansion joint ensuring the top white polyester fleece is completely covered and strip in felt plies.

### ***Installation in Modified Bitumen:***

RedLINE 20G can be installed with a modified bitumen membrane either by mopping or torching. Mopping is preferred, however on occasion torching may be required.

#### ***Mopping Application:***

The bottom surface of the RedLINE is mopped to a modified bitumen base sheet with asphalt. The RedLINE can be stripped in by torching (see below) or by mopping in a modified bitumen cap sheet. Mopping of the cap sheet is done in the conventional manner of mopping in stripping plies.

#### ***Torching Application:***

The bottom surface of the RedLINE is rolled in to a torch liquefied modified bitumen base sheet. The RedLINE can be stripped by torching the modified bitumen cap sheet. For torching application the polyester fleece on the top surface of the RedLINE must be primed with a glaze coat of asphalt prior to the torching. When torching the modified cap sheet, the modified bitumen cap sheet must be torched to the asphalt primed RedLINE fleece, without directing the torching flame on to the RedLINE gland. The "torch and flop" technique is recommended.

### ***Installation in Hot Rubberized Asphalt:***

Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness, immediately embed the RedLINE 20G waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 20G material into the hot asphalt. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE 20G expansion joint ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh overlapping the edge of the RedLINE 20G by 2"-3" [50 mm to 75 mm] and ensuring full contact. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.

## ADDITIONAL PROTECTION COURSE

RedLINE 20G can be additionally protected from mechanical damage by the installation of a 12" [300 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# RedLINE® 40 Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 40 waterproof expansion joint system is used for waterproofing expansion joints in structures, such as commercial and industrial buildings, parking garages, tunnels, etc. RedLINE 40 is specifically designed to accommodate building movements, up to 2" [50 mm]. RedLINE 40 can be installed in variety of roofing and waterproofing membrane systems, these include Built-Up-Roofing, Coal Tar Pitch, mopped Modified Bitumen, Hot Rubberized Asphalt, Spray Polyurethane Foam and Epoxy Resin.

RedLINE 40 is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic sealed joints. Seaming can also be done on site if required.

The advantages of using RedLINE 40 include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE expansion joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE 40 is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

## TYPICAL USES

RedLINE 40 waterproof expansion joint system is designed to be used for:

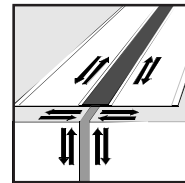
- Roof Expansion Joints
- Sub Grade (Waterproofing) Expansion Joints
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Protected Roof Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Building Closure Joints
- Roof Control Joints



*RedLINE 40 being installed in BUR.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 40 waterproof expansion joint system is designed to accommodate 3 way building movements concurrently.



Movement	RedLINE 40
Horizontal	± 2" [± 50 mm]
Vertical	± 3/4" [± 20 mm]
Shear	± 3/4" [± 20 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	220 lbs/in [38.52 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	10 lbs [45.35 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 40
Thickness	0.087" [2.2 mm]
Roll Width	13½" [340 mm]
Expansion Joint Gland Width	2¼" [55 mm]
Roll Length	Endless
Weight	0.55 lb/ft [0.81 kg/m]
Color	Red

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 40 expansion joint fleece to get wet.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of RedLINE 40 waterproof expansion joint material. Roll out the RedLINE 40 and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation. Align the center line of the expansion joint gap with the centre line of the RedLINE 40 waterproof expansion joint material, and verify the RedLINE 40 conformance to site details prior to the application.

### ***Installation in Asphalt:***

RedLINE 40 is installed typically in an asphaltic based medium. Apply the base coat of the asphaltic medium directly to the substrate and embed the RedLINE 40 waterproof expansion joint material, and making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 40 material into the hot asphalt material. Always lay the RedLINE 40 expansion joint material only in lengths of 10 feet [3 m] or less to allow for contact with the hot asphalt material. Do not lay the RedLINE 40 in cold asphalt. Spread an even coat of asphalt on the top surface of the RedLINE 40 expansion joint ensuring the top white polyester fleece is completely covered and strip in felt plies.

### ***Installation in Modified Bitumen:***

RedLINE 40 can be installed with a modified bitumen membrane either by mopping or torching. Mopping is preferred, however on occasion torching may be required.

#### ***Mopping Application:***

The bottom surface of the RedLINE is mopped to a modified bitumen base sheet with asphalt. The RedLINE can be stripped in by torching (see below) or by mopping in a modified bitumen cap sheet. Mopping of the cap sheet is done in the conventional manner of mopping in stripping plies.

#### ***Torching Application:***

The bottom surface of the RedLINE is rolled in to a torch liquefied modified bitumen base sheet. The RedLINE can be stripped by torching the modified bitumen cap sheet. For torching application the polyester fleece on the top surface of the RedLINE must be primed with a glaze coat of asphalt prior to the torching. When torching the modified cap sheet, the modified bitumen cap sheet must be torched to the asphalt primed RedLINE fleece, without directing the torching flame on to the RedLINE gland. The "torch and flop" technique is recommended.

### ***Installation in Hot Rubberized Asphalt:***

Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness, immediately embed the RedLINE 40 waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 40 material into the hot asphalt. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE 40 expansion joint ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh overlapping the edge of the RedLINE 40 by 2"-3" [50 mm to 75 mm] and ensuring full contact. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.

## ADDITIONAL PROTECTION COURSE

RedLINE 40 can be additionally protected from mechanical damage by the installation of a 12" [300 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# RedLINE® 40G Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 40G waterproof expansion joint system is used for waterproofing expansion joints in structures, such as commercial and industrial buildings, parking garages, tunnels, etc. RedLINE 40G is specifically designed to accommodate building movements, up to 2" [50 mm] under significant hydrostatic pressure. RedLINE 40G can be installed in variety of roofing and waterproofing membrane systems, these include Built-Up-Roofing, Coal Tar Pitch, Modified Bitumen, Hot Rubberized Asphalt, Spray Polyurethane Foam and Epoxy Resin.

RedLINE 40G is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required.

The advantages of using RedLINE 40G include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE expansion joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE 40G is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

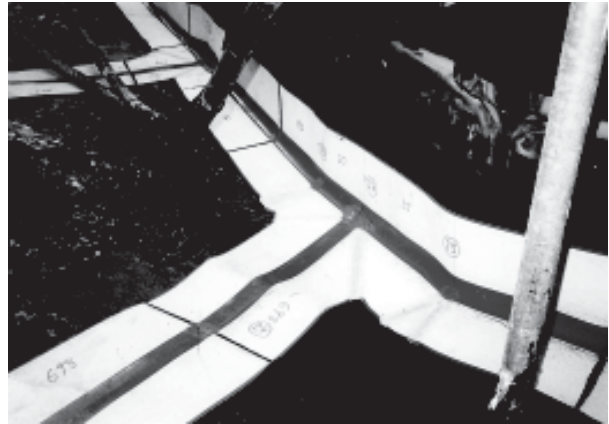
## TYPICAL USES

RedLINE 40G waterproof expansion joint system is designed to be used for:

- Protected Roof Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Foundation Wall Expansion Joints
- Joints in Fluid Containment Structures
- Waterproofing Joints under Hydrostatic Pressure

## HYDROSTATIC HEAD

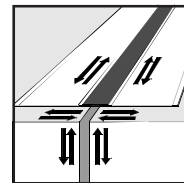
RedLINE 40G can withstand 134 ft [41 m] head of water while sustaining an expansion of 2" [50 mm].



*RedLINE 40G installed for a hydrostatic application.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 40G waterproof expansion joint system is designed to accommodate 3 way building movements concurrently under a hydrostatic head.



Movement	RedLINE 40G
Horizontal	± 2½" [± 60 mm]
Vertical	± ¾" [± 20 mm]
Shear	± ¾" [± 20 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	250 lbs/in [44.64 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	15 lbs [68.10 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 40G
Thickness	0.118" [3.0 mm]
Roll Width	13½" [340 mm]
Expansion Joint Gland Width	2¼" [55 mm]
Roll Length	Endless
Weight	0.81 lb/ft [1.20 kg/m]
Color	Red

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 40G expansion joint fleece to get wet.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of RedLINE 40G waterproof expansion joint material. Roll out the RedLINE 40G and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation. Align the center line of the expansion joint gap with the centre line of the RedLINE 40G waterproof expansion joint material, and verify the RedLINE 40G conformance to site details prior to the application.

### ***Installation in Asphalt:***

RedLINE 40G is installed typically in an asphaltic based medium. Apply the base coat of the asphaltic medium directly to the substrate and embed the RedLINE 40G waterproof expansion joint material, and making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 40G material into the hot asphalt material. Always lay the RedLINE 40G expansion joint material only in lengths of 10 feet [3 m] or less to allow for contact with the hot asphalt material. Do not lay the RedLINE 40G in cold asphalt. Spread an even coat of asphalt on the top surface of the RedLINE 40G expansion joint ensuring the top white polyester fleece is completely covered and strip in felt plies.

### ***Installation in Modified Bitumen:***

RedLINE 40G can be installed with a modified bitumen membrane either by mopping or torching. Mopping is preferred, however on occasion torching may be required.

#### ***Mopping Application:***

The bottom surface of the RedLINE is mopped to a modified bitumen base sheet with asphalt. The RedLINE can be stripped in by torching (see below) or by mopping in a modified bitumen cap sheet. Mopping of the cap sheet is done in the conventional manner of mopping in stripping plies.

#### ***Torching Application:***

The bottom surface of the RedLINE is rolled in to a torch liquefied modified bitumen base sheet. The RedLINE can be stripped by torching the modified bitumen cap sheet. For torching application the polyester fleece on the top surface of the RedLINE must be primed with a glaze coat of asphalt prior to the torching. When torching the modified cap sheet, the modified bitumen cap sheet must be torched to the asphalt primed RedLINE fleece, without directing the torching flame on to the RedLINE gland. The "torch and flop" technique is recommended.

### ***Installation in Hot Rubberized Asphalt:***

Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness, immediately embed the RedLINE 40G waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 40G material into the hot asphalt. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE 40G expansion joint ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh overlapping the edge of the RedLINE 40G by 2"-3" [50 mm to 75 mm] and ensuring full contact. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.

## ADDITIONAL PROTECTION COURSE

RedLINE 40G can be additionally protected from mechanical damage by the installation of a 12" [300 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# RedLINE® 40G-110 Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 40G-110 waterproof expansion joint system is used for waterproofing expansion joints in structures, such as commercial and industrial buildings, parking garages, tunnels, etc. RedLINE 40G-110 is specifically designed to accommodate building movements, up to 2½" [62 mm] under significant hydrostatic pressure. RedLINE 40G-110 is designed to be used with two part methyl methacrylate based acrylic resins commonly called PMMA and epoxy resins as well as fast curing polyurethanes and Liquid Membranes.

RedLINE 40G-110 is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required.

The advantages of using RedLINE 40G-110 include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE expansion joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE 40G-110 is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

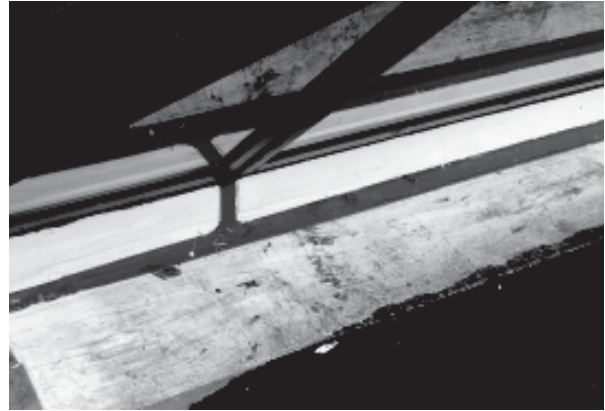
## TYPICAL USES

RedLINE 40G-110 waterproof expansion joint system is designed to be used for:

- Protected Roof Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Foundation Wall Expansion Joints
- Joints in Fluid Containment Structures
- Waterproofing Joints under Hydrostatic Pressure

## HYDROSTATIC HEAD

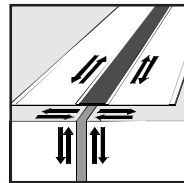
RedLINE 40G-110 can withstand 134 ft [41 m] head of water while sustaining an expansion of 2" [50 mm].



*RedLINE 40G-110 in a curtain wall application.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 40G-110 waterproof expansion joint system is designed to accommodate 3 way building movements concurrently under a hydrostatic head.



#### Movement RedLINE 40G-110

Horizontal	± 2½" [± 62 mm]
Vertical	± 1" [± 25 mm]
Shear	± 1" [± 25 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	250 lbs/in [44.64 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	15 lbs [68.10 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 40G-110
Thickness	0.118" [3.0 mm]
Roll Width	13½" [340 mm]
Expansion Joint Gland Width	2¼" [55 mm]
Roll Length	Endless
Weight	0.81 lb/ft [1.20 kg/m]
Color	Red
Fleece Weight:	0.040 oz/ft² [120 g/m²]

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 40G-110 expansion joint fleece to get wet.

## SURFACE PREPARATION

Ensure that all substrates are free of dust, oil, grease, and other debris. If the surface is contaminated, clean the surface before proceeding. For metal surfaces remove any grease or oils using a commercial degreasing agent such as TSP. Once the metal surface is clean, roughen the surface to white-metal using a grinding tool. Granule surfaces do not require preparation other than cleaning to ensure that the surface is free of debris or materials that may interfere with resin adhesion. Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

### **RedLINE Application with a two part ethyl methacrylate based acrylic resin PMMA:**

The first step is to prepare the RedLINE and layout the material. Snap a straight edge using a chalk line to clearly indicate the areas to receive the resin. The line should correspond with the edge of the fleece on the gland-side and be ½ inch [13 mm] beyond the outer edge of the fleece on the opposite side. Apply masking tape along the outside of each line to allow for a clean, straight line of resin. Once the RedLINE is properly laid and aligned it can be encapsulated in the PMMA resin. The following describes the application in a vertical to horizontal joint configuration. The vertical surfaces are treated first.

**Vertical Surface Application:** The catalyzed PMMA resin is first “worked into” the fleece-surfaced flange of the RedLINE using a mini-roller to ensure full saturation. A generous layer of PMMA flashing resin is also applied to the surfaces to receive the RedLINE fleece-flange. The RedLINE fleece-flange is then set into place, ensuring that full contact is made and a wet film is present between the substrate and RedLINE fleece-flange surface during cure. The wet film must be present until the resin is allowed to cure and adhere the flange to the underlying substrate surfaces. Typical consumption will be a minimum of 0.62 lbs/ft² [3.00 kg/m²]. The use of a jig may be required to ensure that the fleece-flange of the RedLINE remains stable and in contact with the underlying substrate until the resin is allowed to cure. To attain a proper bond to the substrate, the RedLINE shall be under continuous pressure. The RedLINE is then stripped in using a single-layer configuration of flashing over the fleece-flange of the RedLINE. The flashing membrane shall cover the entire fleece-flange of the RedLINE and extend a minimum 2” [50 mm] beyond the leading edge of the RedLINE onto the flashing substrate. The resin is first “worked into” the fleece to achieve full saturation using a mini-roller. A generous resin coating shall then be applied over the saturated fleece and flashing substrates. The reinforcing fabric is then set into place and embedded into the wet resin using a wet, but not saturated, roller. The top coat of resin is then applied. The base coat shall be applied at approximately 0.41 lbs/ft² [2 kg/ft²] of resin. Granular surfaces may require more resin to maintain acceptable mil thickness. The top coat shall be applied at approximately 0.27 lbs/ft² [1.30 kg/m²] of resin.

**Horizontal Surface Application:** The fleece-flange of the RedLINE to be applied on horizontal surfaces requires a two-ply configuration of compatible membrane flashing over the fleece-flange. Masking tape can be used to create clean lines of resin. The first ply shall extend a minimum 2” [50 mm] onto the RedLINE 40G-110 fleece-flange and a minimum of 3” [75 mm] onto the horizontal surface. The second layer shall cover the entire flange of the RedLINE and extend a minimum 2” [50 mm] beyond the outer edge of the first flashing course onto the substrate surface. Masking tape can be used to ensure a clean line of application for the second layer. The PMMA resin is first “worked into” the RedLINE fleece to achieve full saturation using a mini-roller. Apply a generous coat of the resin over the saturated RedLINE fleece-flange and substrate surfaces. A reinforcing fabric is then set into place and embedded into the wet resin using a wet, but not saturated, roller. The top coat of resin is then applied. Following cure, the second layer is applied in the same manner. The base coat shall be applied at approximately 0.41 lbs/ft² [2 kg/ft²] of resin. Granular surfaces will require 50% more PMMA resin to maintain acceptable mil thickness. The top coat of PMMA resin shall be applied at approximately 0.27 lbs/ft² [1.30 kg/m²] of resin.

**Leading edge sealant:** It is recommended that a sealant bead be applied to the leading edges of the PMMA resin on the RedLINE gland. This is recommended for both horizontal and vertical applications. The sealant should be compatible with both the waterproofing/roofing membrane and the SITURA expansion joint.

## ADDITIONAL PROTECTION COURSE

RedLINE 40G-110 can be additionally protected from mechanical damage by the installation of a 12” [300 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete

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# RedLINE® 100 Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 100 waterproof expansion joint system is used for waterproofing expansion joints in structures, such as commercial and industrial buildings, parking garages, tunnels, etc. RedLINE 100 is specifically designed to accommodate building movements, up to 4" [100 mm]. It is primarily used in situations where RedLINE 40 cannot adequately span the joint gap. RedLINE 100 can be installed in variety of roofing and waterproofing membrane systems, these include Built-Up-Roofing, Coal Tar Pitch, mopped Modified Bitumen, Hot Rubberized Asphalt, Spray Polyurethane Foam and Epoxy Resin.

RedLINE 100 is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required.

The advantages of using RedLINE 100 include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE expansion joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE 100 is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

## TYPICAL USES

RedLINE 100 waterproof expansion joint system is designed to be used for:

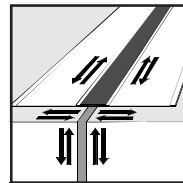
- Roof Expansion Joints
- Sub Grade (Waterproofing) Expansion Joints
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Building Closure Joints
- Seismic and Large Movement Joints



*A RedLINE 100 installation.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 100 waterproof expansion joint system is designed to accommodate 3 way building movements concurrently.



Movement	RedLINE 100
Horizontal	± 4" [± 100 mm]
Vertical	± 2" [± 50 mm]
Shear	± 2" [± 50 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	250 lbs/in [44.64 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	15 lbs [68.10 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 100
Thickness	0.118" [3.0 mm]
Roll Width	16" [400 mm]
Expansion Joint Gland Width	4¾" [120 mm]
Roll Length	Endless
Weight	0.77 lb/ft [1.15 kg/m]
Color	Red

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 100 expansion joint fleece to get wet.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of RedLINE 100 waterproof expansion joint material. Roll out the RedLINE 100 and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation. Align the center line of the expansion joint gap with the centre line of the RedLINE 100 waterproof expansion joint material, and verify the RedLINE 100 conformance to site details prior to the application.

### ***Installation in Asphalt:***

RedLINE 100 is installed typically in an asphaltic based medium. Apply the base coat of the asphaltic medium directly to the substrate and embed the RedLINE 100 waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 100 material into the hot asphalt material. Always lay the RedLINE 100 expansion joint material only in lengths of 10 feet [3 m] or less to allow for contact with the hot asphalt material. Do not lay the RedLINE 100 in cold asphalt. Spread an even coat of asphalt on the top surface of the RedLINE 100 expansion joint ensuring the top white polyester fleece is completely covered and strip in felt plies.

### ***Installation in Modified Bitumen:***

RedLINE 100 can be installed with a modified bitumen membrane either by mopping or torching. Mopping is preferred, however on occasion torching may be required.

#### ***Mopping Application:***

The bottom surface of the RedLINE is mopped to a modified bitumen base sheet with asphalt. The RedLINE can be stripped in by torching (see below) or by mopping in a modified bitumen cap sheet. Mopping of the cap sheet is done in the conventional manner of mopping in stripping plies.

#### ***Torching Application:***

The bottom surface of the RedLINE is rolled in to a torch liquefied modified bitumen base sheet. The RedLINE can be stripped by torching the modified bitumen cap sheet. For torching application the polyester fleece on the top surface of the RedLINE must be primed with a glaze coat of asphalt prior to the torching. When torching the modified cap sheet, the modified bitumen cap sheet must be torched to the asphalt primed RedLINE fleece, without directing the torching flame on to the RedLINE gland. The "torch and flop" technique is recommended.

### ***Installation in Hot Rubberized Asphalt:***

Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness, immediately embed the RedLINE 100 waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 100 material into the hot asphalt. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE 100 expansion joint ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh overlapping the edge of the RedLINE 100 by 2"-3" [50 mm to 75 mm] and ensuring full contact. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.

## ADDITIONAL PROTECTION COURSE

RedLINE 100 can be additionally protected from mechanical damage by the installation of a 14" [350 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# RedLINE® 240 Waterproof Expansion Joint System

## DESCRIPTION

RedLINE 240 waterproof expansion joint system is used for waterproofing expansion joints in structures, such as commercial and industrial buildings, parking garages, tunnels, etc. RedLINE 240 is specifically designed to accommodate large building movements, up to 10" [250 mm]. RedLINE 240 can be installed in variety of roofing and waterproofing membrane systems, these include Built-Up-Roofing, Coal Tar Pitch, mopped Modified Bitumen, Hot Rubberized Asphalt, Spray Polyurethane Foam and Epoxy Resin.

RedLINE 240 is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required.

The advantages of using RedLINE 240 include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE expansion joint also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE 240 is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to the effects of weathering.

## TYPICAL USES

RedLINE 240 waterproof expansion joint system is designed to be used for:

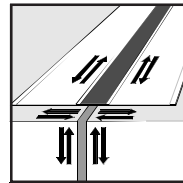
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Protected Roof Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Seismic and Large Movement Joints



*RedLINE 240 being installed.*

### EXPANSION/CONTRACTION RANGE DATA

The RedLINE 240 waterproof expansion joint system is designed to accommodate 3 way building movements concurrently.



Movement	RedLINE 240
Horizontal	± 10" [± 250 mm]
Vertical	± 4" [± 100 mm]
Shear	± 4" [± 100 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	250 lbs/in [44.64 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	15 lbs [68.10 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking
Chemical Resistance to: Acids, Alkalies, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	RedLINE 240
Thickness	0.118" [3.0 mm]
Roll Width	22¼" [560 mm]
Expansion Joint Gland Width	11" [280 mm]
Roll Length	Endless
Weight	1.14 lb/ft [1.70 kg/m]
Color	Red

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE 240 expansion joint fleece to get wet.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of RedLINE 240 waterproof expansion joint material. Roll out the RedLINE 240 and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation. Align the center line of the expansion joint gap with the centre line of the RedLINE 240 waterproof expansion joint material, and verify the RedLINE 240 conformance to site details prior to the application.

### ***Installation in Asphalt:***

RedLINE 240 is installed typically in an asphaltic based medium. Apply the base coat of the asphaltic medium directly to the substrate and embed the RedLINE 240 waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 240 material into the hot asphalt material. Always lay the RedLINE 240 expansion joint material only in lengths of 10 feet [3 m] or less to allow for contact with the hot asphalt material. Do not lay the RedLINE 240 in cold asphalt. Spread an even coat of asphalt on the top surface of the RedLINE 240 expansion joint ensuring the top white polyester fleece is completely covered and strip in felt plies.

### ***Installation in Modified Bitumen:***

RedLINE 240 can be installed with a modified bitumen membrane either by mopping or torching. Mopping is preferred, however on occasion torching may be required.

#### ***Mopping Application:***

The bottom surface of the RedLINE is mopped to a modified bitumen base sheet with asphalt. The RedLINE can be stripped in by torching (see below) or by mopping in a modified bitumen cap sheet. Mopping of the cap sheet is done in the conventional manner of mopping in stripping plies.

#### ***Torching Application:***

The bottom surface of the RedLINE is rolled in to a torch liquefied modified bitumen base sheet. The RedLINE can be stripped by torching the modified bitumen cap sheet. For torching application the polyester fleece on the top surface of the RedLINE must be primed with a glaze coat of asphalt prior to the torching. When torching the modified cap sheet, the modified bitumen cap sheet must be torched to the asphalt primed RedLINE fleece, without directing the torching flame on to the RedLINE gland. The "torch and flop" technique is recommended.

### ***Installation in Hot Rubberized Asphalt:***

Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness, immediately embed the RedLINE 240 waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE 240 material into the hot asphalt. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE 240 expansion joint ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh overlapping the edge of the RedLINE 240 by 2"-3" [50 mm to 75 mm] and ensuring full contact. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.

## ADDITIONAL PROTECTION COURSE

RedLINE 240 can be additionally protected from mechanical damage by the installation of a 16" [400 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

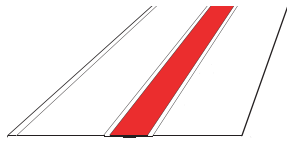
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# RedLINE® Tie-in for Single Ply Membranes

## DESCRIPTION

RedLINE Tie-in is a dual roof membrane tie-in system. It effectively solves the problem detail of single ply roof membrane connection to other incompatible roof systems. The RedLINE Tie-in material is specially formulated to provide a long term performance solution to cross roofing system compatibility, specifically between Built-Up-Roofing, Coal Tar Pitch, mopped Modified Bitumen, Hot Rubberized Asphalt, Spray Polyurethane Foam and single ply roofing systems such as thermoplastic and thermoset.



The RedLINE Tie-in is comprised of a continuous material strip compounded of a specially formulated elastomer with polyester

fleece embedded in the selvage edge on both sides. RedLINE Tie-in is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process, which results in monolithic and elastic seamed joints. Seaming can also be done on site if required. The advantages of using RedLINE Tie-in include the elimination of wood curbs, metal components such as metal flashing, nails and screws, caulked or glued seams resulting in significant labor savings. The flat profile of the RedLINE Tie-in also does not obstruct the flow of water to drainage resulting in the elimination of ponded water. RedLINE Tie-in is manufactured from a saturated elastomer which is chemically stable and has excellent resistance to weathering.

## ADVANTAGES

RedLINE Tie-in has number of advantages over conventional tie-in solutions:

- No restrictions as to ponding water or direction of water flow against seam laps
- Flat profile, Waterproof, vulcanized seams
- Any detailing and unique shapes possible
- Compatible with Thermoset/Thermoplastic membranes along with either Built-Up-Roofs (BUR), Modified Bitumen or Coal Tar Pitch

## MATERIAL DATA

The RedLINE Tie-in is used to connect two incompatible roof membrane assemblies.

## TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	45 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	500 %
Tear Resistance ASTM D-624 Die C (minimum)	220 lbs/in [38.52 N/mm]
Puncture Test CGSB 37.56 M96 (minimum)	15 lbs [68.10 N]
UV Exposure ASTM G-53 5000 hours	No Cracks or Cracking

Chemical Resistance to:  
Acids, Alkalis, Polar Solvents  
Saline Solutions

No effect

## PHYSICAL DATA

Property	RedLINE Tie-in
Thickness	0.118" [3.0 mm]
Roll Width	12" to 24" [300 mm to 600 mm]
Tie-in width	Min. 4" [100 mm]
Roll Length	Endless
Weight	0.55 to 0.81 lb/ft [0.80 to 1.20 kg/m]
Color	Red

## MOVEMENT RANGE

The RedLINE Tie-in has a restricted movement range depending on actual site conditions and existing tie-in membranes. To obtain specific engineering criteria please contact SITURA at 1-888-4-SITURA (1-888-474-8872).

## TYPICAL USES

The RedLINE Tie-in can be used in variety of situations, when incompatible materials have to tie in.

- BUR/EPDM (or PVC) Roof Tie-in
- Modified Bitumen/EPDM (or PVC) Tie-in
- Coal Tar Pitch/EPDM (or PVC) Tie-in
- Protected Roof Membrane Assembly tie in to a regular roof

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area. Do not allow the RedLINE Tie-in fleece to get wet.

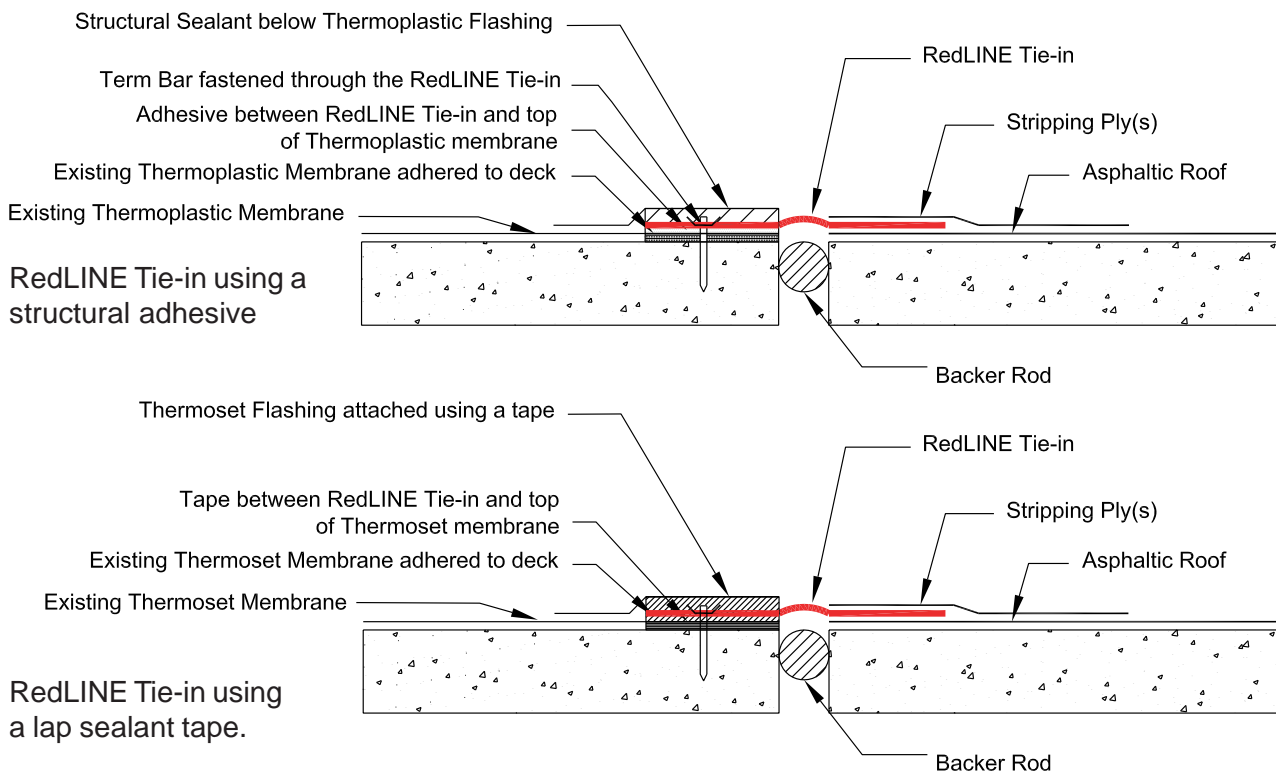
## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## APPLICATION

Identify the location of the tie-in detail. Roll out the RedLINE Tie-in and allow it to relax prior to application. Make sure that the substrate is clean and free of debris. Align the selvage edge of the RedLINE over the installed single ply roof membrane, in such a manner that a least 4" [100 mm] width is over the single ply membrane, (either on top or the bottom).

Fold back the RedLINE Tie-in on itself and clean the single ply membrane in accordance to the single ply membrane manufacturer's requirements. Once the single ply roof membrane has been cleaned, primed (if necessary) and allowed to dry, apply the membrane manufacturer compatible structural adhesive or compatible adhesive sealing tape on to the single ply membrane and embed the RedLINE Tie-in. Once the adhesive has set, apply a coat of adhesive over the RedLINE Tie-in and strip in the single ply membrane, as shown on the details below, a termination bar may be required. Once the RedLINE Tie-in has set, install the fleece end to the adjacent roof, as if installing a regular RedLINE expansion joint, by mopping and stripping into the roofing plies.



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## FlamLINE EXPANSION JOINT FORMULATION

The SITURA FlamLINE material is specially formulated to provide a long term performance solution to expansion joints with torched or self adhered membranes. The FlamLINE joint waterproofing system is comprised of a continuous material strip which is compounded of a specially formulated copolymer with woven polyester embedded inside each selvage edge, (both surfaces). The expansion joint material is manufactured by a proprietary process. During the manufacturing process the polyester mesh is embedded into the gelling copolymer material matrix. The joint material has no polyester mesh material over the actual expanding joint section. The copolymer used in the formulation is very unique as it has a number of specific chemical properties suited to this application. The material is resistant to the effects of UV, ozone, high temperatures, chemicals such as; alkalis, acids, saline solutions, alcohol and ketones. The high quality and purity of the base copolymer allows the vulcanization of the joint, this makes the construction of details around unique shapes possible and watertight without the use of adhesive, caulking or joint tape. FlamLINE is compatible with all asphalt based materials, although FlamLINE itself does not contain any asphalt.

## FlamLINE COMPATIBILITY

FlamLINE has been developed to be used with torched modified bitumen membranes and self adhered membranes. FlamLINE is compatible also with RedLINE and can be vulcanized together to form a seamless waterproof expansion joint. FlamLINE is also compatible with many other types of membranes although RedLINE maybe more suited to these specific applications. The list below is by no means complete. If you would like a particular product tested, please contact SITURA INC.

- 100% Compatibility with RedLINE
- Roofing Tars and Asphalts
- Asphaltic Saturants
- Self Adhered Membranes (SAM)
- Modified Bitumen (SBS/APP) - Torched
- Hot Rubberized Asphalt (HRA)
- Epoxy Resin (ER)
- EPDM Tie-in
- PVC/TPO Tie-in

## FlamLINE TYPICAL USES

FlamLINE can be used in a wide variety of applications and with different types of waterproofing and roofing materials. Examples of applications are:

- Roof Expansion/Control Joints
- Plaza Deck Expansion/Control Joints
- Parking Garage Expansion/Control Joints
- PMR Expansion/Control Joints
- Tunnel Expansion/Control Joints
- Vertical Wall Expansion/Control Joints
- Bridge Expansion Joints
- Seismic and Large Movement Joints
- Thermoplastic/Thermoset Membrane Tie-in to Torched Modified Bitumen and Self Adhered membranes
- Roof Split Repairs

## FlamLINE PHYSICAL PROPERTIES

FlamLINE is engineered for compatibility with the mechanical properties of the roofing and waterproofing materials to which it is bonded. FlamLINE is specifically designed for use as a waterproof expansion joint and its mechanical properties reflect this. Many products on the market today are not designed for use as an expansion joint material; hence their mechanical properties do not reflect the uniqueness of their application. The following table describes the key physical properties of typical FlamLINE expansion joint material:

**Table 2.7 FlamLINE Physical Properties Performance Data**

FlamLINE PHYSICAL PROPERTY TESTED	TEST RESULT
Hardness to ASTM D2240 (Durometer A)	55 ± 5
Elongation at break to ASTM D412	> 700 %
Low temperature flex to ASTM D746	- 70 ° F [- 56.7 °C]
Tensile resistance to ASTM D624	45 lb/in [8.0 N/mm] min.
Resistance to heat aging, 7 days @ 121°F [80 °C] change in hardness	± 10 % max.
Resistance to heat aging, 7 days @ 121°F [80 °C] change in tensile strength	± 10 % max.
Resistance to heat aging, 7 days @ 121°F [80 °C] change in elongation	± 10 % max.
Minimum number of cycles of expansion and contraction with the FlamLINE material encapsulated in a modified bitumen membrane	> 5000 cycles
Change in weight after immersion in water 7 days @ 121°F [80 °C] to ASTM D471	< 0.001 %
Seam tensile strength to ASTM D816	Same as base material
Water vapor permeability to ASTM E 96 Method B	0.0010 perms [0.5721 ng/Pa s m <sup>2</sup> ] max.
Puncture test - done to CGSB 37.56 M (1996)	10 lbs [44.5 N] min.
5000 hours exposure to UV to ASTM G 53	No Cracks or Crazeing

## EXPANSION JOINT STANDARD

To date there is no one single ASTM or CGSB standard for expansion joints. Performance and specification of expansion joints is solely based on individual material property test data. No limits of performance have ever been set.

*The information and specifications presented herein, represent the applicable information available at the time of publication. All information and statements herein are expressions of opinion, which by performance and testing are believed to be accurate and reliable.*

## FlamLINE EXPANSION AND CONTRACTION RANGE

The amount of anticipated building movement can be found on architectural or structural drawings. The expansion joint gap dimension shown on drawings does not indicate the building movement. FlamLINE product types have the following range of expansion and contraction.

**Table 2.8 FlamLINE Waterproof Joint Expansion and Contraction Range**

FlamLINE Type	Expansion and Contraction Range (see Fig. 3)		
	Horizontal	Vertical	Shear
<b>FlamLINE 20</b>	± 1" [ ± 25 mm]	± 1/2" [ ± 13 mm]	± 1/2" [ ± 13 mm]
<b>FlamLINE 40</b>	± 2" [ ± 50 mm]	± 3/4" [ ± 20 mm]	± 3/4" [ ± 20 mm]
<b>FlamLINE 100</b>	± 4" [ ± 100 mm]	± 2" [ ± 50 mm]	± 2" [ ± 50 mm]
<b>FlamLINE 240</b>	± 10" [ ± 250 mm]	± 4" [ ± 100 mm]	± 4" [ ± 100 mm]

All movements are based on limit states design (LSD).

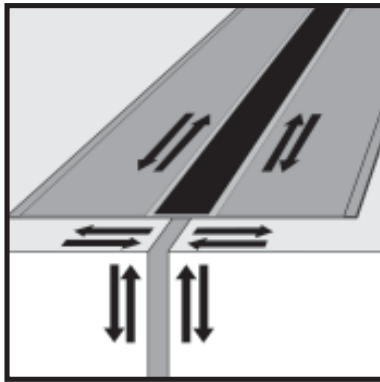


Fig. 3: FlamLINE Expansion and Contraction Movement in Horizontal, Vertical and Shear Directions.

**Note:**

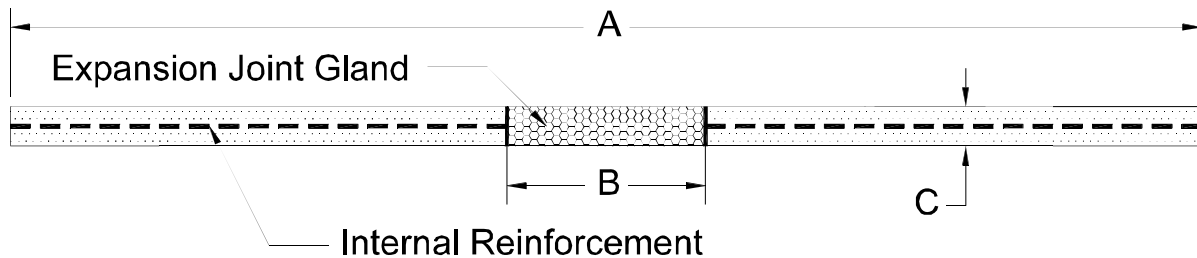
Certain site specific detail configurations may require a FlamLINE that is a combination of dimensions of two standard FlamLINE grades. Please consult SITURA in such instances.

## FlamLINE DIMENSIONS

FlamLINE product types have the following key dimensions. FlamLINE waterproof expansion joints are used only with torched modified bitumen and self adhered membranes. FlamLINE is 100% compatible with RedLINE waterproof expansion joints.

**Table 2.9 FlamLINE Waterproof Joint Dimensions**

Property and Material	FlamLINE Dimension Data (see Fig. 4)		
	A	B	C
<b>FlamLINE 20</b>	13 <sup>3</sup> / <sub>4</sub> " [ 340 mm]	1 <sup>1</sup> / <sub>2</sub> " [ 40 mm]	78 mil [ 2.0 mm]
<b>FlamLINE 40</b>	14 <sup>1</sup> / <sub>2</sub> " [ 360 mm]	2 <sup>1</sup> / <sub>4</sub> " [ 60 mm]	78 mil [ 2.0 mm]
<b>FlamLINE 100</b>	16 <sup>3</sup> / <sub>4</sub> " [ 420 mm]	4 <sup>3</sup> / <sub>4</sub> " [ 120 mm]	118 mil [ 3.0 mm]
<b>FlamLINE 240</b>	22" [ 560 mm]	10 <sup>3</sup> / <sub>4</sub> " [ 260 mm]	118 mil [ 3.0 mm]



*Fig.4: FlamLINE Dimensions.*

# FlamLINE® 20 Torch Grade Waterproof Expansion Joint

## DESCRIPTION

FlamLINE 20 is a torchable waterproof expansion joint that is used with torch applied roofing and waterproofing membranes.

FlamLINE 20 is manufactured from a proprietary copolymer with internal polyester reinforcement. FlamLINE 20's superior material qualities allow for monolithic seam vulcanization, tri-directional movement and high fire resistance. The adhesion to the waterproofing membrane sheet is torch-welded. The torchable membrane is heated and the liquefied asphalt penetrates into the FlamLINE 20 dimpled surface for a homogenous bond. FlamLINE 20 is compatible with torchable asphaltic membranes, as well as self adhered membranes. FlamLINE does not contain any asphalt.

All detailing is factory manufactured to suit site specific requirements. FlamLINE 20 is delivered to the job site in one continuous roll for the project. A proprietary vulcanization process, is utilized which results in monolithic and elastic joints. Vulcanization can also be done on site if so required.

The flat profile of the FlamLINE 20 expansion joint is unobtrusive to finishes and allows for free flow of water over the joint.

## TYPICAL USES

FlamLINE 20 waterproof expansion joint system is specifically designed to be used with torch down modified bitumen membranes. Typical uses include;

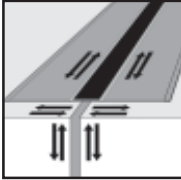
- Roof Expansion Joints
- Sub Grade Expansion Joints
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Protected Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Building Closure Joints
- Roof Control Joints



*FlamLINE 20 installed in a torched system.*

### EXPANSION/CONTRACTION RANGE DATA

The FlamLINE waterproof expansion joint system is designed to accommodate 3 way movements concurrently:

	Movement	FlamLINE 20
	Horizontal	± 1" [± 25 mm]
	Vertical	± ½" [± 13 mm]
	Shear	± ½" [± 13 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	55 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Maximum Torching Temperature:	1600°F [870°C]
Ultimate Elongation ASTM D-412	700 %
Tensile Strength ASTM D-624 (min.)	44.8 lbs/in [8.00 N/mm]
Puncture test - cone to CGSB 37.56 M (1995):	10 lbs. [44.5 N] min.
Water absorption ASTM D-570 (min.)	< 0.001%
UV Exposure ASTM G-53	No cracks
5000 hours	or Cracking
Chemical Resistance to:	
Acids, Alkalies, Polar Solvents	No effect
Saline Solutions	

### PHYSICAL DATA

Property	FlamLINE 20
Thickness	0.078" [2.0 mm]
Roll Width	13¾" [340 mm]
Expansion Joint Gland Width	1½" [40 mm]
Roll Length	Endless
Weight	0.67 lb/ft [1.00 kg/m]
Color	Varies*

\* Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## MODIFIED BITUMEN MEMBRANE TORCHING APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 20 waterproof expansion joint material. Roll out the FlamLINE 20 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Align the center line of the expansion joint gap or gap with the centre line of the FlamLINE 20 waterproof expansion joint material, and verify the FlamLINE 20 conformance to site details prior to the torching application.

### *Step 2 Torching:*

**Method A.** Apply heat to the waterproofing ply and embed the FlamLINE 20 into it, using the "torch and flop" technique. Press the FlamLINE 20 into the hot waterproofing with a blunt putty knife.

**Method B.** Apply heat to the waterproofing ply and unroll the FlamLINE 20 into it. Press the FlamLINE 20 into the hot waterproofing with a blunt putty knife.

### *Step 3 Flashing in:*

Flash in the FlamLINE 20 with a compatible torch down flashing ply, encapsulating the FlamLINE 20.

## SELF ADHERED MEMBRANE APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 20 waterproof expansion joint material. Roll out the FlamLINE 20 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Verify the FlamLINE 20 conformance to site details.

### *Step 2 Substrate Preparation:*

FlamLINE material does not contain any asphalt, it therefore has to be set in a bed of asphalt based adhesive, prior to the application of the self adhered membrane. A coat of cold adhesive such as polybitumen can be used, consult roofing/waterproofing membrane manufacturer for a compatible product.

### *Step 3 Priming:*

Apply a compatible primer as recommended by the self adhered membrane manufacturer, to the top surface of the FlamLINE 20 material. Allow the primer to flash off.

### *Step 4 Application:*

Align the center line of the expansion joint gap with the centre line of the FlamLINE 20 waterproof expansion joint material and set the FlamLINE in the pre applied bed of adhesive. The FlamLINE maybe additionally secured to the substrate with a flat termination bar (stainless 16 ga. min.) fastened at 8" [200 mm] on center staggered. The requirement for additional securement would depend on site conditions and design performance requirements. Apply the self adhered membrane to the primed FlamLINE 20 surface, covering the termination bars if installed. Use a roller to apply uniform pressure to the self adhered membrane to achieve a good bond.

## ADDITIONAL PROTECTION COURSE

FlamLINE 20 can be additionally protected from mechanical damage by the installation of a 12" [300 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# FlamLINE® 40 Torch Grade Waterproof Expansion Joint

## DESCRIPTION

FlamLINE 40 is a torchable waterproof expansion joint that is used with torch applied roofing and waterproofing membranes.

FlamLINE 40 is manufactured from a proprietary copolymer with internal polyester reinforcement. FlamLINE 40's superior material qualities allow for monolithic seam vulcanization, tri-directional movement and high fire resistance. The adhesion to the waterproofing membrane sheet is torch-welded. The torchable membrane is heated and the liquefied asphalt penetrates into the FlamLINE 40 dimpled surface for a homogenous bond. FlamLINE 40 is compatible with torchable asphaltic membranes, as well as self adhered membranes. FlamLINE does not contain any asphalt.

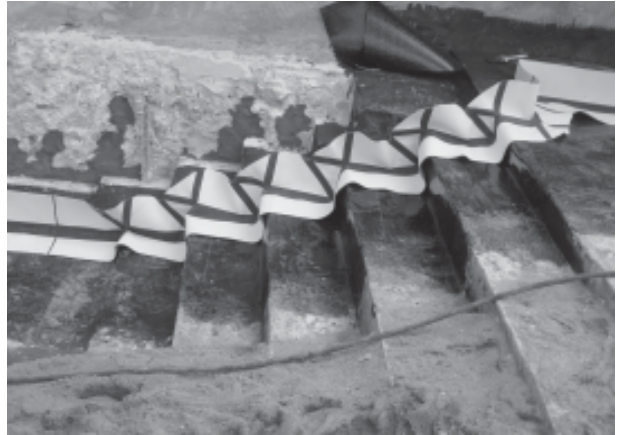
All detailing is factory manufactured to suit site specific requirements. FlamLINE 40 is delivered to the job site in one continuous roll for the project. A proprietary vulcanization process, is utilized which results in monolithic and elastic joints. Vulcanization can also be done on site if so required.

The flat profile of the FlamLINE 40 expansion joint is unobtrusive to finishes and allows for free flow of water over the joint.

## TYPICAL USES

FlamLINE 40 waterproof expansion joint system is specifically designed to be used with torch down modified bitumen membranes. Typical uses include;

- Roof Expansion Joints
- Sub Grade Expansion Joints
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Protected Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Building Closure Joints
- Roof Control Joints



*FlamLINE 40 installed in a torched system.*

### EXPANSION/CONTRACTION RANGE DATA

The FlamLINE waterproof expansion joint system is designed to accommodate 3 way movements concurrently:

Movement	FlamLINE 40
Horizontal	± 2" [± 50 mm]
Vertical	± ¾" [± 20 mm]
Shear	± ¾" [± 20 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	55 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Maximum Torching Temperature:	1600°F [870°C]
Ultimate Elongation ASTM D-412	700 %
Tensile Strength ASTM D-624 (min.)	44.8 lbs/in [8.00 N/mm]
Puncture test - cone to CGSB 37.56 M (1995):	10 lbs.
Water absorption ASTM D-570 (min.)	[44.5 N] min.
UV Exposure ASTM G-53	< 0.001%
5000 hours	No cracks or Crazing
Chemical Resistance to:	
Acids, Alkalies, Polar Solvents	No effect
Saline Solutions	

### PHYSICAL DATA

Property	FlamLINE 40
Thickness	0.078" [2.0 mm]
Roll Width	14½" [360 mm]
Expansion Joint Gland Width	2¼" [60 mm]
Roll Length	Endless
Weight	0.74lb/ft [1.10kg/m]
Color	Varies*

\* Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## MODIFIED BITUMEN MEMBRANE TORCHING APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 40 waterproof expansion joint material. Roll out the FlamLINE 40 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Align the center line of the expansion joint gap or gap with the centre line of the FlamLINE 40 waterproof expansion joint material, and verify the FlamLINE 40 conformance to site details prior to the torching application.

### *Step 2 Torching:*

**Method A.** Apply heat to the waterproofing ply and embed the FlamLINE 40 into it, using the "torch and flop" technique. Press the FlamLINE 40 into the hot waterproofing with a blunt putty knife.

**Method B.** Apply heat to the waterproofing ply and unroll the FlamLINE 40 into it. Press the FlamLINE 40 into the hot waterproofing with a blunt putty knife.

### *Step 3 Flashing in:*

Flash in the FlamLINE 40 with a compatible torch down flashing ply, encapsulating the FlamLINE 40.

## SELF ADHERED MEMBRANE APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 40 waterproof expansion joint material. Roll out the FlamLINE 40 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Verify the FlamLINE 40 conformance to site details.

### *Step 2 Substrate Preparation:*

FlamLINE material does not contain any asphalt, it therefore has to be set in a bed of asphalt based adhesive, prior to the application of the self adhered membrane. A coat of cold adhesive such as polybitumen can be used, consult roofing/waterproofing membrane manufacturer for a compatible product.

### *Step 3 Priming:*

Apply a compatible primer as recommended by the self adhered membrane manufacturer, to the top surface of the FlamLINE 40 material. Allow the primer to flash off.

### *Step 4 Application:*

Align the center line of the expansion joint gap with the centre line of the FlamLINE 40 waterproof expansion joint material and set the FlamLINE in the pre applied bed of adhesive. The FlamLINE maybe additionally secured to the substrate with a flat termination bar (stainless 16 ga. min.) fastened at 8" [200 mm] on center staggered. The requirement for additional securement would depend on site conditions and design performance requirements. Apply the self adhered membrane to the primed FlamLINE 40 surface, covering the termination bars if installed. Use a roller to apply uniform pressure to the self adhered membrane to achieve a good bond.

## ADDITIONAL PROTECTION COURSE

FlamLINE 40 can be additionally protected from mechanical damage by the installation of a 14" [350 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# FlamLINE® 100 Torch Grade Waterproof Expansion Joint

## DESCRIPTION

FlamLINE 100 is a torchable waterproof expansion joint that is used with torch applied roofing and waterproofing membranes. FlamLINE 100 is specifically designed to accommodate building movements, up to 4" [100 mm]. It is primarily used in situations where FlamLINE 40 cannot span the joint cavity.

FlamLINE 100 is manufactured from a proprietary copolymer with internal polyester reinforcement. FlamLINE 100's superior material qualities allow for monolithic seam vulcanization, tri-directional movement and high fire resistance. The adhesion to the waterproofing membrane sheet is torch-welded. The torchable membrane is heated and the liquefied asphalt penetrates into the FlamLINE 100 dimpled surface for a homogenous bond. FlamLINE 100 is compatible with torchable asphaltic membranes, as well as self adhered membranes. FlamLINE does not contain any asphalt. All detailing is factory manufactured to suit site specific requirements. FlamLINE 100 is delivered to the job site in one continuous roll for the project. A proprietary vulcanization process, is utilized which results in monolithic and elastic joints. Vulcanization can also be done on site if so required.

The flat profile of the FlamLINE 100 expansion joint is unobtrusive to finishes and allows for free flow of water over the joint.

## TYPICAL USES

FlamLINE 100 waterproof expansion joint system is specifically designed to be used with torched modified bitumen membranes. Typical uses include;

- Roof Expansion Joints
- Sub Grade Expansion Joints
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Protected Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Building Closure Joints



*FlamLINE 100 installed in a torched system.*

### EXPANSION/CONTRACTION RANGE DATA

The FlamLINE waterproof expansion joint system is designed to accommodate 3 way movements concurrently:

Movement	FlamLINE 100
Horizontal	± 4" [± 100 mm]
Vertical	± 2" [± 50 mm]
Shear	± 2" [± 50 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	55 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Maximum Torching Temperature:	1600°F [870°C]
Ultimate Elongation ASTM D-412	700 %
Tensile Strength ASTM D-624 (min.)	44.8 lbs/in [8.00 N/mm]
Puncture test - cone to CGSB 37.56 M (1995):	10 lbs.
Water absorption ASTM D-570 (min.)	[44.5 N] min.
UV Exposure ASTM G-53	< 0.001%
5000 hours	No cracks or crazing
Chemical Resistance to:	
Acids, Alkalis, Polar Solvents	No effect
Saline Solutions	

### PHYSICAL DATA

Property	FlamLINE 100
Thickness	0.118" [3.0 mm]
Roll Width	16¾" [420 mm]
Expansion Joint Gland Width	4¾" [120 mm]
Roll Length	Endless
Weight	0.81 lb/ft [1.20 kg/m]
Color	Varies*

\* Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## MODIFIED BITUMEN MEMBRANE TORCHING APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 100 waterproof expansion joint material. Roll out the FlamLINE 100 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Align the center line of the expansion joint gap or gap with the centre line of the FlamLINE 100 waterproof expansion joint material, and verify the FlamLINE 100 conformance to site details prior to the torching application.

### *Step 2 Torching:*

**Method A.** Apply heat to the waterproofing ply and embed the FlamLINE 100 into it, using the "torch and flop" technique. Press the FlamLINE 100 into the hot waterproofing with a blunt putty knife.

**Method B.** Apply heat to the waterproofing ply and unroll the FlamLINE 100 into it. Press the FlamLINE 100 into the hot waterproofing with a blunt putty knife.

### *Step 3 Flashing in:*

Flash in the FlamLINE 100 with a compatible torch down flashing ply, encapsulating the FlamLINE 100.

## SELF ADHERED MEMBRANE APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 100 waterproof expansion joint material. Roll out the FlamLINE 100 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Verify the FlamLINE 100 conformance to site details.

### *Step 2 Substrate Preparation:*

FlamLINE material does not contain any asphalt, it therefore has to be set in a bed of asphalt based adhesive, prior to the application of the self adhered membrane. A coat of cold adhesive such as polybitumen can be used, consult roofing/waterproofing membrane manufacturer for a compatible product.

### *Step 3 Priming:*

Apply a compatible primer as recommended by the self adhered membrane manufacturer, to the top surface of the FlamLINE 100 material. Allow the primer to flash off.

### *Step 4 Application:*

Align the center line of the expansion joint gap with the centre line of the FlamLINE 100 waterproof expansion joint material and set the FlamLINE in the pre applied bed of adhesive. The FlamLINE maybe additionally secured to the substrate with a flat termination bar (stainless 14 ga. min.) fastened at 8" [200 mm] on center staggered. The requirement for additional securement would depend on site conditions and design performance requirements. Apply the self adhered membrane to the primed FlamLINE 100 surface, covering the termination bars if installed. Use a roller to apply uniform pressure to the self adhered membrane to achieve a good bond.

## ADDITIONAL PROTECTION COURSE

FlamLINE 100 can be additionally protected from mechanical damage by the installation of a 16" [400 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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# FlamLINE® 240 Torch Grade Waterproof Expansion Joint

## DESCRIPTION

FlamLINE 240 is a torchable waterproof expansion joint that is used with torch applied roofing and waterproofing membranes.

FlamLINE 240 is manufactured from a proprietary copolymer with internal polyester reinforcement. FlamLINE 240's superior material qualities allow for monolithic seam vulcanization, tri-directional movement and high fire resistance. The adhesion to the waterproofing membrane sheet is torch-welded. The torchable membrane is heated and the liquefied asphalt penetrates into the FlamLINE 240 dimpled surface for a homogenous bond. FlamLINE 240 is compatible with torchable asphaltic membranes, as well as self adhered membranes. FlamLINE does not contain any asphalt.

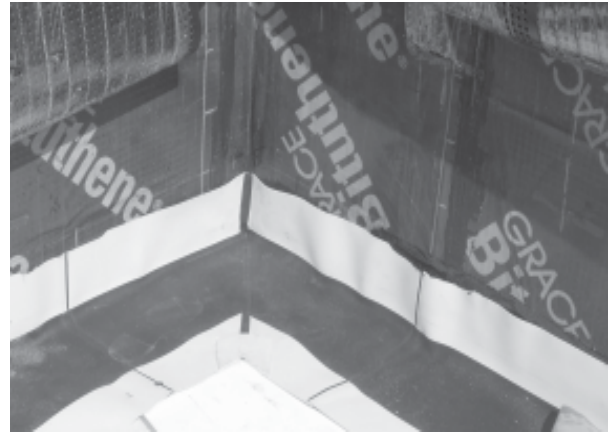
All detailing is factory manufactured to suit site specific requirements. FlamLINE 240 is delivered to the job site in one continuous roll for the project. A proprietary vulcanization process, is utilized which results in monolithic and elastic joints. Vulcanization can also be done on site if so required.

The flat profile of the FlamLINE 240 expansion joint is unobtrusive to finishes and allows for free flow of water over the joint.

## TYPICAL USES

FlamLINE 240 waterproof expansion joint system is specifically designed to be used with torch down modified bitumen membranes. Typical uses include;

- Roof Expansion Joints
- Sub Grade Expansion Joints
- Plaza Deck Expansion Joints
- Parking Garage Expansion Joints
- Protected Membrane Expansion Joints
- Tunnel Expansion Joints
- Vertical Wall Expansion Joints
- Bridge Expansion Joints
- Building Closure Joints
- Roof Control Joints



*FlamLINE 240 installed in a torched system.*

### EXPANSION/CONTRACTION RANGE DATA

The FlamLINE waterproof expansion joint system is designed to accommodate 3 way movements concurrently:

Movement	FlamLINE 240
Horizontal	± 10" [± 250 mm]
Vertical	± 4" [± 100 mm]
Shear	± 4" [± 100 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	55 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Maximum Torching Temperature:	1600°F [870°C]
Ultimate Elongation ASTM D-412	700 %
Tensile Strength ASTM D-624 (min.)	44.8 lbs/in [8.00 N/mm]
Puncture test - cone to CGSB 37.56 M (1995):	10 lbs.
Water absorption ASTM D-570 (min.)	[44.5 N] min.
UV Exposure ASTM G-53	< 0.001%
5000 hours	No cracks or Cracking
Chemical Resistance to:	
Acids, Alkalis, Polar Solvents	No effect
Saline Solutions	

### PHYSICAL DATA

Property	FlamLINE 240
Thickness	0.118" [3.0 mm]
Roll Width	22" [560 mm]
Expansion Joint Gland Width	10¾" [260 mm]
Roll Length	Endless
Weight	1.65lb/ft [2.45kg/m]
Color	Varies*

\* Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area.

## SURFACE PREPARATION

Refer to roofing/waterproofing manufacturer's guide specifications and recommendations for detailed roofing/waterproof membrane application information. All surfaces must be dry and clean of debris, prior to application.

## MODIFIED BITUMEN MEMBRANE TORCHING APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 240 waterproof expansion joint material. Roll out the FlamLINE 240 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Align the center line of the expansion joint gap or gap with the centre line of the FlamLINE 240 waterproof expansion joint material, and verify the FlamLINE 240 conformance to site details prior to the torching application.

### *Step 2 Torching:*

**Method A.** Apply heat to the waterproofing ply and embed the FlamLINE 240 into it, using the "torch and flop" technique. Press the FlamLINE 240 into the hot waterproofing with a blunt putty knife.

**Method B.** Apply heat to the waterproofing ply and unroll the FlamLINE 240 into it. Press the FlamLINE 240 into the hot waterproofing with a blunt putty knife.

### *Step 3 Flashing in:*

Flash in the FlamLINE 240 with a compatible torch down flashing ply, encapsulating the FlamLINE 240.

## SELF ADHERED MEMBRANE APPLICATION

### *Step 1 Preparation:*

Identify the start installation location from the plan accompanying the roll of FlamLINE 240 waterproof expansion joint material. Roll out the FlamLINE 240 and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Verify the FlamLINE 240 conformance to site details.

### *Step 2 Substrate Preparation:*

FlamLINE material does not contain any asphalt, it therefore has to be set in a bed of asphalt based adhesive, prior to the application of the self adhered membrane. A coat of cold adhesive such as polybitumen can be used, consult roofing/waterproofing membrane manufacturer for a compatible product.

### *Step 3 Priming:*

Apply a compatible primer as recommended by the self adhered membrane manufacturer, to the top surface of the FlamLINE 240 material. Allow the primer to flash off.

### *Step 4 Application:*

Align the center line of the expansion joint gap with the centre line of the FlamLINE 240 waterproof expansion joint material and set the FlamLINE in the pre applied bed of adhesive. The FlamLINE maybe additionally secured to the substrate with a flat termination bar (stainless 14 ga. min.) fastened at 8" [200 mm] on center staggered. The requirement for additional securement would depend on site conditions and design performance requirements. Apply the self adhered membrane to the primed FlamLINE 240 surface, covering the termination bars if installed. Use a roller to apply uniform pressure to the self adhered membrane to achieve a good bond.

## ADDITIONAL PROTECTION COURSE

FlamLINE 240 can be additionally protected from mechanical damage by the installation of a 20" [500 mm] wide strip of modified bitumen cap sheet, secured by mopping or torching to one side of the expansion joint. Alternatively in the case of waterproofing a generic protection board can be used, and a variety of toppings or finishes applied, e.g. asphalt, concrete, stamped concrete.

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## AquaLINE TYPICAL USES

AquaLINE has been specifically developed for use with potable water containment structures and clean room facility areas. AquaLINE is used with an approved epoxy resin. AquaLINE is NSF rated.

## AquaLINE PHYSICAL PROPERTIES

The following table describes the key physical properties of an AquaLINE expansion joint material:

**Table 2.10 AquaLINE Physical Properties Performance Data**

AquaLINE PHYSICAL PROPERTY TESTED	TEST RESULT
Hardness to ASTM D2240 (Durometer A)	55 ± 5
Elongation at break to ASTM D412	> 700 %
Low temperature flex to ASTM D746	- 70 ° F [- 56.7 °C]
Tensile resistance to ASTM D624	45 lb/in [8.0 N/mm] min.
Resistance to heat aging, 7 days @ 121°F [80 °C] change in hardness	± 10 % max.
Resistance to heat aging, 7 days @ 121°F [80 °C] change in tensile strength	± 10 % max.
Resistance to heat aging, 7 days @ 121°F [80 °C] change in elongation	± 10 % max.
Minimum number of cycles of expansion and contraction with the AquaLINE material encapsulated in an epoxy resin.	> 5000 cycles
Change in weight after immersion in water 7 days @ 121°F [80 °C] to ASTM D471	< 0.001 %
Seam tensile strength to ASTM D816	Same as base material
Water vapor permeability to ASTM E 96 Method B	0.0020 perms [1.149 ng/Pa s m <sup>2</sup> ] max.
Puncture test - done to CGSB 37.56 M (1996)	10 lbs [44.5 N] min.
5000 hours exposure to UV to ASTM G 53	No Cracks or Crazing

## AquaLINE NSF CERTIFICATION

AquaLINE passes NSF 61 requirements to the following criteria:

Method	Test Object	Units	Specification	AquaLINE
ISO 2781	Test Piece	g/ml	1380 to 1400	1380 to 1394
ISO 7619	Test Piece	Shore A	55 to 61	55
Opalescents	Solution S	NTU	6.00	0.34
Color	Solution S		GY 5	Pass
Absorbance	Solution S	Absorbance @ 220 nm	0.20	0.02
Heavy Metals	Solution S	ppm Pb	2.00	Pass
Soluble Zinc	Solution S	ppm Zn	5.00	0.10
Ammonium	Solution S	ppm NH <sub>4</sub>	2.00	Pass
Volatile Sulfides	20 cm <sup>2</sup>	mg Na <sub>2</sub> S	0.05	Pass

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## AquaLINE EXPANSION AND CONTRACTION RANGE

The amount of anticipated building movement can be found on architectural or structural drawings. The expansion joint gap dimension shown on drawings does not indicate the building movement. AquaLINE product types have the following range of expansion and contraction.

**Table 2.11 AquaLINE Waterproof Joint Expansion and Contraction Range**

Property and Material	Expansion and Contraction Range (standard product type) (see Fig. 5)		
	Horizontal	Vertical	Shear
AquaLINE (standard)	$\pm 2"$ [ $\pm 50$ mm]	$\pm \frac{3}{4}"$ [ $\pm 20$ mm]	$\pm \frac{3}{4}"$ [ $\pm 20$ mm]

All movements are based on limit states design (LSD).

## AquaLINE DIMENSIONS

AquaLINE product types have the key following dimensions.

**Table 2.12 AquaLINE Waterproof Joint Dimensions**

Property and Material	AquaLINE Dimension Data (standard product) (see Fig. 6)		
	A (min.)	B (min.)	C (min.)
AquaLINE (standard)	14" [ 355 mm]	1½" [ 35 mm]	87 mil [ 2.2 mm]

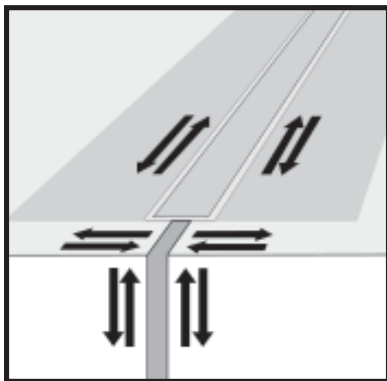


Fig. 5: AquaLINE Expansion and Contraction Movement in Horizontal, Vertical and Shear Directions.

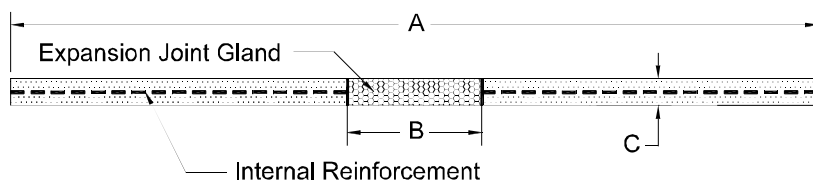


Fig.6: AquaLINE Dimensions.

# AquaLINE® Waterproof Expansion Joint System for Potable and Drinking Water Applications

## DESCRIPTION

AquaLINE waterproof expansion joint system is used for waterproofing expansion joints in structures, where potable and drinking water is stored. These structures require that all materials used meet stringent health and contaminant requirements as set out by local regulatory agencies.

AquaLINE is specifically designed to accommodate movements, up to 2" [50 mm]. AquaLINE is installed on a prepared substrate with epoxy resin, which conforms health and contaminant requirements set out by local regulatory agencies.

AquaLINE is supplied directly to the job site in a roll with all detail work done and seamed together by a proprietary vulcanizing process. The vulcanization process utilized results in a monolithic and elastic joint. Vulcanization can also be done on site if so required.

The flat profile of the AquaLINE joint is unobtrusive to finishes, such as, special coatings, tiles, toppings etc. AquaLINE is manufactured from a proprietary elastomer which is chemically stable and has excellent resistance to the effects of prolonged water saturation. AquaLINE has been certified to the following standards:

### CERTIFICATION

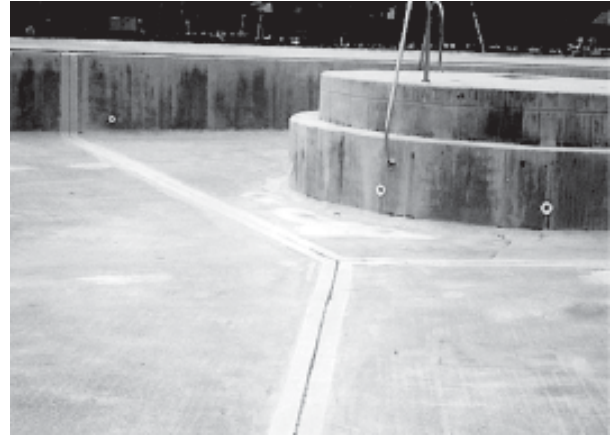
#### Certifying Agency

Food and Drug Administration  
NSF 61 Standard Certification

## TYPICAL USES

AquaLINE waterproof expansion joint system is designed to be used for:

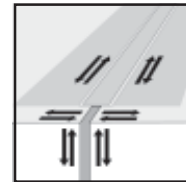
- Potable Water Tanks
- Potable Water Desalination Plants
- Potable Water Filtration Plants
- Potable Water Wells
- Sewage Treatment Plants



*AquaLINE installed in potable water storage tank.*

### EXPANSION/CONTRACTION RANGE DATA

The AquaLINE waterproof expansion joint system is designed to accommodate 3 way movements concurrently:



Movement	AquaLINE (STN)	
Horizontal	± 2"	[± 50 mm]
Vertical	± ¾"	[± 20 mm]
Shear	± ¾"	[± 20 mm]

### TECHNICAL DATA

Property & Test Method	Results
Hardness Shore A ASTM D-2240	55 ± 5
Lap Joint Strength ASTM D-816	Same as base material
Low Temperature Flex ASTM D-746	-70°F [-57°C]
Ultimate Elongation ASTM D-412	700 %
Tear Resistance ASTM D-624 Die C (minimum)	180 lbs/in [32.14 N/mm]
Water absorption ASTM D-570 (minimum)	< 0.001%
Puncture test - cone to CGSB 37.56 M (1995):	10 lbs. [44.5 N] min.
UV Exposure ASTM G-53 5000 hours	No cracks or Crazing
Hydrostatic pressure capacity	29 psi [200 kPa]
Chemical Resistance to: Acids, Alkalis, Polar Solvents Saline Solutions	No effect

### PHYSICAL DATA

Property	AquaLINE
Thickness	0.087" [2.2 mm]
Roll Width	14" [355 mm]
Expansion Joint Gland Width	1½" [35 mm]
Roll Length	Endless
Weight	0.15lb/ft [0.23kg/m]
Color	Blue with yellow centering strips

## STORAGE

Store rolls on end, on original pallets or elevated platform. Protect from weather or store in an enclosed area.

## SURFACE PREPARATION

All surfaces must be dry and clean of debris, prior to application. The typical application is on a concrete surface. If the application is on new concrete, the following criteria define an acceptable condition of the concrete surface, concrete age 4 - 6 weeks, maximum allowable moisture content 3% and the concrete must be free of all scaling and bleed. Existing concrete surfaces must be free of all oils and debris. An acceptable surface is one that has been sand blasted. If the existing concrete surface has been wet and saturated with water, an epoxy primer must be used to ensure a good adhesion bond. Refer to the epoxy resins manufacturer printed literature for limitations and application guidelines.

## APPLICATION

Identify the start installation location from the plan accompanying the roll of AquaLINE waterproof expansion joint material. Roll out the AquaLINE and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Align the center line of the expansion joint gap or gap with the centre line of the AquaLINE waterproof expansion joint material, and verify the AquaLINE conformance to site details prior to the epoxy application.

### ***Installation in Epoxy Resin: (Recommended Application)***

AquaLINE is installed on a concrete substrate using an epoxy resin. The epoxy resin must be meet all local health and contamination requirements. Ensure that the epoxy resin meets current FDA and NSF approvals for potable water, consult the labeling on the epoxy resin container for the latest approval information and material preparation guidelines.

The AquaLINE material is laid down in a prepared 1/8" [4 mm] thick bed of epoxy. The underside surface of the AquaLINE is NOT coated. The AquaLINE is pressed firmly into the epoxy. A smooth tool is recommended for pressing the AquaLINE into the epoxy resin bed. Once the underside surface of the AquaLINE has been laid into the epoxy resin bed, the top side surface is coated. A uniform layer 1/16" [2 mm] thick is applied to the top side surface of the AquaLINE, using a notched trowel as a feathering tool. All the exposed material must be covered. The epoxy must encapsulate wholly a minimum of 1 3/4" [40 mm] of the AquaLINE edging and extend a minimum of 3/4" [20 mm] onto the substrate. A typical quantity of epoxy resin used for a normal AquaLINE application is 8.6 oz./ft. [800g/m]. Once installed, the epoxy resin must be cured for at least 72 hours before submerging underwater. A flood test is also recommended prior to final use.

## SITURA JOINT WARRANTY

Any one of SITURA's waterproof expansion joints is guaranteed to perform on roof and waterproof structures for a prescribed period of time from the date of purchase. The expansion joint system must be installed by qualified individuals in accordance with the installation instructions provided to the purchaser, as described in this manual. Failure to follow such installation instructions shall void the SITURA joint warranty. The purchaser of the SITURA expansion joint system shall assume all liability of any nature and kind arising from any improper installation. Unless the purchaser gives SITURA INC., notice of any defect in the expansion joint system within the stipulated warranty period from the date of invoice or as expressly stated in the warranty, the expansion joint system shall be conclusively deemed to be free of defects.

**Limitation of Liability:** In the event of a defect in material within the time period set out above, the liability of SITURA INC. shall be limited to: (i) replacing the expansion joint system at no expense to the purchaser; or (ii) reimbursing the purchaser for the original invoice amount for the expansion joint system. SITURA INC. shall have the option of refunding the original invoice value for the defective product. SITURA INC., shall not be liable for any loss or damage caused by the use, installation and maintenance of the SITURA waterproof expansion joint system, or any repairs, servicing or adjustments thereto, or any incidental or consequential damages (including without limitation injury to persons or property) or any other damages whatsoever or howsoever caused.

<b>SITURA Waterproof Expansion Joint Warranty</b>	
<b>Construction Project Name:</b>	
<b>Installed by:</b>	
<b>Material Type:</b>	<b>Warranty Number:</b> _____
<b><u>Liability:</u></b>	
Replacement in the event of damage as a result of the following:	
<ul style="list-style-type: none"> <li>a. Manufacturing fault</li> <li>b. Material fault</li> <li>c. Insufficient instructions from SITURA INC., resulting in incorrect installation.</li> <li>d. Failure to provide the properties warranted expressly by SITURA INC.</li> </ul>	
<b><u>Obligation of SITURA INC.</u></b>	
In the event of a defect in material within the time period set out above, the liability of SITURA INC., shall be limited to: (i) replacing the SITURA system at no expense to the purchaser; or (ii) reimbursing the purchaser for the original invoice amount for the SITURA system. SITURA INC., shall have the option of refunding the original invoice value for the defective product. SITURA INC., shall not be liable for any loss or damage caused by the use, installation and maintenance of the SITURA system, or any repairs, servicing or adjustments thereto, or any incidental or consequential damages (including without limitation injury to persons or property) or any other damages whatsoever or howsoever caused.	
<b><u>Commencement of Warranty Period:</u></b>	
The warranty agreement shall commence with acceptance of the work performed and shall last for a period of: _____ years.	
<b><u>Obligation of SITURA INC.:</u></b> Installation instructions must be provided for every SITURA installation	
<b><u>Obligation of the Warranty Holder:</u></b>	
<ul style="list-style-type: none"> <li>a. Observe all of the technical specifications and regulations as they relate to SITURA</li> <li>b. Proactively prevent damage to the SITURA product</li> <li>c. Inspect SITURA product on delivery</li> <li>d. Immediate submission of a damage report to SITURA INC., verbally and in writing by way of a registered letter within 7 working days after the damage has occurred</li> <li>e. Perform emergency corrective measures or modifications on the damage parts after prior consultation with SITURA INC.</li> <li>f. Obligation to retain all the damaged material until an inspection by SITURA INC.</li> <li>g. On completion of installation this warranty registration form must be completed and a copy returned to SITURA INC.</li> </ul>	
Signed: _____ <b>Building Owner</b> Date: _____	Signed: _____ <b>SITURA INC.</b> Date: _____

*A sample copy of the SITURA Expansion Joint Warranty.*

## **TECHNICAL SERVICE AND SUPPORT**

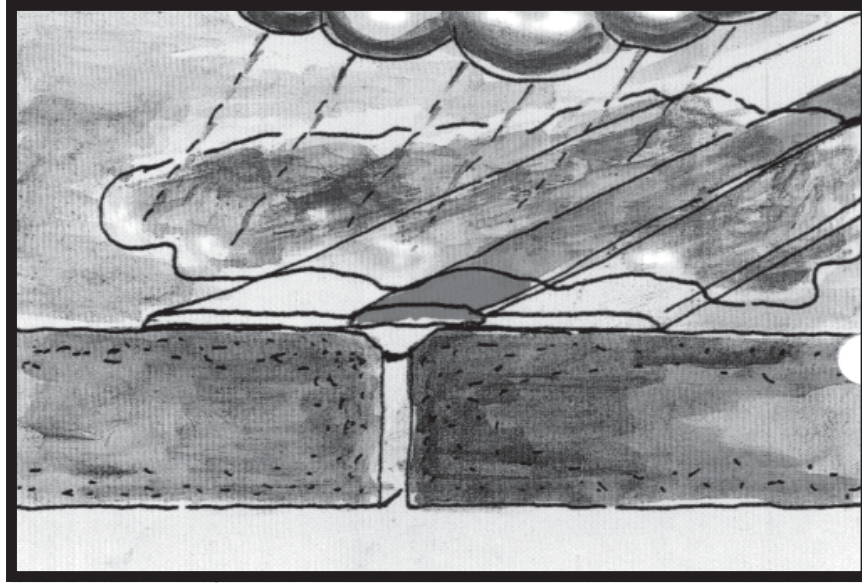
The SITURA expansion joint product line offers a comprehensive solution to joint waterproofing problems. Please call SITURA INC., toll free at **1-888-4-SITURA** (1-888-474-8872) for assistance in specifying, detailing and installing a waterproof expansion joint.



# Chapter 3.

## SITURA Expansion Joints

### Guide Specifications & Typical Details



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*Please turn over*

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*The information and specifications presented herein, represent the applicable information available at the time of publication. All information and statements herein are expressions of opinion, which by performance and testing are believed to be accurate and reliable.*

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# Chapter 3.

## Guide Specifications & Typical Details

SITURA waterproof expansion joints can be specified in: Division 3 - Concrete, Division 5 - Metals or Division 7 - Thermal and Moisture Protection. The following section provides the reader with specifications, in the CSI MasterFormat™.

Included in this section are all the commonly used specifications for applications of RedLINE®, FlamLINE® and AquaLINE® expansion joints installed in: BUR, Coal Tar Pitch, Hot Rubberized Asphalt, APP/SBS Modified Bitumen, Spray Polyurethane Foam, Epoxy Resin, Cold Applied Adhesives, Liquid Applied Membranes and Self Adhered Membranes. These specifications serve as a guideline and design aid to the roofing/waterproofing specifier and are not a substitute for the sound technical judgement of an experienced professional.

Typical details are also included in this section of the manual. There is a wide variety of conditions that can exist on a construction project, however the two most typical conditions are; a roof to roof (or deck to deck) and a roof to wall (or deck to wall) condition. Typical details are included for both of these situations with each type of SITURA expansion joint and the compatible waterproofing membrane. If a condition exists that is not covered by these typical details please contact SITURA. Additionally, SITURA products are sometimes required to tie-in, to incompatible products such as; thermoset and thermoplastic single ply membranes, special tie-in products have been developed for these applications. Specifications for these types of uses need to be carefully evaluated to the actual site condition, guide specifications for these applications are provided only in the most basic of terms.

### SPECIFICATIONS IN ELECTRONIC FORMAT

Specifications are also available in electronic format on CD-ROM. The latest updated specifications are also available on-line at **SITURA's web site: [www.situra.com](http://www.situra.com)**.

### MINIMUM REQUIREMENTS FOR OTHER COMPONENTS USED IN CONJUNCTION WITH SITURA EXPANSION JOINTS

The specifications and typical details make reference to a number of components such as compressible sealant, epoxy resin and insulation. To aid the designer, a short list of these component's minimum specification requirements is outlined in the adjacent table shown. The listed components and specifications meet the minimum requirements for use with any SITURA waterproof expansion joint system.

For components not listed or specific product brand names and approved manufacturers, contact our Technical Department, toll free at **1-888-4-SITURA (1-888-474-8872)**.

COMPONENT	MINIMUM SPECIFICATION
Asphalt Primer	ASTM D 41 or CGSB-37-GP-9M
Compressible Batt Insulation	ASTM C 665 Type I or Type II
Compressible Caulking	ASTM C-920-86, Type M, Grade P, Class 25, SWI 2A, Polyurethane Joint Sealant
Compressible Joint Filler Material	Rubberized Asphalt CANCGSB 37.50 M89
Epoxy Resin	Two Component, High Viscosity Epoxy Resin
Quartz/Silica Sand	ASTM/NSF Standard 61 300µm - 400µm
Separation Mat	Woven Polyolefin Sheet

## **SHORT FORM SPECIFICATION: RedLINE Application Built-Up-Roofing (BUR)**

***Overview:** Short form specification for the installation of the RedLINE waterproofing joint material with BUR. This application is most commonly used for horizontal roofing and waterproofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configuration.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCTS**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [20], [20G], [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions.
- B. RedLINE is installed typically in an asphaltic based medium. Apply the base coat of asphaltic directly to the substrate and embed the RedLINE waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE material into the hot asphalt material.
- C. Spread an even coat of asphalt on the top surface of the RedLINE expansion joint, ensuring the top white polyester fleece is completely covered, and strip in felt plies (typ. 12" and 18"). The system is to be wholly encapsulated between plies in an [asphalt/bitumen] compatible roofing/waterproofing system with flood coat (mopping is acceptable) of [asphalt/bitumen].

The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.

### 3.02 PRECAUTIONS

- A. The center of the RedLINE waterproof expansion joint material must be aligned with the center line of the expansion joint gap. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

### 3.03 PROTECTION

- A. The joint can be protected by means of an overlap membrane mopped to one side of the joint as per manufacturer's instructions.

## TERMS OF REFERENCE

## END OF SECTION

### [Bituminous Materials]

1. ASTM D 312, Asphalt Used in Bitumen Type [II], [III], [IV].
2. ASTM D 41, Asphalt Primer Used in Roofing, Damp proofing and Waterproofing.
3. ASTM D 4586 Type [II], Asphalt Roof Cement, Asbestos Free.

### [RedLINE, 20, 20G, 40, 40G, 100, 240]

#### A. *Appearance*

1. Color: Orange-red with white fleece on selvage edge.

#### B. *Material Chemistry*

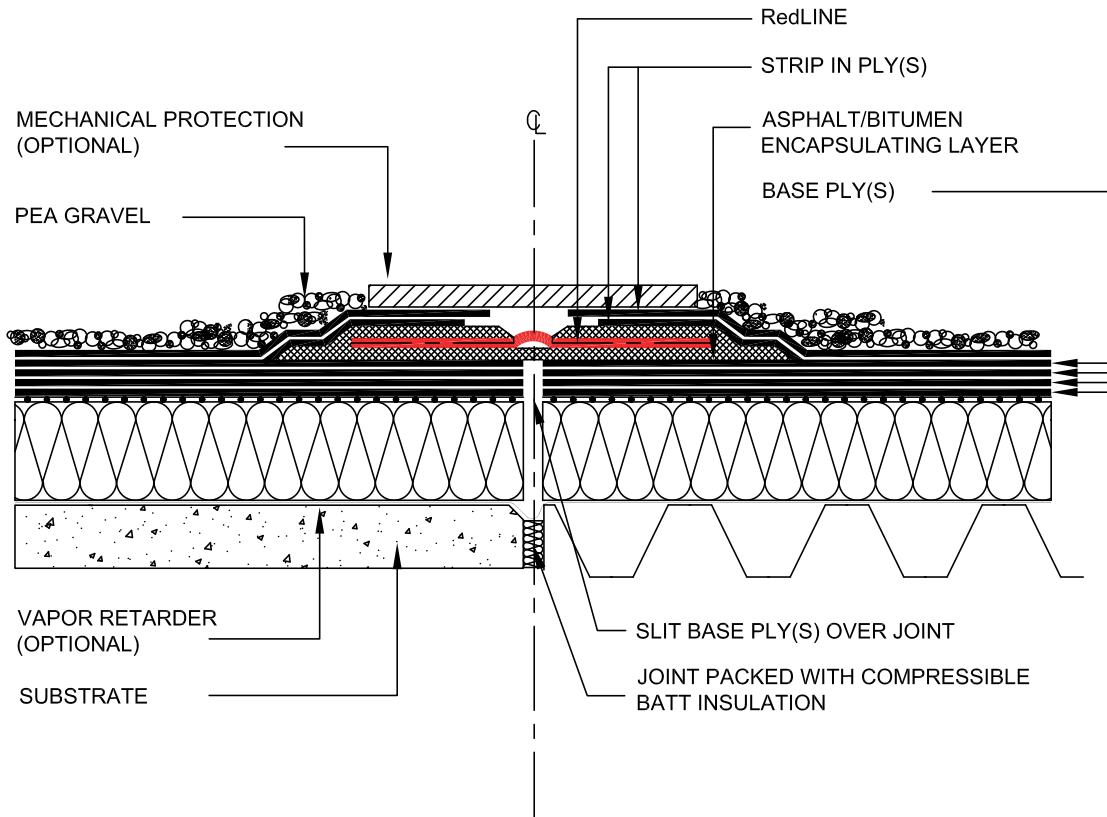
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

#### C. *RedLINE waterproofing material, minimum physical performance specifications:*

- |                                                                                                         |                                                           |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                    |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                     |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                       |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                    |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                                  |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                                  |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                                  |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                               |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                                |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                             |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                             |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms<br>[1.149 ng/Pa s m <sup>2</sup> ] |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        | 10 lbs. [44.5 N] min.                                     |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                                 |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                     |

**D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## RedLINE Application Built-Up-Roofing (BUR) Roof to Roof Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

AS A SUPPLIER OF FINISHED PRODUCTS ONLY, SITURA INC., DOES NOT ASSUME RESPONSIBILITY FOR ERRORS IN DESIGN, ENGINEERING OR DIMENSIONS. THE ARCHITECT OR OWNER'S REPRESENTATIVE MUST VERIFY ALL DIMENSIONS AND SUITABILITY OF DETAILS. REDLINE® IS A REGISTERED TRADE MARK OF SITURA INC. © COPYRIGHT 1997-2007 SITURA INC.

PROJECT NAME:

## CONVENTIONAL BUR DETAIL WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

BUR/TD-01

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

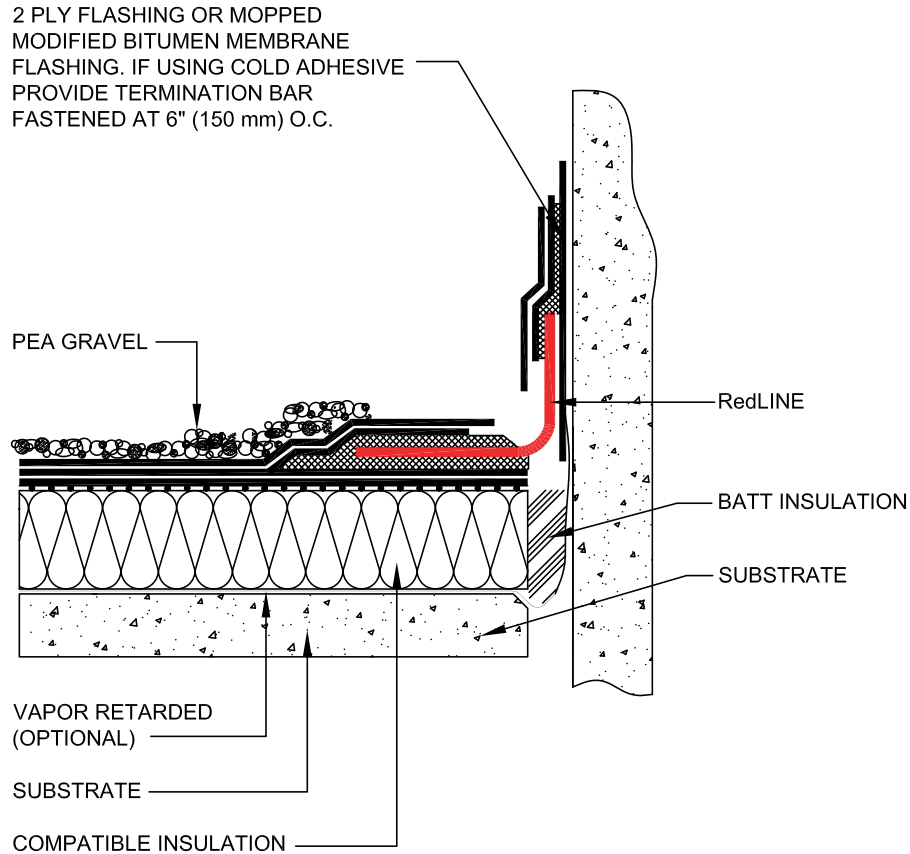
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1 OF 1



## RedLINE Application Built-Up-Roofing (BUR) Roof to Wall Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
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PROJECT NAME:

## CONVENTIONAL BUR DETAIL WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

BUR/TD-02

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

06/01/07

SHEET:

1 OF 1

## **SHORT FORM SPECIFICATION: RedLINE Application Hot Rubberized Asphalt (HRA)**

***Overview:** Short form specification for the installation of the RedLINE waterproofing joint material with Hot Rubberized Asphalt. This application is most commonly used for horizontal waterproofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configuration.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [20], [20G], [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions.
- B. Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness. Immediately, embed the RedLINE waterproof expansion joint material, in the hot asphalt, making sure that the bottom polyester fleece is in full contact with the hot asphalt.
- C. Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE expansion joint, ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness.

The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.

### 3.02 PRECAUTIONS

- A. The center of the RedLINE waterproof expansion joint material must be aligned with the center line of the expansion joint gap. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt.

### 3.03 PROTECTION

- A. The joint can be protected by means of a protection board as per manufacturer's instructions.

## TERMS OF REFERENCE

## END OF SECTION

### [Hot Rubberized Asphalt]

1. CAN/CGSB 37.50.M89 and applicable ASTM standard tests, Asphalt, Rubberized, Hot Applied for Roofing and Waterproofing.

### [RedLINE, 20, 20G, 40, 40G, 100, 240]

#### A. *Appearance*

1. Color: Orange-red with white fleece on selvage edge.

#### B. *Material Chemistry*

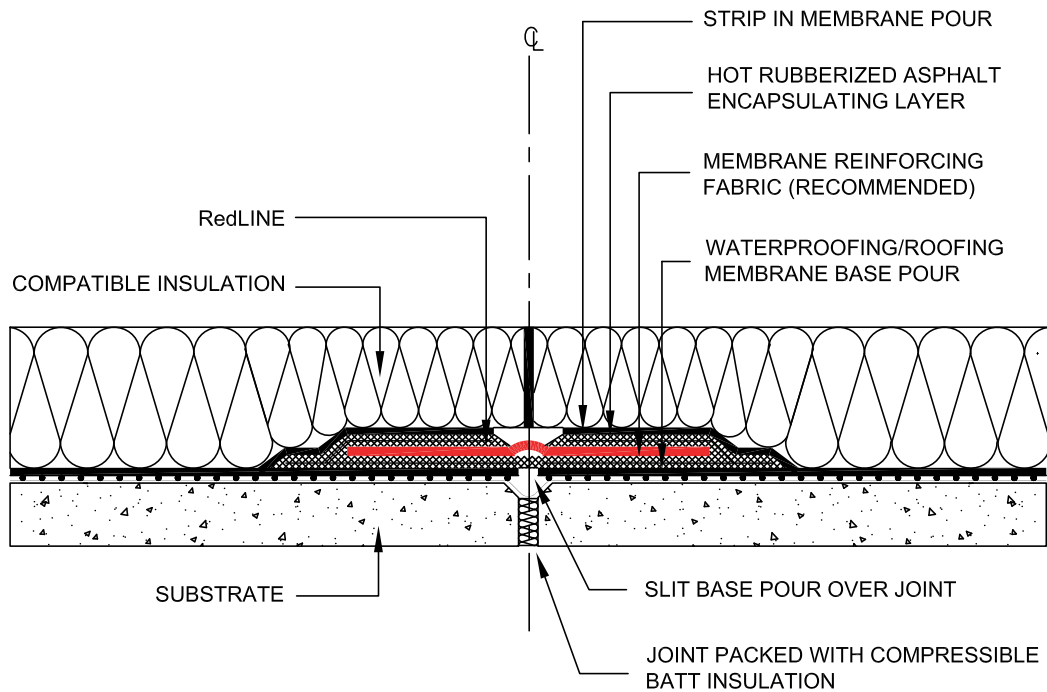
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

#### C. *RedLINE waterproofing material, minimum physical performance specifications:*

- |                                                                                                         |                                                        |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                 |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                  |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                    |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                 |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                               |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                               |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                               |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                            |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                             |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                          |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                          |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less than 0.0020 perms [1.149 ng/Pa s m <sup>2</sup> ] |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        | 10 lbs. [44.5 N] min.                                  |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                              |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                  |

D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).

## RedLINE Application Hot Rubberized Asphalt (HRA) Roof to Roof Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
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- 3.)

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PROJECT NAME:

**HOT RUBBERIZED ASPHALT  
INSULATION DETAIL**  
WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

**HRA/TD-01A**

SCALE:

**N.T.S.**

CHECKED BY:

**KMZ**

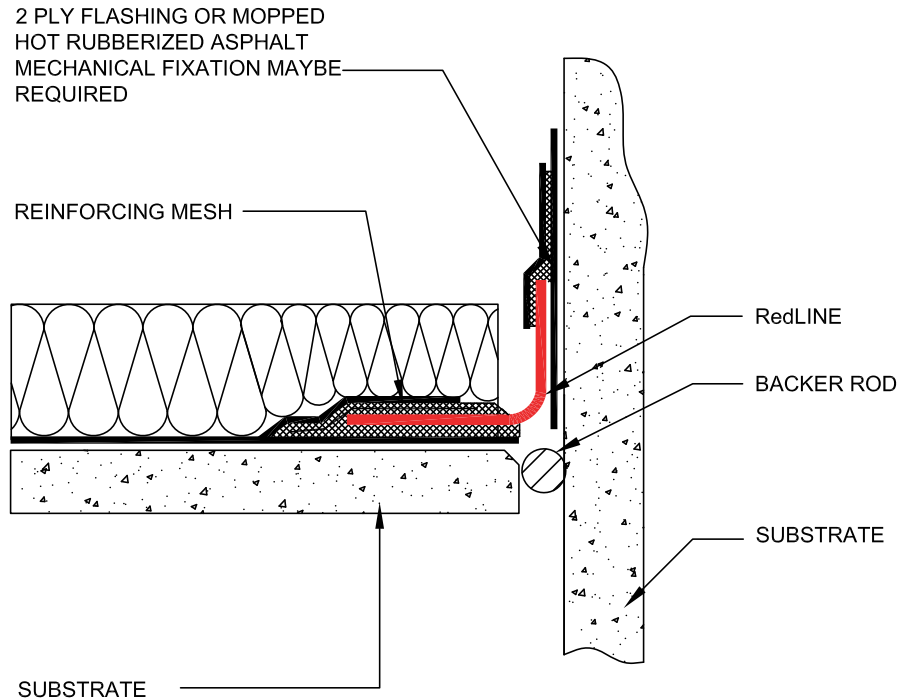
DATE:

**06/01/07**

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**1 OF 1**

## RedLINE Application Hot Rubberized Asphalt (HRA) Roof to Wall Typical Detail



**SITURA INC.**  
Building Envelope Components

### NOTES:

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- 2.)
- 3.)

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PROJECT NAME:

**HOT RUBBERIZED ASPHALT  
INSULATION DETAIL**  
WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

**HRA/TD-02A**

SCALE:

**N.T.S.**

DATE:

**06/01/07**

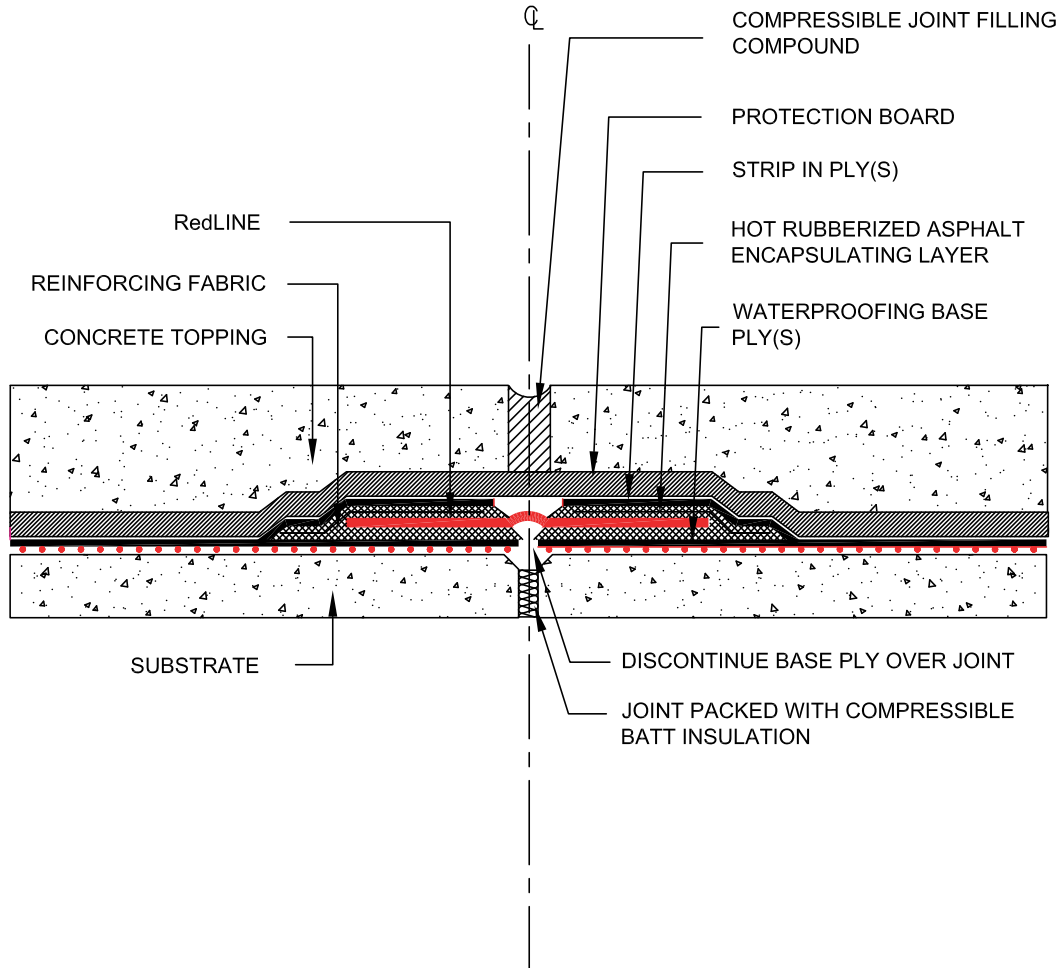
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**KMZ**

SHEET:

**1 OF 1**

# RedLINE Application Hot Rubberized Asphalt (HRA) Concrete Deck to Deck Typical Detail



## NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

**HOT RUBBERIZED ASPHALT  
CONCRETE TOPPING DETAIL**  
WITH RedLINE® WATERPROOF EXPANSION JOINT.

## APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

**HRA/TD-01B**

SCALE:

N.T.S.

CHECKED BY:

**KMZ**

DATE:

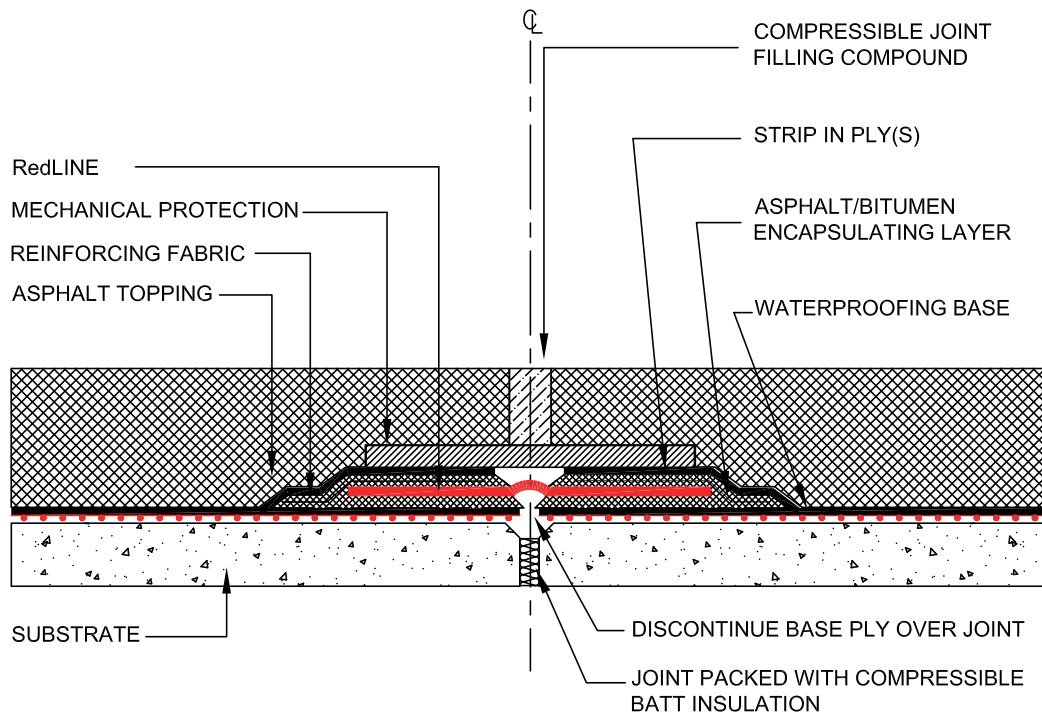
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SHEET:

**1 OF 1**



## RedLINE Application Hot Rubberized Asphalt (HRA) Asphalt Deck to Deck Typical Detail

NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

**HOT RUBBERIZED ASPHALT  
ASPHALT TOPPING DETAIL**  
WITH RedLINE® WATERPROOF EXPANSION JOINT.

APPROVALS & SIGN OFFS

<u>DESCRIPTION:</u>	<u>DATE:</u>	<u>SIGNED BY:</u>
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

HRA/TD-01C

SCALE:

N.T.S.

CHECKED BY:

KMZ

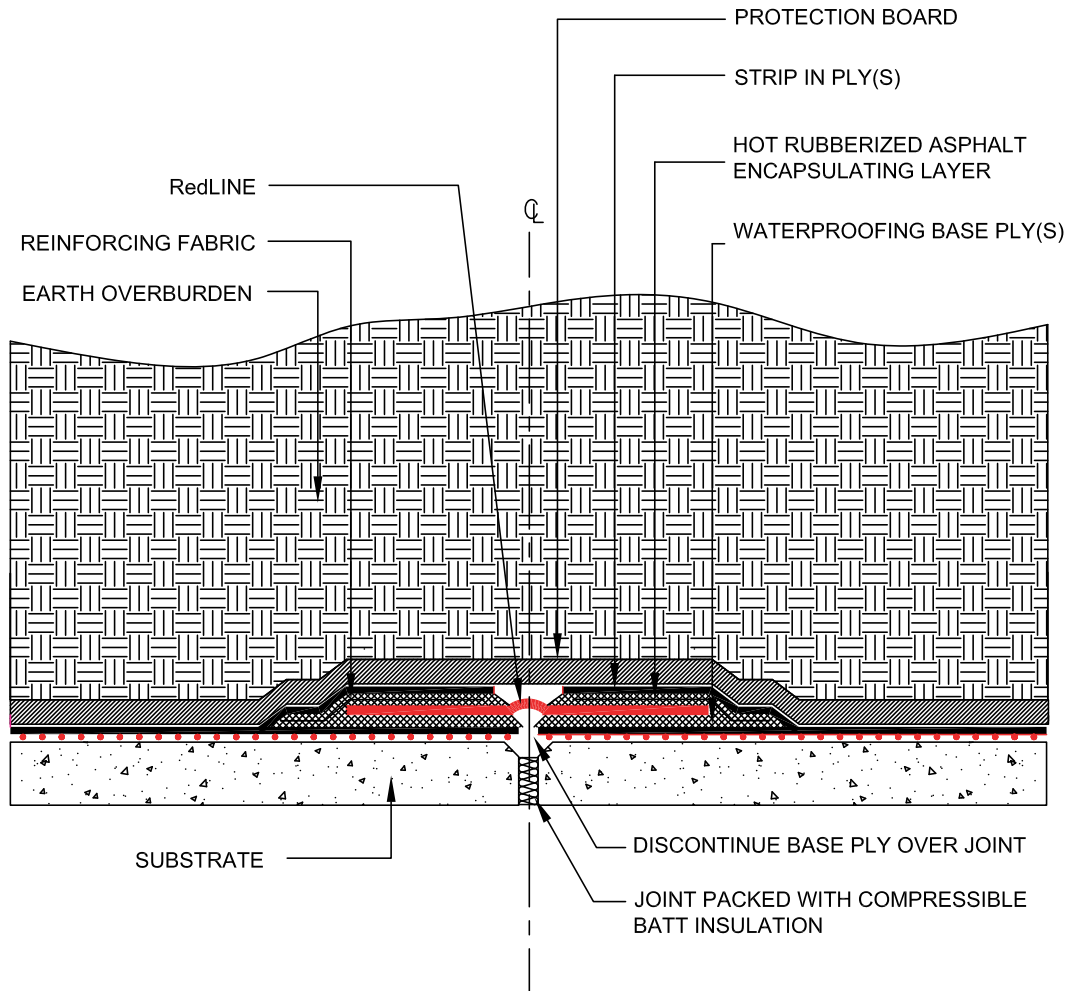
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06/01/07

SHEET:

1 OF 1

# RedLINE Application Hot Rubberized Asphalt (HRA) Planter Deck to Deck Typical Detail



## NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

**HOT RUBBERIZED ASPHALT  
EARTH OVERBURDEN DETAIL**  
WITH RedLINE® WATERPROOF EXPANSION JOINT.

## APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

**HRA/TD-01D**

SCALE:

N.T.S.

CHECKED BY:

**KMZ**

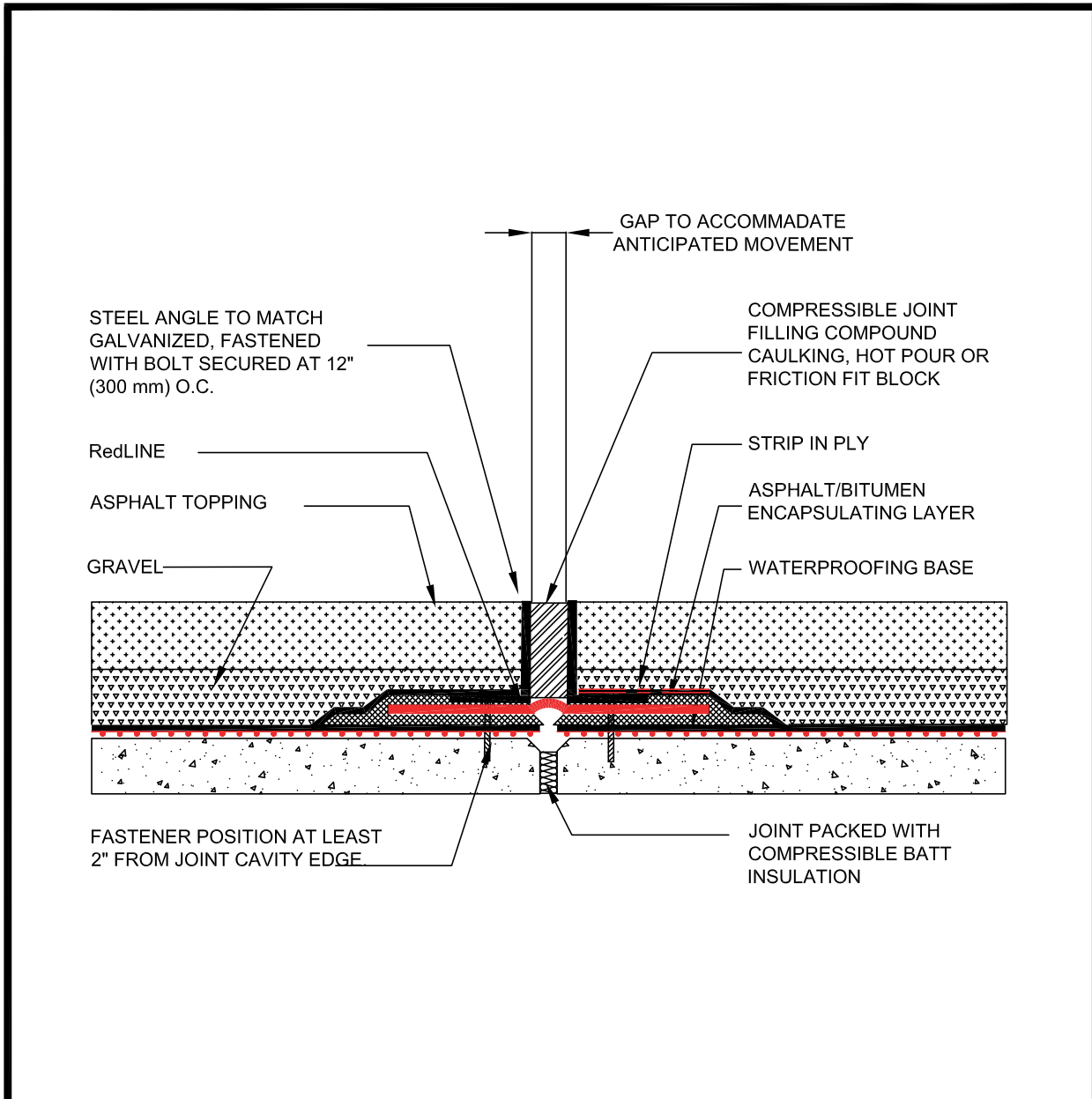
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**06/01/07**

SHEET:

**1 OF 1**

## RedLINE Application Hot Rubberized Asphalt (HRA) Typical Deck Detail with Steel Angles

**NOTES:**

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
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- 3.)

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PROJECT NAME:

**HOT RUBBERIZED ASPHALT  
ASPHALT TOPPING WITH ANGLES  
WITH RedLINE® WATERPROOF EXPANSION JOINT.**

**APPROVALS & SIGN OFFS**

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

HRA/TD-01E

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

06/01/07

SHEET:

1 OF 1

## **SHORT FORM SPECIFICATION: RedLINE Application Coal Tar Pitch (CTP)**

**Overview:** Short form specification for the installation of the RedLINE waterproofing joint material with Coal Tar Pitch (CTP). This application is most commonly used for horizontal roofing and waterproofing installations.

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configuration.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturers most recent printed instructions.
- B. The system is to be wholly encapsulated between plies in a coal tar pitch roofing/waterproofing system with flood coat of coal tar pitch.
- C. Install a base ply set in mastic over the joint gap to prevent the flow of pitch into the joint. Provide for ply envelopes to prevent the migration of pitch into the joint cavity.
- D. Apply the base coat of the coal tar pitch directly to the substrate and embed the RedLINE waterproof expansion joint material, and making sure that the bottom polyester fleece is in full contact with the hot pitch. Press the RedLINE material into the hot pitch material.

- E. Spread an even coat of pitch on the top surface of the RedLINE expansion joint ensuring the top white polyester fleece is completely covered and strip in felt plies. The system is to be wholly encapsulated between plies. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.
- F. Add two ply polyester reinforced sheet, embedded in Coal Tar Pitch on top of the RedLINE as a protection if required.

### 3.02 PRECAUTIONS

- A. The center of the RedLINE waterproof expansion joint material must be aligned with the center line of the expansion joint gap. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot pitch material. Do not lay the RedLINE in cold tar pitch.

## END OF SECTION

### TERMS OF REFERENCE

#### [Coal Tar Pitch]

1. ASTM D 450 Roofing Pitch Type I & Type III
2. ASTM D 450 Waterproofing Pitch Type II

#### [RedLINE, 40, 40G, 100, 240]

#### **A. Appearance**

1. Color: Orange-red with white fleece on selvage edge.

#### **B. Material Chemistry**

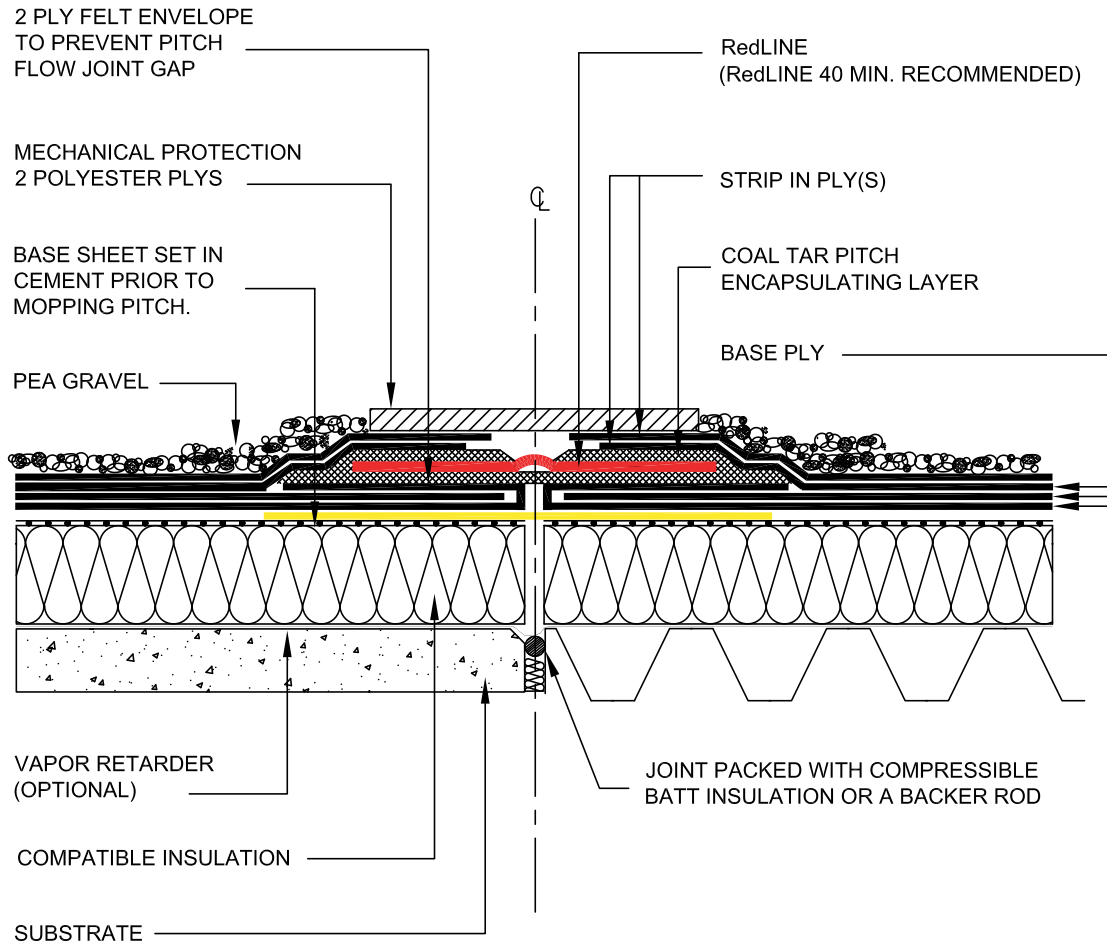
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

#### **C. RedLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                                         |                                                        |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                 |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                  |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                    |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                 |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                               |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                               |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                               |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                            |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                             |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                          |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                          |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms [1.149 ng/Pa s m <sup>2</sup> ] |
|                                                                                                         | 10 lbs. [44.5 N] min.                                  |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        |                                                        |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                              |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                  |

#### **D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## RedLINE Application Coal Tar Pitch (CTP) Roof to Roof Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## COLD TAR PITCH DETAIL

WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

CTP/TD-01

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

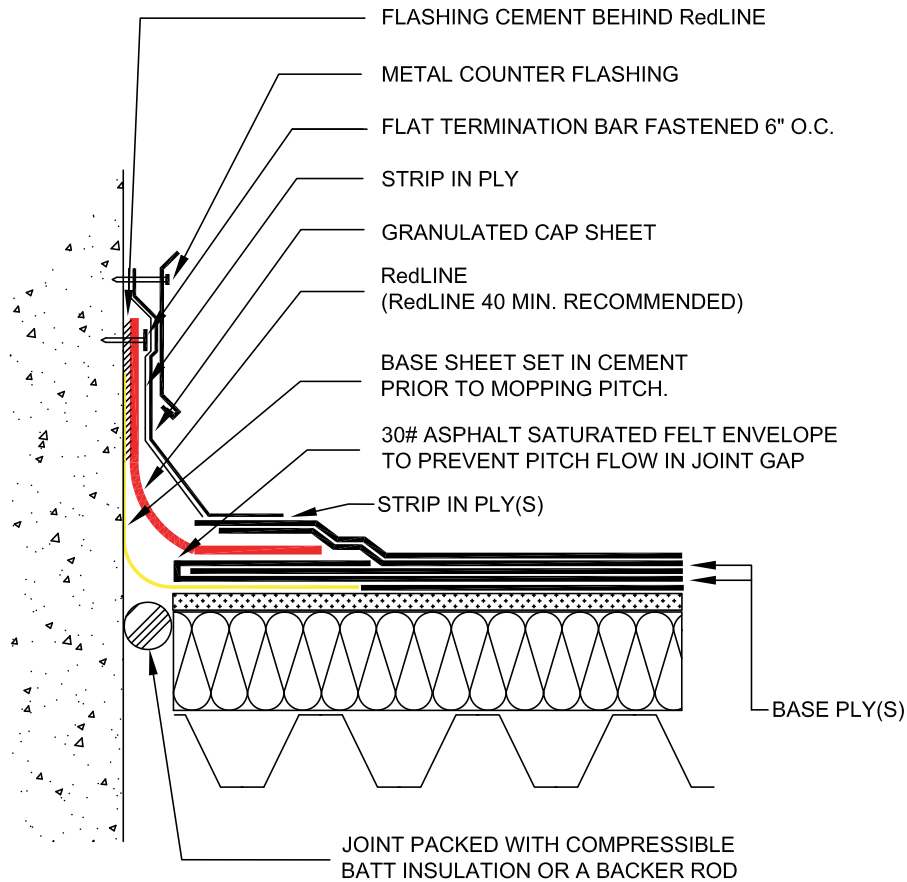
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1 OF 1



## RedLINE Application Coal Tar Pitch (CTP) Roof to Wall Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL  
SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## COLD TAR PITCH DETAIL

WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

CTP/TD-02

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

06/01/07

SHEET:

1 OF 1

## **SHORT FORM SPECIFICATION: RedLINE Mopped Application APP/SBS Modified Bitumen (MBM)**

***Overview:** Short form specification for the installation of the RedLINE waterproofing joint material with Modified Bitumen. This application is used for horizontal and vertical roofing and waterproofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [20], [20G], [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions.
- B. The system is to be wholly encapsulated between the plies of the modified bitumen membrane in a roofing/waterproofing system with flood coat (mopping is acceptable) of asphalt/bitumen. Refer to manufacturer's instructions for torch down applications.
- C. Slit the base ply with a knife along the joint gap. Mop the base modified bitumen ply and the RedLINE surfaces with hot asphalt/bitumen. Install each RedLINE edging polyester fleece so that it shall be firmly and uniformly set, without voids, into the hot asphalt. At all times observe the modified bitumen manufacturer's recommendations. The RedLINE fleece must be completely encapsulated in the hot asphalt/bitumen.

- D. Apply the modified bitumen stripping plies smooth, free from air pockets, wrinkles, fishmouths, or tears. Coat the top surface of the RedLINE fleece with hot asphalt/bitumen. Install each stripping ply, shingle lap fashion, onto the RedLINE edged polyester fleece firmly and uniformly, without voids, into the hot asphalt. At all times observe the modified bitumen manufacturer's recommendations. The RedLINE fleece must be completely encapsulated in the hot asphalt/bitumen, The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.

### 3.02 PROTECTION

- A. The joint can be protected by means of an overlap membrane mopped to one side of the joint as per manufacturer's instructions.

## END OF SECTION

### TERMS OF REFERENCE

#### [Modified Bituminous Materials]

1. ASTM D 5147, Test Methods for Modified Bitumen Roofing Membranes.
2. ASTM D 312, Asphalt Used in Bitumen Type [II], [III], [IV].
3. ASTM D 41, Asphalt Primer Used in Roofing, Damp proofing and Waterproofing.
4. ASTM D 4586 Type [II], Asphalt Roof Cement, Asbestos Free.

#### [RedLINE, 20, 20G, 40, 40G, 100, 240]

#### **A. Appearance**

1. Color: Orange-red with white fleece on selvage edge.

#### **B. Material Chemistry**

1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

#### **C. RedLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                                         |                                                                                 |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                                          |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                                           |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                                             |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                                          |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                                                        |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                                                        |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                                                        |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                                                     |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                                                      |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                                                   |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                                                   |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms [1.149 ng/Pa s m <sup>2</sup> ]<br>10 lbs. [44.5 N] min. |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        |                                                                                 |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                                                       |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                                           |

#### **D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## **SHORT FORM SPECIFICATION: RedLINE Mopped/Torched Application APP/SBS Modified Bitumen (MBM/T)**

***Overview:** Short form specification for the installation of the RedLINE waterproofing joint material with Modified Bitumen. This application is used for horizontal and vertical roofing and waterproofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [20], [20G], [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions. The system is to be wholly encapsulated between the plies of the modified bitumen membrane in a roofing/waterproofing system. Refer to manufacturer's instructions for torch down applications.
- B. Slit the base ply with a knife along the joint gap. The bottom surface of the RedLINE is rolled in to a torch liquefied modified bitumen base sheet. The RedLINE can be stripped by torching the modified bitumen cap sheet. For torching application the polyester fleece on the top surface of the RedLINE must be primed with a glaze coat of asphalt prior to the torching. It is assumed that the RedLINE has already been mopped to the substrate. Coat the top surface of the RedLINE with asphalt/bitumen as if mopping the RedLINE and stripping it in. Coat the entire top surface of the RedLINE including the gland area.

- C. Apply the modified bitumen stripping plies smooth, free from air pockets, wrinkles, fishmouths, or tears. Heat the modified bitumen as it is unrolled with a flame or hot air torch. As the heated modified bitumen liquefies, it is rolled into contact with the primed RedLINE fleece material. Repeat for both edges of RedLINE expansion joint material. Bond the modified bitumen material to the substrate extending 10" [250 mm] past the RedLINE expansion joint material. The RedLINE fleece must be completely encapsulated in the hot asphalt/bitumen, The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.

### 3.02 PROTECTION

- A. The joint can be protected by means of an overlap membrane mopped to one side of the joint as per manufacturer's instructions.

## TERMS OF REFERENCE

## END OF SECTION

### [Modified Bituminous Materials]

1. ASTM D 5147, Test Methods for Modified Bitumen Roofing Membranes.
2. ASTM D 312, Asphalt Used in Bitumen Type [II], [III], [IV].
3. ASTM D 41, Asphalt Primer Used in Roofing, Damp proofing and Waterproofing.
4. ASTM D 4586 Type [II], Asphalt Roof Cement, Asbestos Free.

### [RedLINE, 20, 20G, 40, 40G, 100, 240]

#### A. Appearance

1. Color: Orange-red with white fleece on selvage edge.

#### B. Material Chemistry

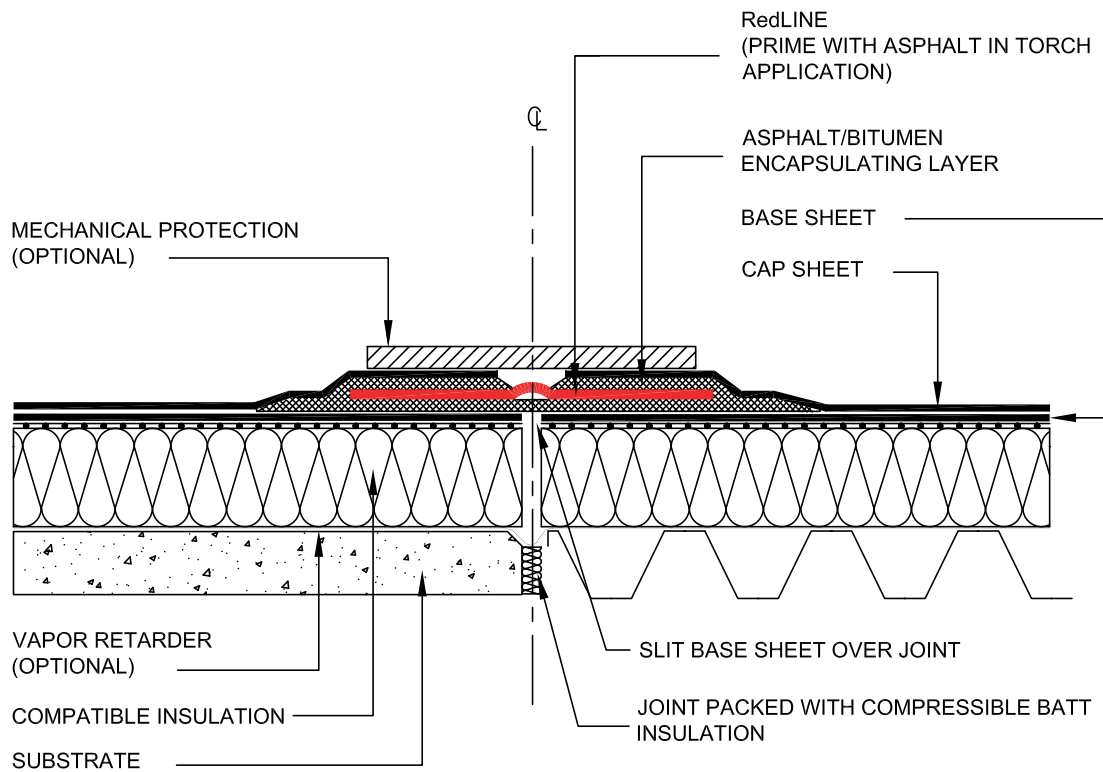
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

#### C. RedLINE waterproofing material, minimum physical performance specifications:

- |                                                                                                         |                                                                                 |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                                          |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                                           |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                                             |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                                          |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                                                        |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                                                        |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                                                        |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                                                     |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                                                      |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                                                   |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                                                   |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms [1.149 ng/Pa s m <sup>2</sup> ]<br>10 lbs. [44.5 N] min. |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        |                                                                                 |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                                                       |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                                           |

#### D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).

## RedLINE Application Mopped - Modified Bitumen (MBM) Roof to Roof Typical Detail



### NOTE:

THE DETAIL CAN BE USED FOR A TORCHED APPLICATION PROVIDED THE TOP SURFACE OF THE RedLINE IS COVER WITH HOT ASPHALT PRIOR TO TORCHING.



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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### PROJECT NAME:

**SBS/APP MODIFIED BITUMEN  
MEMBRANE TORCH/MOPPED DETAIL  
WITH RedLINE® WATERPROOF EXPANSION JOINT.**

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

### DETAIL NUMBER:

**MBM/TD-01**

### SCALE:

**N.T.S.**

### CHECKED BY:

**KMZ**

### DATE:

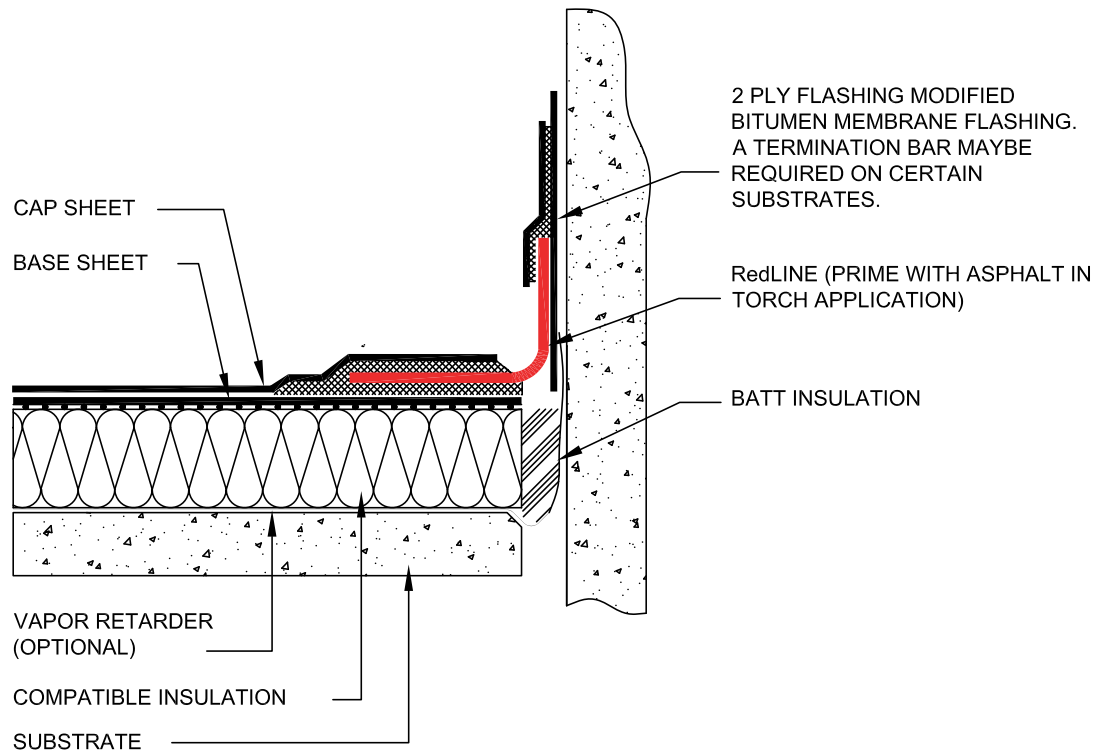
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### SHEET:

**1 OF 1**



## RedLINE Application Mopped - Modified Bitumen (MBM) Roof to Wall Typical Detail



### NOTE:

THE DETAIL CAN BE USED FOR A TORCHED APPLICATION PROVIDED THE TOP SURFACE OF THE RedLINE IS COVER WITH HOT ASPHALT PRIOR TO TORCHING.



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

**SBS/APP MODIFIED BITUMEN  
MEMBRANE TORCH/MOPPED DETAIL  
WITH RedLINE® WATERPROOF EXPANSION JOINT.**

### APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION APPROVAL

DETAIL NUMBER:

**MBM/TD-02**

SCALE:

**N.T.S.**

CHECKED BY:

**KMZ**

DATE:

**06/01/07**

SHEET:

**1 OF 1**

## **SHORT FORM SPECIFICATION: RedLINE Application Liquid Applied Membranes (LAM)**

***Overview:** Short form specification for the installation of the RedLINE joint waterproofing material with Liquid Applied Membranes. This application is most commonly used for horizontal waterproofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 250 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [20], [20G], [40], [40G], [240], [100] as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions. The system is to be wholly encapsulated between the coats of the liquid applied membrane in a roofing/waterproofing system. Refer to manufacturer's instructions for method of application.
- B. Typically the RedLINE is encapsulated in the liquid applied membrane. A coat of the membrane is applied to the substrate, and the RedLINE is laid into the liquid membrane while wet. The manufacturers' recommendation with regards to the flash off time must be observed, before the RedLINE is laid in.

- C. Following the substrate embedment, the top fleece surface of the RedLINE material is coated with the liquid membrane and allowed to cure as per the membrane manufacturers requirements. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.

### 3.02 PROTECTION

- A. The joint can be protected by means of an overlap membrane adhered to one side of the joint.

### END OF SECTION

#### TERMS OF REFERENCE

##### [Liquid Applied Membranes]

1. ASTM C957 / C957M - 10 Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Integral Wearing Surface
2. ASTM C898 / C898M - 09 Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Separate Wearing Course
3. ASTM C1471 - 05 Standard Guide for the Use of High Solids Content Cold Liquid-Applied Elastomeric Waterproofing Membrane on Vertical Surfaces

##### [RedLINE, 20, 20G, 40, 40G, 100, 240]

##### **A. Appearance**

1. Color: Orange-red with white fleece on selvage edge.

##### **B. Material Chemistry**

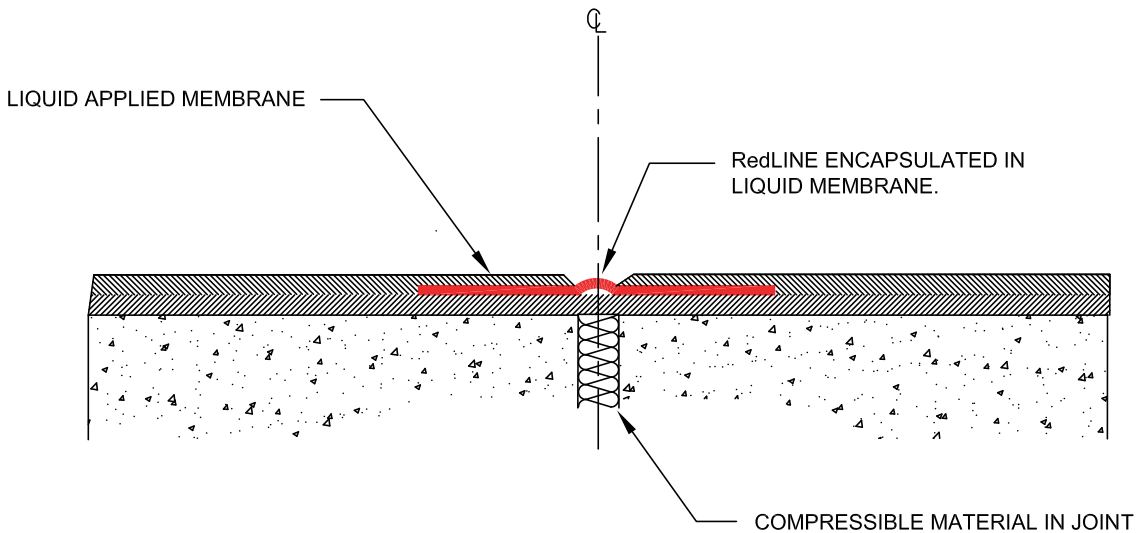
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

##### **C. RedLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                                         |                                                                                 |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                                          |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                                           |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                                             |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                                          |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                                                        |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                                                        |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                                                        |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                                                     |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                                                      |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                                                   |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                                                   |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms [1.149 ng/Pa s m <sup>2</sup> ]<br>10 lbs. [44.5 N] min. |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        |                                                                                 |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                                                       |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                                           |

##### **D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## RedLINE Application - Liquid Applied Membrane (LAM) Roof to Roof Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## LIQUID MEMBRANE APPLICATION WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

LAM/TD-01

SCALE:

N.T.S.

CHECKED BY:

KMZ

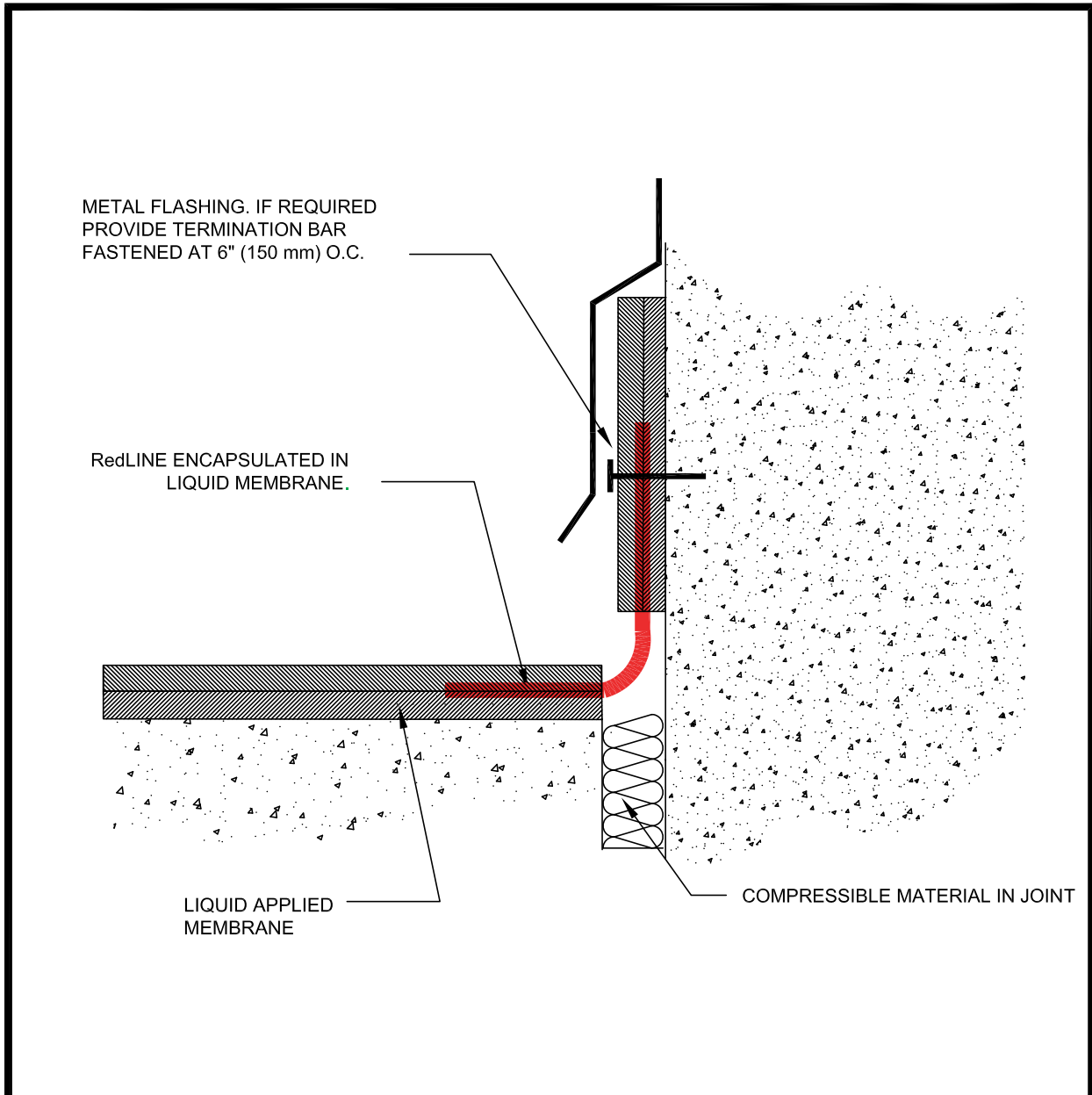
DATE:

06/01/07

SHEET:

1 OF 1

## RedLINE Application - Liquid Applied Membrane (LAM) Roof to Wall Typical Detail

NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL  
SITURA INC. AT 1-888-4-SITURA (474-8872)
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PROJECT NAME:

## LIQUID MEMBRANE APPLICATION

WITH RedLINE® WATERPROOF EXPANSION JOINT.

APPROVALS & SIGN OFFS

<u>DESCRIPTION:</u>	<u>DATE:</u>	<u>SIGNED BY:</u>
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

LAM/TD-02

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

06/01/07

SHEET:

1 OF 1

## **SHORT FORM SPECIFICATION: RedLINE Application Cold Applied Adhesives (CAA)**

***Overview:** Short form specification for the installation of the RedLINE joint waterproofing material with Cold Applied Adhesives. This application is most commonly used for horizontal roofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [20], [20G], [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturer's instructions.
- B. Encapsulate the RedLINE material in a bed of trowel grade cold adhesive. Coat the substrate with the cold adhesive in accordance to the manufacturer's recommendations and embed the bottom fleece surface of RedLINE in it.
- C. Use flat head nails to secure the RedLINE to the substrate. Place nails 2" (50 mm) away from the selva edge of the RedLINE, within the fleece. Fastening pattern is 8" o.c. (200 mm o.c.) staggered on both selva edges.
- D. Coat the top fleece surface of the RedLINE, with trowel grade cold adhesive and lay in the roofing / waterproofing membrane in the cold adhesives. Consult the manufacturer for specific application procedures. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.



## 3.02 PROTECTION

- A. The joint can be protected by means of an overlap membrane adhered to one side of the joint.

## END OF SECTION

## TERMS OF REFERENCE

[Cold Applied Adhesive]

1. ASTM 3019 Type III, Grade 1, 2

[RedLINE, 20, 20G, 40, 40G, 100, 240]

**A. Appearance**

1. Color: Orange-red with white fleece on selvage edge.

**B. Material Chemistry**

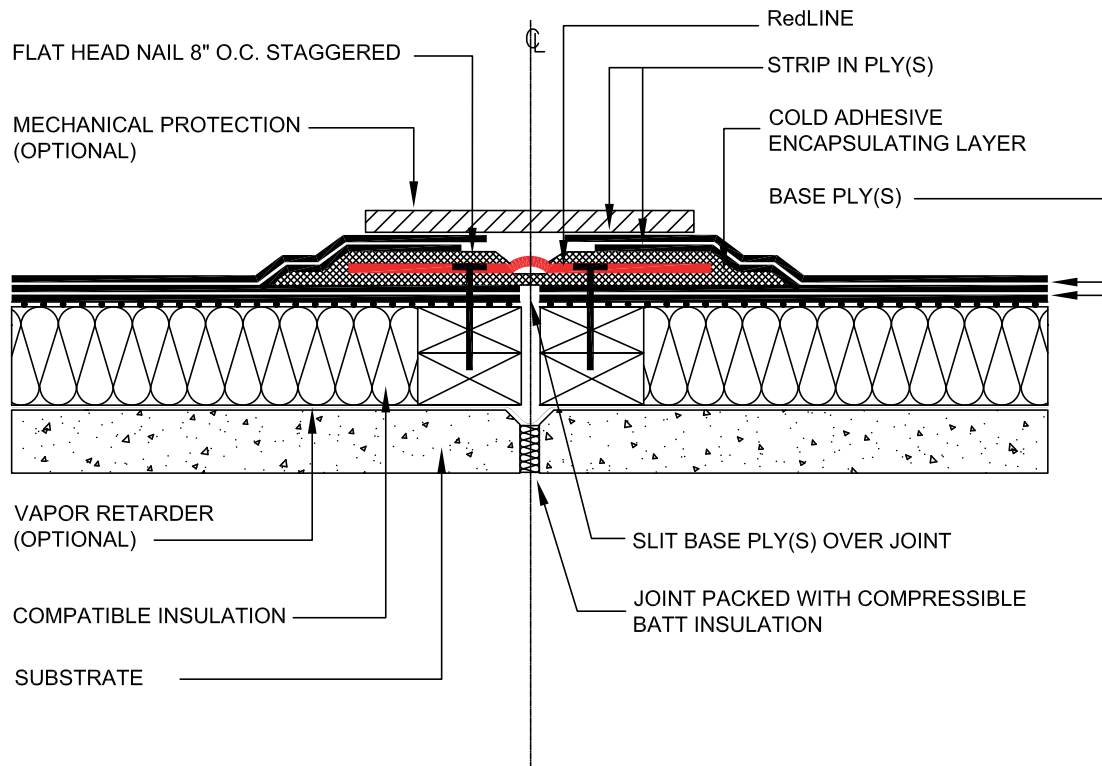
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

**C. RedLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                                         |                                                                                    |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                                             |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                                              |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                                                |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                                             |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                                                           |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                                                           |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                                                           |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                                                        |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                                                         |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                                                      |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                                                      |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms<br>[1.149 ng/Pa s m <sup>2</sup> ]<br>10 lbs. [44.5 N] min. |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        |                                                                                    |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                                                          |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                                              |

**D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## RedLINE Application Cold Applied Adhesive (CAA) Roof to Roof Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## COLD ADHESIVE APPLICATION WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

CAA/TD-01

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

06/01/07

SHEET:

1 OF 1

## RedLINE Application Cold Applied Adhesive (CAA) Roof to Wall Typical Detail

2 PLY FLASHING OR MOPPED  
MODIFIED BITUMEN MEMBRANE  
FLASHING. FOR COLD ADHESIVE  
PROVIDE TERMINATION BAR  
FASTENED AT 6" (150 mm) O.C.

FLAT HEAD NAIL 8" O.C. STAGGERED

VAPOR RETARDED  
(OPTIONAL)

SUBSTRATE

COMPATIBLE INSULATION

RedLINE

BATT INSULATION

SUBSTRATE



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL  
SITURA INC. AT 1-888-4-SITURA (474-8872)
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PROJECT NAME:

## COLD ADHESIVE APPLICATION WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

CAA/TD-02

SCALE:

N.T.S.

DATE:

06/01/07

CHECKED BY:

KMZ

SHEET:

1 OF 1

## SHORT FORM SPECIFICATION: RedLINE Application Spray Polyurethane Foam (SPF)

*Overview: Short form specification for the installation of the RedLINE joint waterproofing material with Spray Polyurethane Foam. This application is most commonly used for roofing installations.*

### PART 1: GENERAL

#### 1.01 SCOPE

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### 1.02 SUBMITTALS

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### PART 2: PRODUCT

#### 2.01 DESCRIPTION

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [20], [20G], [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions.
- B. Encapsulate the RedLINE material in the *surface coating of the spray polyurethane foam*; alternatively, if the setting time of the foam is long, embed the RedLINE in the *base coat of the polyurethane foam*.
- C. The top surface fleece of the RedLINE must be covered by the coating applied to the polyurethane roof or embedded in the polyurethane base coat. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier. Consult the manufacturer for specific application procedures.

- D. Do not cover the center gland of the RedLINE joint with spray polyurethane, if required use masking tape to prevent the sprayed polyurethane from covering the RedLINE gland.

## END OF SECTION

### TERMS OF REFERENCE

#### [Spray Polyurethane Foam]

1. ASTM C 1079, Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation
2. ASTM D 5469, Standard Guide for Application of New Spray-Applied Polyurethane Foam and Coated Roofing System

#### [RedLINE, 20, 20G, 40, 40G, 100, 240]

##### **A. Appearance**

1. Color: Orange-red with white fleece on selvage edge.

##### **B. Material Chemistry**

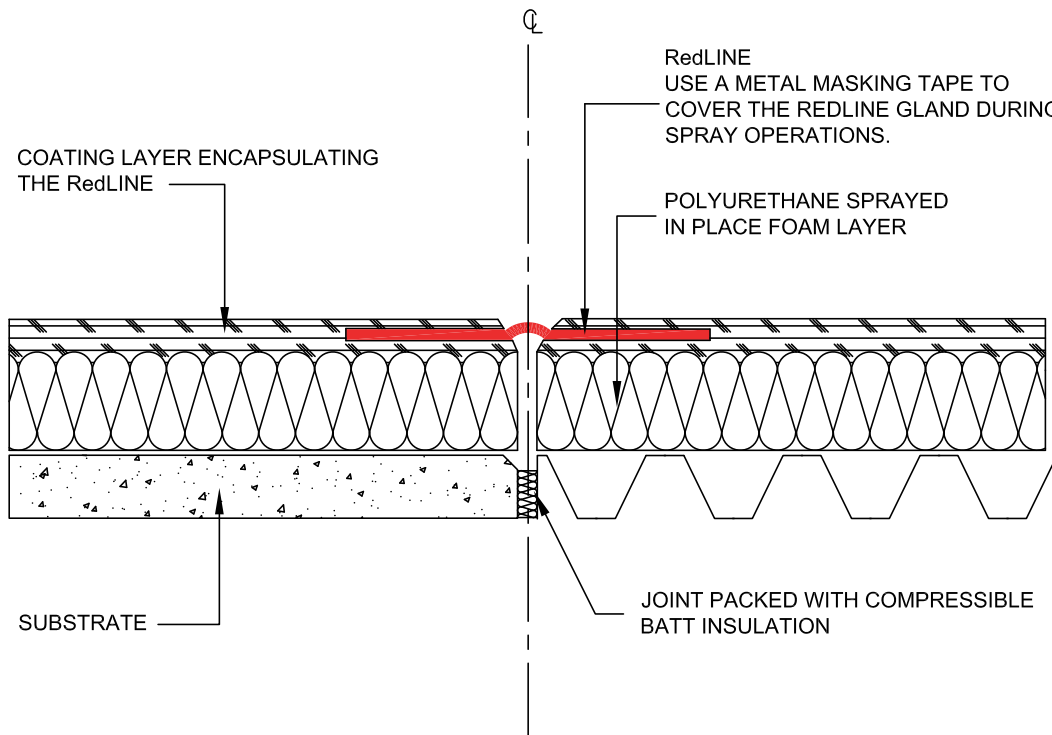
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

##### **C. RedLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                                         |                                                           |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                    |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                     |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                       |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                    |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                                  |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                                  |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                                  |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                               |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                                |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                             |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                             |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms<br>[1.149 ng/Pa s m <sup>2</sup> ] |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        | 10 lbs. [44.5 N] min.                                     |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                                 |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                     |

- D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## RedLINE Application Spray Polyurethane Foam (SPF) Roof to Roof Typical Detail



THE EMBEDMENT OF REDLINE IN SPF IS DEPENDENT UPON THE TYPE OF SPF USED. IT EITHER CAN BE IN THE BOTTOM COATING OR TOPPING.



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## SPRAY POLYURETHANE FOAM WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

SPF/TD-01

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

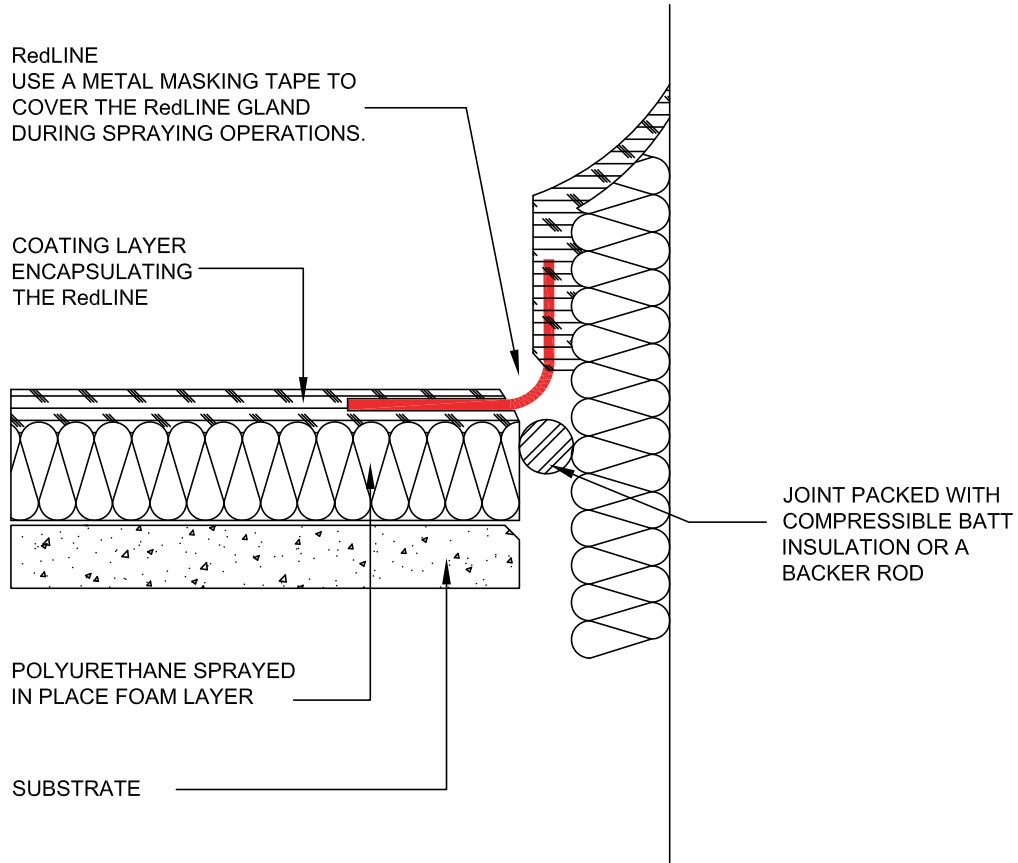
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SHEET:

1 OF 1



## RedLINE Application Spray Polyurethane Foam (SPF) Roof to Wall Typical Detail



THE EMBEDMENT OF REDLINE IN SPF IS DEPENDENT UPON THE TYPE OF SPF USED. IT EITHER CAN BE IN THE BOTTOM COATING OR TOPPING.



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## SPRAY POLYURETHANE FOAM WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

SPF/TD-02

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

06/01/07

SHEET:

1 OF 1

## SHORT FORM SPECIFICATION: RedLINE Application Epoxy Resin (ER)

**Overview:** Short form specification for the installation of the RedLINE waterproofing joint material with an Epoxy Resin. This application is most commonly used for horizontal and vertical waterproofing installations on concrete and metal substrates.

### PART 1: GENERAL

#### 1.01 SCOPE

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects'/engineers' drawings, in new or retrofit installations.

#### 1.02 SUBMITTALS

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### PART 2: PRODUCT

#### 2.01 DESCRIPTION

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm \frac{1}{4}$ " [  $\pm 6$  mm ] /  $\pm 1$ " [  $\pm 25$  mm ] /  $\pm 2$ " [  $\pm 50$  mm ] /  $\pm 4$ " [  $\pm 100$  mm ] /  $\pm 10$ " [  $\pm 240$  mm ] capable of 500% elongation at - 40 °F [ - 40 °C ] across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be RedLINE [06], [20], [20G], [40], [40G], [100], [240] waterproof expansion joint as supplied by SITURA INC., 1-888-474-8872.

### PART 3: EXECUTION

#### 3.01 INSTALLATION

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions. The system is to be wholly encapsulated in a two-component, high viscosity, epoxy resin.
- B. The epoxy resin is applied to the substrate and the bottom surface of the RedLINE fleece is embedded into it, by pressing. The top surface of the fleece is then covered by the epoxy resin and allowed to dry. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.
- C. Apply silica sand to the top epoxy layer while wet, for friction bite.

### 3.02 PRECAUTIONS

- A. The applicator must observe the open pot time of the epoxy resin manufacturer.

### 3.03 PROTECTION

- A. The joint material can be protected by means of a light gauge metal cover, to match external finishes, if required.

## END OF SECTION

### TERMS OF REFERENCE

#### [Epoxy Resin]

1. Two-component, solvent-free, moisture-insensitive, high-modulus, high-strength, structural epoxy paste adhesive.
2. ASTM C881, Type I, II, IV and V, Grade 3, Class B and C, epoxy resin adhesive.

#### [RedLINE, 06, 20, 20G, 40, 40G, 100, 240]

##### **A. Appearance**

1. Color: Orange-red with white fleece on selvage edge.

##### **B. Material Chemistry**

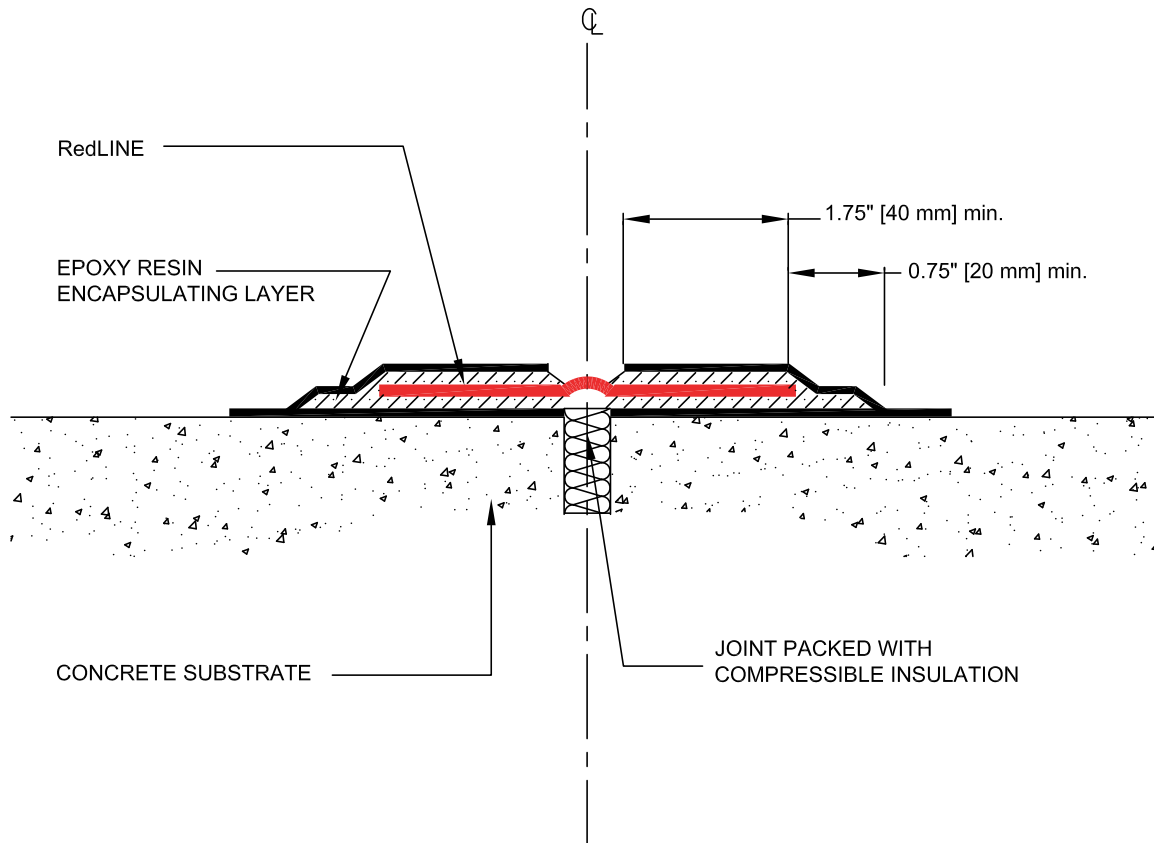
1. RedLINE base material elastomer with a saturated polymethylene chain.
2. Non woven Polyester fleece: 0.60 oz/ft<sup>2</sup> [200 g/m<sup>2</sup>].

##### **C. RedLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                                         |                                                           |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                                                 | 45 ± 5                                                    |
| 2. Elongation at break to ASTM D 412:                                                                   | 500 %                                                     |
| 3. Low temperature flex to ASTM D 746:                                                                  | -70 °F [ - 56.7 °C]                                       |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                                          | 220 lbf/in [38.8 N/mm]                                    |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:                               | 10% max.                                                  |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:                       | 10% max.                                                  |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:                             | 10% max.                                                  |
| 8. Resistance to oil aging, change in volume after 72 hours, immersion in ASTM Oil #3 @ 121 °F [80 °C]: | +100 % max.                                               |
| 9. Resistance to ozone, to ASTM D 1149:                                                                 | No cracks.                                                |
| 10. Change in weight, after immersion in water 7 days @ 121 °F [80 °C], ASTM D 471:                     | less than 2 %                                             |
| 11. Seam tensile strength to ASTM D 816:                                                                | base material                                             |
| 12. Water vapor permeability to ASTM E 96 Method B:                                                     | less then 0.0020 perms<br>[1.149 ng/Pa s m <sup>2</sup> ] |
| 13. Puncture test - cone to CGSB 37.56 M (1995):                                                        | 10 lbs. [44.5 N] min.                                     |
| 14. Embedment of fleece covered flaps in Type II or III asphalt according to CGSB 37.56 M (1995):       | 23 lbs/in [4.0 N/mm] min.                                 |
| 15. 5000 hours exposure to UV to ASTM G 53:                                                             | No cracks or crazing.                                     |

##### **D. RedLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## RedLINE Application Epoxy Resin (ER) Deck to Deck Typical Detail

NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## EPOXY RESIN APPLICATION

WITH RedLINE® WATERPROOF EXPANSION JOINT.

APPROVALS & SIGN OFFS

<u>DESCRIPTION:</u>	<u>DATE:</u>	<u>SIGNED BY:</u>
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

ERA/TD-01

SCALE:

N.T.S.

CHECKED BY:

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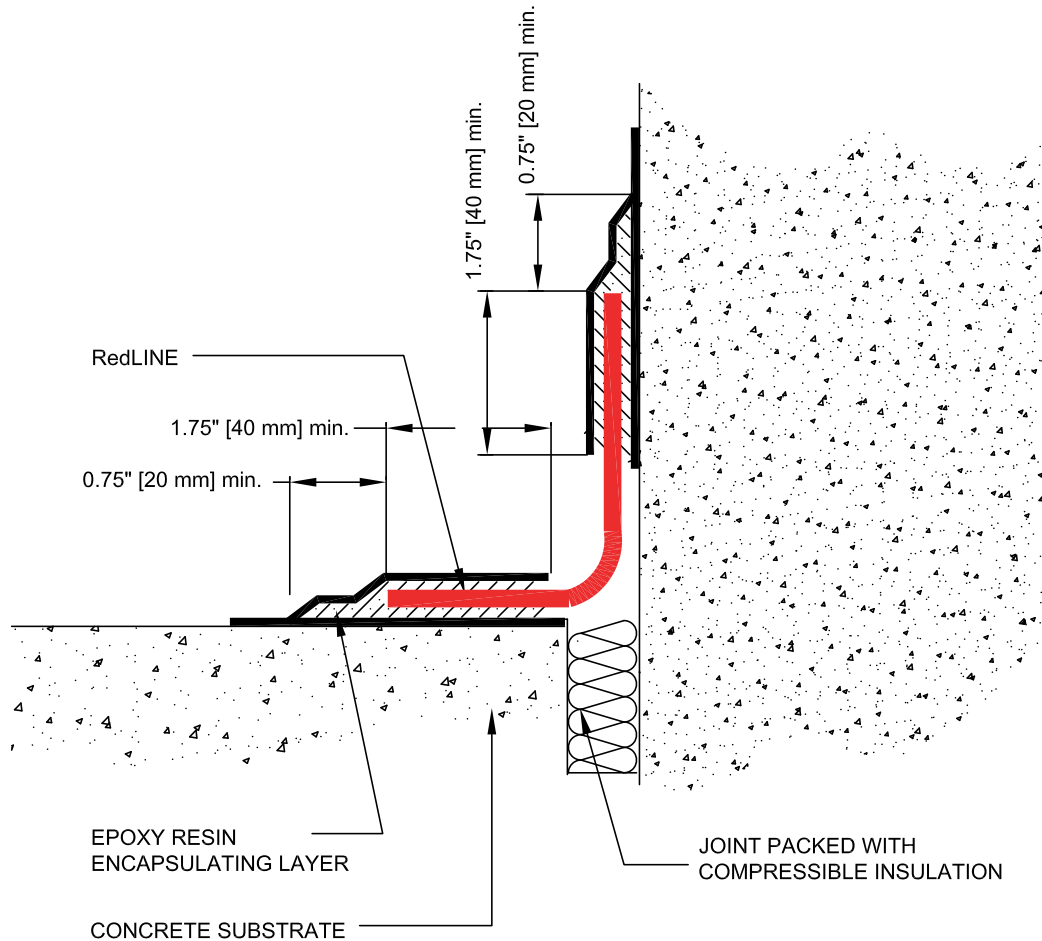
DATE:

06/01/07

SHEET:

1 OF 1

## RedLINE Application Epoxy Resin (ER) Deck to Wall Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
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- 3.)

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PROJECT NAME:

## EPOXY RESIN APPLICATION

WITH RedLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

ERA/TD-02

SCALE:

N.T.S.

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DATE:

06/01/07

SHEET:

1 OF 1

## **SHORT FORM SPECIFICATION: FlamLINE Torched Application APP/SBS Modified Bitumen (MBM)**

***Overview:** Short form specification for the installation of the FlamLINE joint waterproofing material with Modified Bitumen. This application is most commonly used for horizontal roofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects/engineers drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be FlamLINE [20], [40], [100], [240] as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

- A. Install all components of the system in accordance with the manufacturer's instructions. The system is to be wholly encapsulated between the plies of the modified bitumen membrane in a roofing/waterproofing by torching.
- B. Slit the modified bitumen base ply with a knife along the joint gap. Refer to the manufacturer's instructions for the preparations and torching of the FlamLINE. Torch the prepared FlamLINE to the substrate, making sure that the FlamLINE is firmly and uniformly set, without voids, into the liquefied asphalt. Torching is carried out by the liquefaction of the modified bitumen base sheet and the FlamLINE rolled into it. Flame can be directed at the FlamLINE material. At all times observe the modified bitumen manufacturer's recommendations and safety instructions. The FlamLINE must be completely encapsulated in the hot asphalt/bitumen and a bitumen bead visible along FlamLINE selvage edge.
- C. Torch the modified bitumen stripping plies smooth, free from air pockets, wrinkles, fish mouths, or tears. When torching, direct the flame away from the FlamLINE gland material, use the torch and flop technique. Install each stripping ply; shingle lap fashion, onto the



FlamLINE firmly and uniformly, without voids. At all times observe the modified bitumen manufacturer's recommendations. The FlamLINE must be completely encapsulated in the melted bitumen and a bitumen bead visible along the FlamLINE selvage edge

### 3.02 PROTECTION

- A Additional protection to the FlamLINE joint is optional but can be provided by attaching a modified bitumen sheet to one side of the FlamLINE joint. This is achieved by either mopping or torching the modified bitumen sheet to the already installed modified bitumen cap ply.

## END OF SECTION

### TERMS OF REFERENCE

#### [Modified Bituminous Materials]

1. ASTM D 5147, Test Methods for Modified Bitumen Roofing Membranes.
2. ASTM D 312, Asphalt Used in Bitumen Type [II], [III], [IV].
3. ASTM D 41, Asphalt Primer Used in Roofing, Damp proofing and Waterproofing.
4. ASTM D 4586 Type [II], Asphalt Roof Cement, Asbestos Free.

#### [FlamLINE, 20, 40, 100, 240,]

#### **A. Appearance**

1. Color: Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.

#### **B. Material Chemistry**

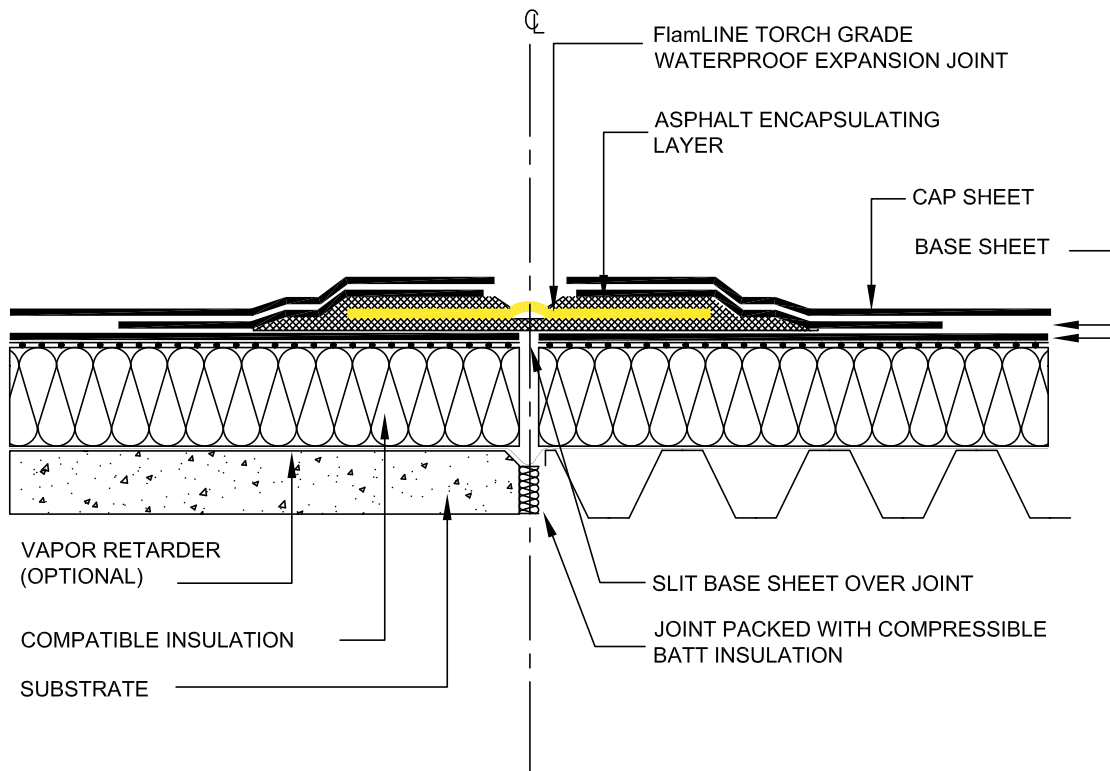
1. FlamLINE base material copolymer with a proprietary fire retardant package.
2. Internally reinforced with woven polyester fibres.

#### **C. FlamLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                       |                                               |
|---------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                               | 55 ± 5                                        |
| 2. Elongation at break to ASTM D 412:                                                 | >700 %                                        |
| 3. Low temperature flex to ASTM D 746:                                                | -70 °F [ - 56.7 °C]                           |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                        | 45 lbf/in [8.0 N/mm]                          |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:             | 10% max.                                      |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:     | 10% max.                                      |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:           | 10% max.                                      |
| 8. Change in weight, after immersion in water<br>7 days @ 121 °F [80 °C], ASTM D 471: | less than 0.001 %                             |
| 9. Seam tensile strength to ASTM D 816:                                               | base material                                 |
| 10. Water vapor permeability to ASTM E 96 Method B:                                   | less then 0.0010 perms<br>[0.5721 ng/Pa s m²] |
| 11. Puncture test - cone to CGSB 37.56 M (1995):                                      | 10 lbs. [44.5 N] min.                         |
| 12. 5000 hours exposure to UV to ASTM G 53:                                           | No cracks or crazing.                         |

#### **D. FlamLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## FlamLINE Application Torched Modified Bitumen (MBM) Roof to Roof Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
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PROJECT NAME:

**SBS/APP MODIFIED BITUMEN  
MEMBRANE TORCH DETAIL  
WITH FlamLINE® WATERPROOF EXPANSION JOINT.**

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

**MBT/TD-01**

SCALE:

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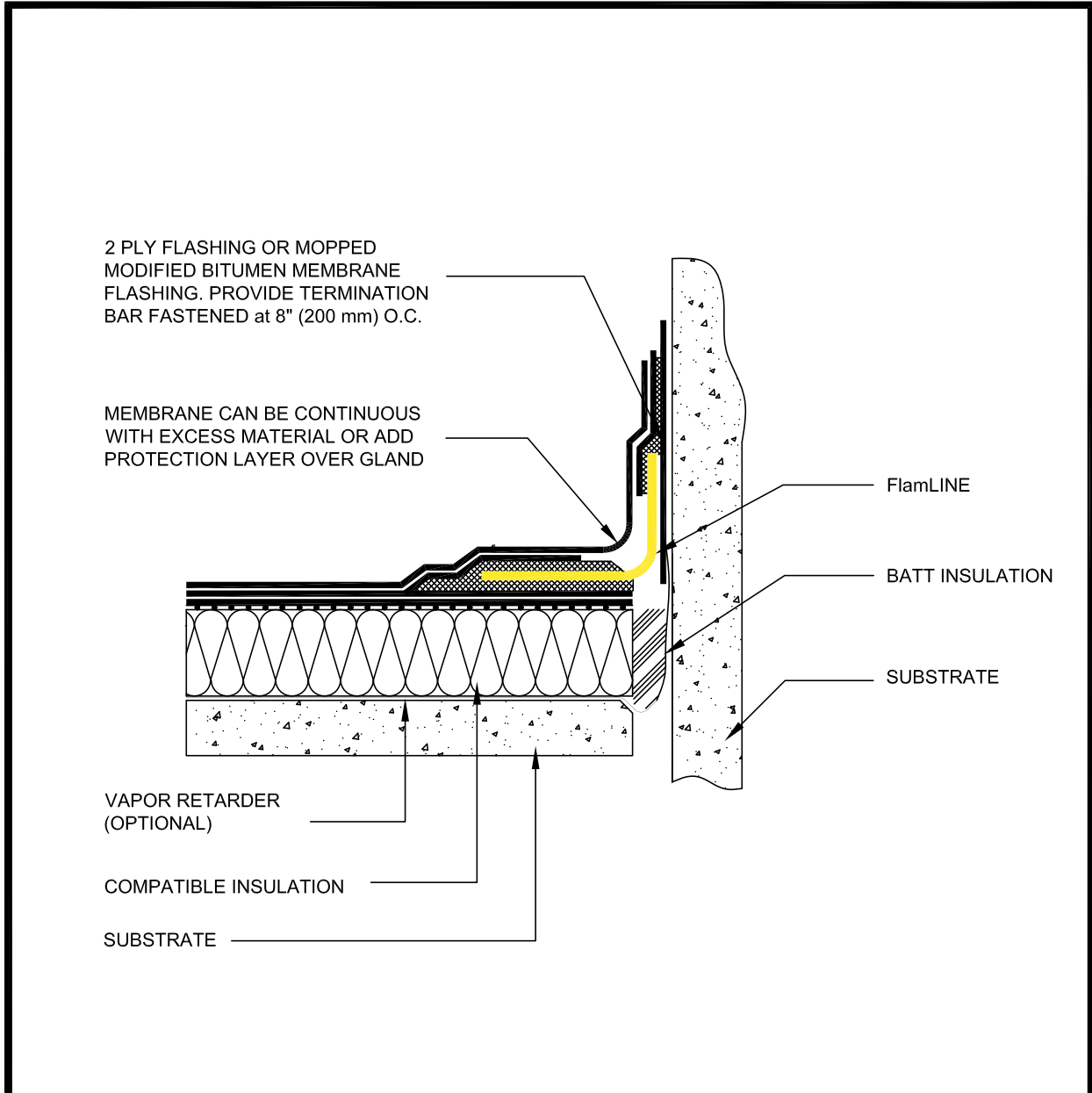
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**1 OF 1**

## FlamLINE Application Torched Modified Bitumen (MBM) Roof to Wall Typical Detail



**SITURA INC.**  
Building Envelope Components

### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
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PROJECT NAME:

### SBS/APP MODIFIED BITUMEN TORCH DETAIL

WITH FlamLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

MBT/TD-02

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1 OF 1

## **SHORT FORM SPECIFICATION: FlamLINE Application Self Adhered Membrane (SAM)**

***Overview:** Short form specification for the installation of the FlamLINE joint waterproofing material with a self adhered membrane. This application is most commonly used for horizontal roofing and waterproofing installations.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects/engineers drawings, in new or retrofit installations.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturer's printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 1" [\pm 25 \text{ mm}] / \pm 2" [\pm 50 \text{ mm}] / \pm 4" [\pm 100 \text{ mm}] / \pm 10" [\pm 240 \text{ mm}]$  capable of 500% elongation at  $-40^\circ\text{F} [-40^\circ\text{C}]$  across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be FlamLINE [20], [40], [100], [240] as supplied by SITURA INC., 1-888-474-8872.

### **PART 3: EXECUTION**

- A. Install all components of the system in accordance with the manufacturer's most recent printed instructions.
- B. The FlamLINE can be used with Self Adhered Membranes. Set the FlamLINE in a bed of asphalt based mastic, which has been applied to the substrate. Prime the FlamLINE top surface with a compatible asphalt primer. The primer must be allowed to flash off.
- C. Encapsulate the FlamLINE material by applying the Self Adhered Membrane to the primed to surface. Do not apply the Self Adhered Membrane over the gland of the FlamLINE material. The FlamLINE must be completely stripped in. The FlamLINE joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier. If necessary flat head fasteners can be used with a 14 ga. (min.) stainless steel fastening bar, fastened at 8" [200 mm] on center staggered.

- D. A protection board can be applied over the FlamLINE joint to protect it from mechanical damage. The protection board can be secured to one side of the joint.
- E. Consult the manufacturer for specific application procedures.

## END OF SECTION

### TERMS OF REFERENCE

#### [Asphaltic Primers]

1. ASTM D 41, Asphalt Primer Used in Roofing, Damp proofing and Waterproofing.
2. ASTM D 4586 Type [II], Asphalt Roof Cement, Asbestos Free.

#### [FlamLINE, 20, 40, 100, 240,]

##### **A. Appearance**

1. Color: Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.

##### **B. Material Chemistry**

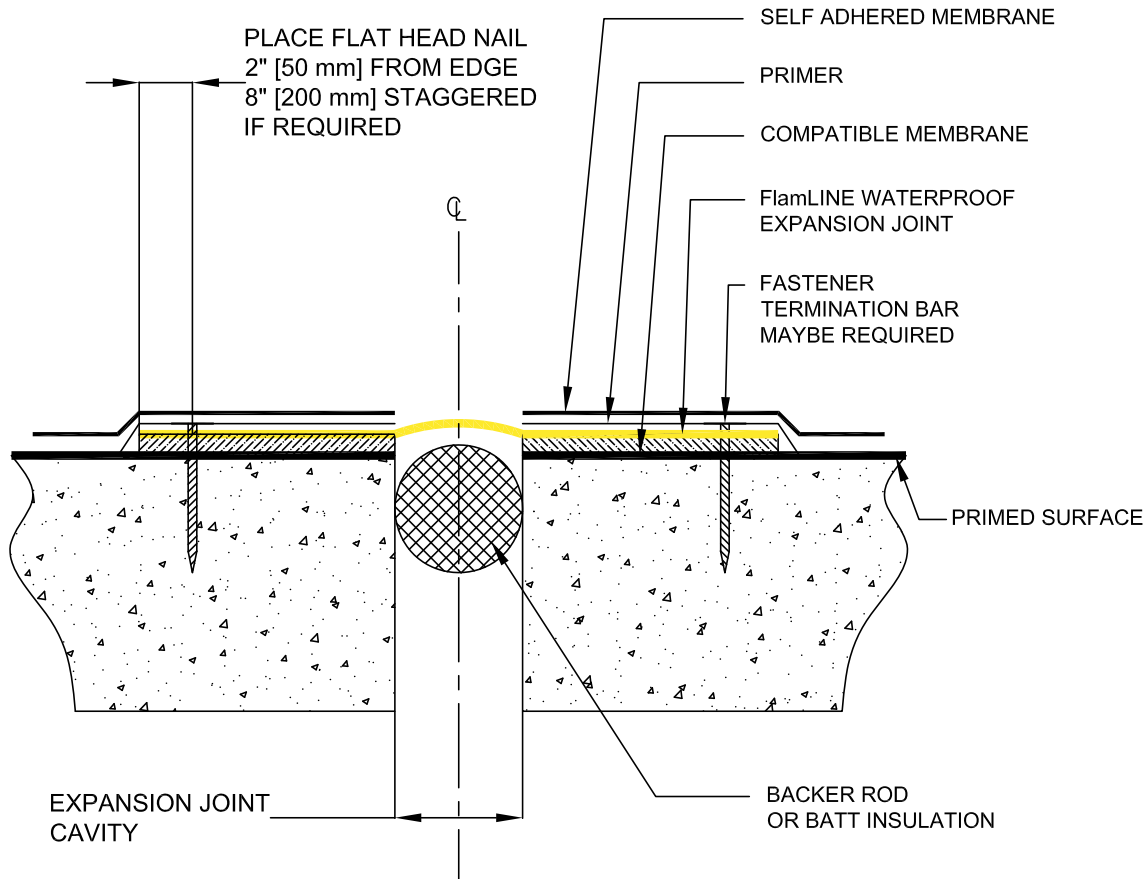
1. FlamLINE base material elastomer halo butyl with a proprietary fire retardant package.
2. Internally reinforced with woven polyester fibers.

##### **C. FlamLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                       |                                               |
|---------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                               | 55 ± 5                                        |
| 2. Elongation at break to ASTM D 412:                                                 | >700 %                                        |
| 3. Low temperature flex to ASTM D 746:                                                | -70 °F [ - 56.7 °C]                           |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                        | 45 lbf/in [8.0 N/mm]                          |
| 5. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in hardness:             | 10% max.                                      |
| 6. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in tensile strength:     | 10% max.                                      |
| 7. Resistance to heat aging, 7 days @ 121 °F [80 °C], change in elongation:           | 10% max.                                      |
| 8. Change in weight, after immersion in water<br>7 days @ 121 °F [80 °C], ASTM D 471: | less than 0.001 %<br>base material            |
| 9. Seam tensile strength to ASTM D 816:                                               | less then 0.0010 perms<br>[0.5721 ng/Pa s m²] |
| 10. Water vapor permeability to ASTM E 96 Method B:                                   | 10 lbs. [44.5 N] min.                         |
| 11. Puncture test - cone to CGSB 37.56 M (1995):                                      | No cracks or crazing.                         |
| 12. 5000 hours exposure to UV to ASTM G 53:                                           |                                               |

- D. FlamLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## FlamLINE Application Self Adhered Membrane (SAM) Roof to Roof Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
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PROJECT NAME:

## SELF ADHERED MEMBRANE DETAIL

WITH FlamLINE® TORCH GRADE EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

SAM/TD-01

SCALE:

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DATE:

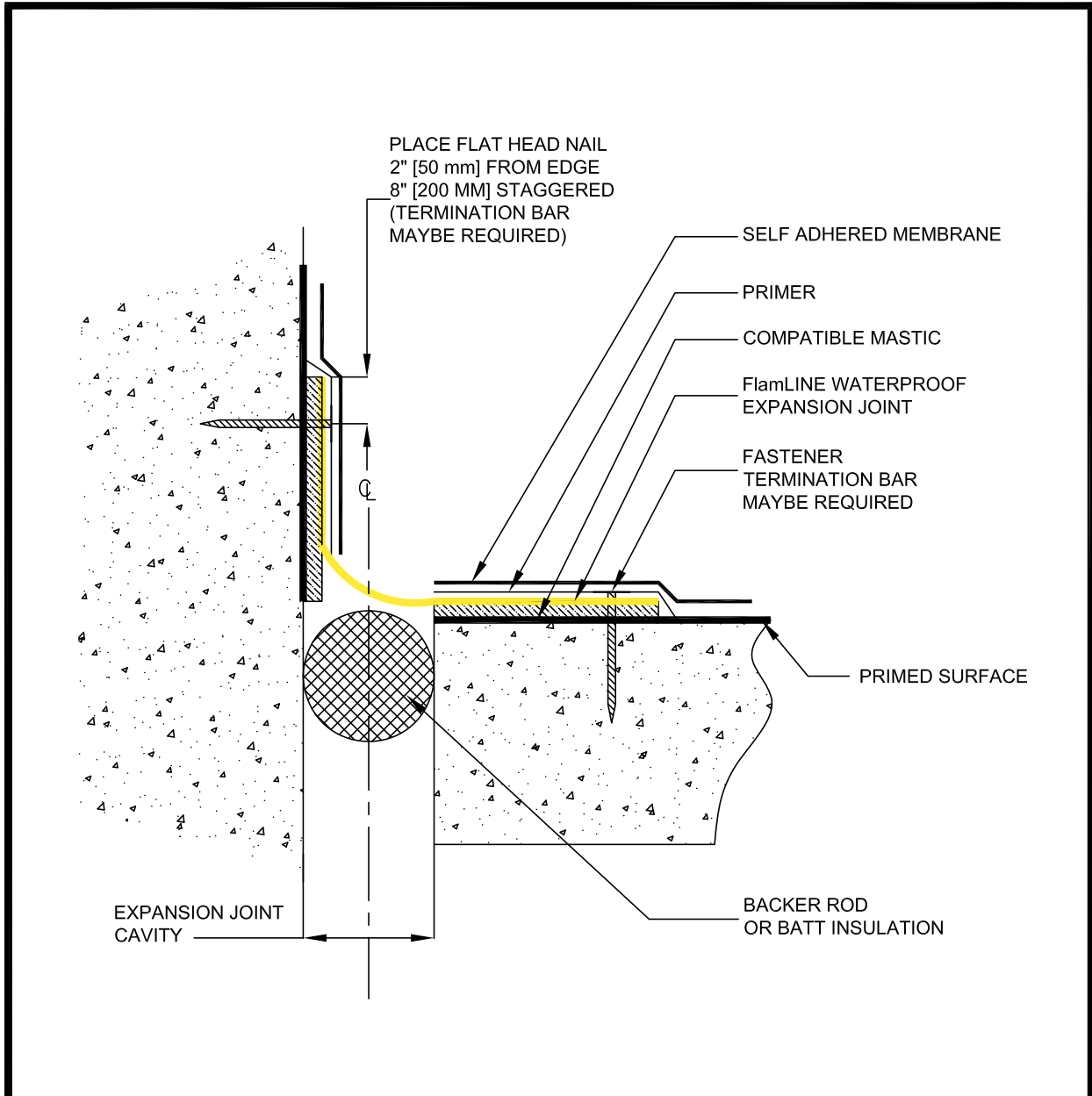
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1 OF 1



## FlamLINE Application Self Adhered Membrane (SAM) Roof to Wall Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL  
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PROJECT NAME:

## SELF ADHERED MEMBRANE DETAIL WITH FlamLINE® TORCH GRADE EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

SAM/TD-02

SCALE:

N.T.S.

DATE:

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1 OF 1

## **SHORT FORM SPECIFICATION: AquaLINE Application for Potable Water with Epoxy Resin (ER-PW)**

***Overview:** Short form specification for the installation of the AquaLINE joint waterproofing material with an epoxy resin. This application is used for waterproofing joints in potable water structures.*

### **PART 1: GENERAL**

#### **1.01 SCOPE**

- A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on architects/engineers drawings, in new or retrofit installations of potable water structures.

#### **1.02 SUBMITTALS**

- A. Submit to joint manufacturer drawings indicating location of joint and configurations.
- B. Manufacturers printed literature and installation instructions.

### **PART 2: PRODUCT**

#### **2.01 DESCRIPTION**

- A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to:  $\pm 2"$  [ $\pm 50$  mm] capable of 500% elongation at - 40 °F [- 40 °C] across its length and at all vulcanized points.
- B. All details and connections are factory fabricated by means of vulcanization.
- C. Joint material is to be AquaLINE as supplied by SITURA INC., 1-888-474-8872.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install all components of the system in accordance with the manufacturers most recent printed instructions. The system is to be wholly encapsulated in a two component, high viscosity, epoxy resin. Epoxy resin shall be certified for use in potable water.
- B. The epoxy resin is applied to the substrate and the bottom surface of the AquaLINE. The AquaLINE is embedded in to it, by pressing. The top surface of the AquaLINE is then covered by the epoxy resin and allowed to dry. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier

#### **3.02 PRECAUTIONS**

- A. The applicator must observe the open pot time of the epoxy resin.

**END OF SECTION**

**TERMS OF REFERENCE****[Epoxy Resin]**

1. Two-component, solvent-free, moisture-insensitive, high-modulus, high-strength, structural epoxy paste adhesive.
2. ASTM C881, Type I, II, IV and V, Grade 2, Class B and C, epoxy resin adhesive.
3. USDA and NSF approved for use in food plants and potable water

**[AquaLINE]****A. Appearance**

1. Color: Blue with yellow centering lines.

**B. Material Chemistry**

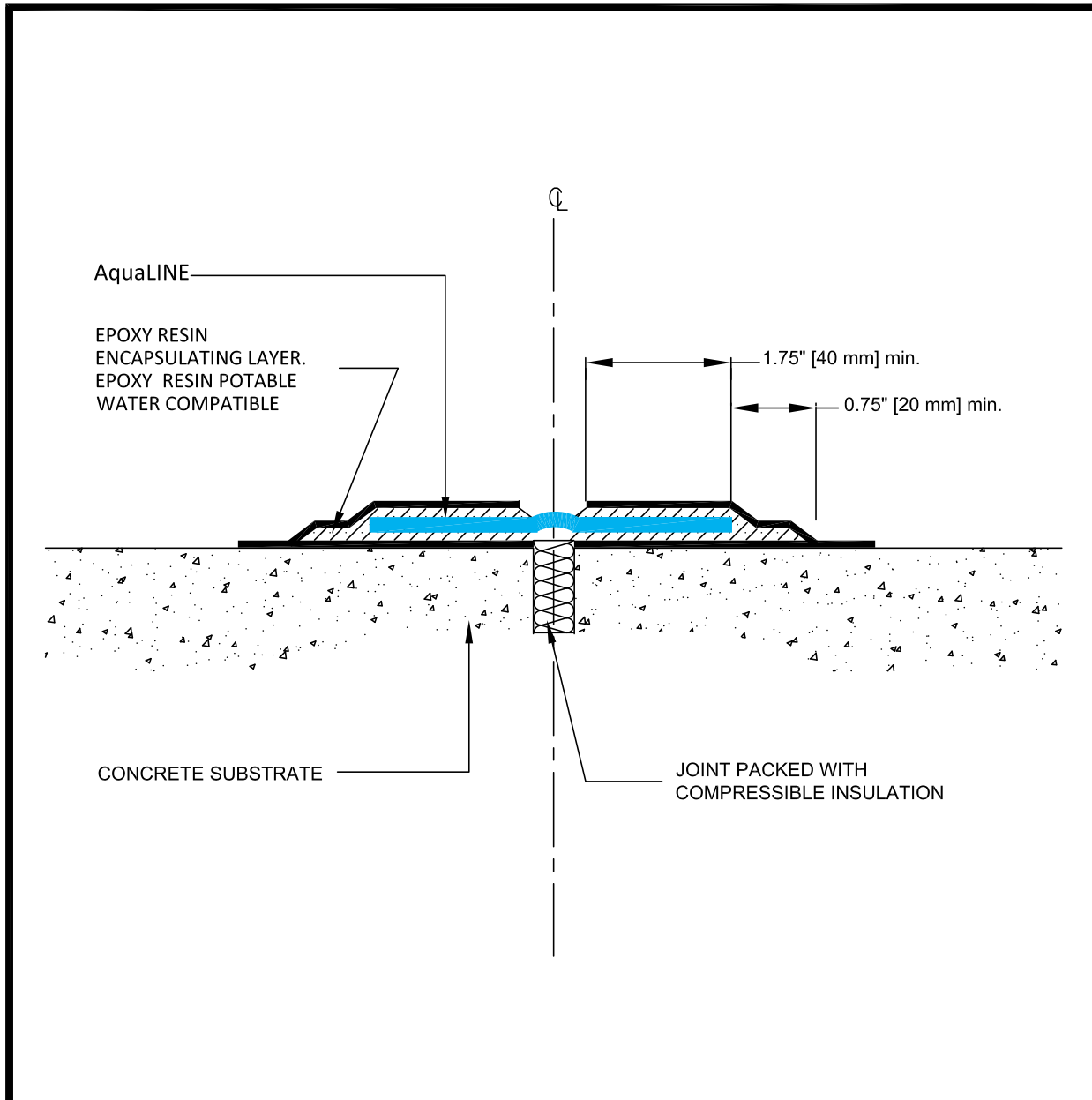
1. AquaLINE base material pharmaceutical grade elastomer.
2. Internally reinforced with woven polyester fibers.

**C. AquaLINE waterproofing material, minimum physical performance specifications:**

- |                                                                                       |                                                           |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1. Hardness Durometer A to ASTM D 2240:                                               | 55 ± 5                                                    |
| 2. Elongation at break to ASTM D 412:                                                 | 500 %                                                     |
| 3. Low temperature flex to ASTM D 746:                                                | -70 °F [ - 56.7 °C]                                       |
| 4. Tear resistance to ASTM D 624 (Die C) min.:                                        | 180 lbf/in [32.1 N/mm]                                    |
| 5. Resistance to ozone, to ASTM D 1149:                                               | No cracks.                                                |
| 6. Change in weight, after immersion in water<br>7 days @ 121 °F [80 °C], ASTM D 471: | less than 0.001 %                                         |
| 7. Seam tensile strength to ASTM D 816:                                               | base material                                             |
| 8. Water vapor permeability to ASTM E 96 Method B:                                    | less than 0.0020 perms<br>[1.149 ng/Pa s m <sup>2</sup> ] |
| 9. Puncture test - cone to CGSB 37.56 M (1995):                                       | 10 lbs. [44.5 N] min.                                     |
| 10. Hydrostatic Pressure Capacity:                                                    | 130 ft [40 m]                                             |
| 11. 5000 hours exposure to UV to ASTM G 53:                                           | No cracks or crazing.                                     |

**D. AquaLINE waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).**

## AquaLINE Application with Epoxy Resin (ER-PW) Deck to Deck Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL  
SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## EPOXY RESIN APPLICATION WITH AquaLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

ERA/TD-01/PW

SCALE:

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CHECKED BY:

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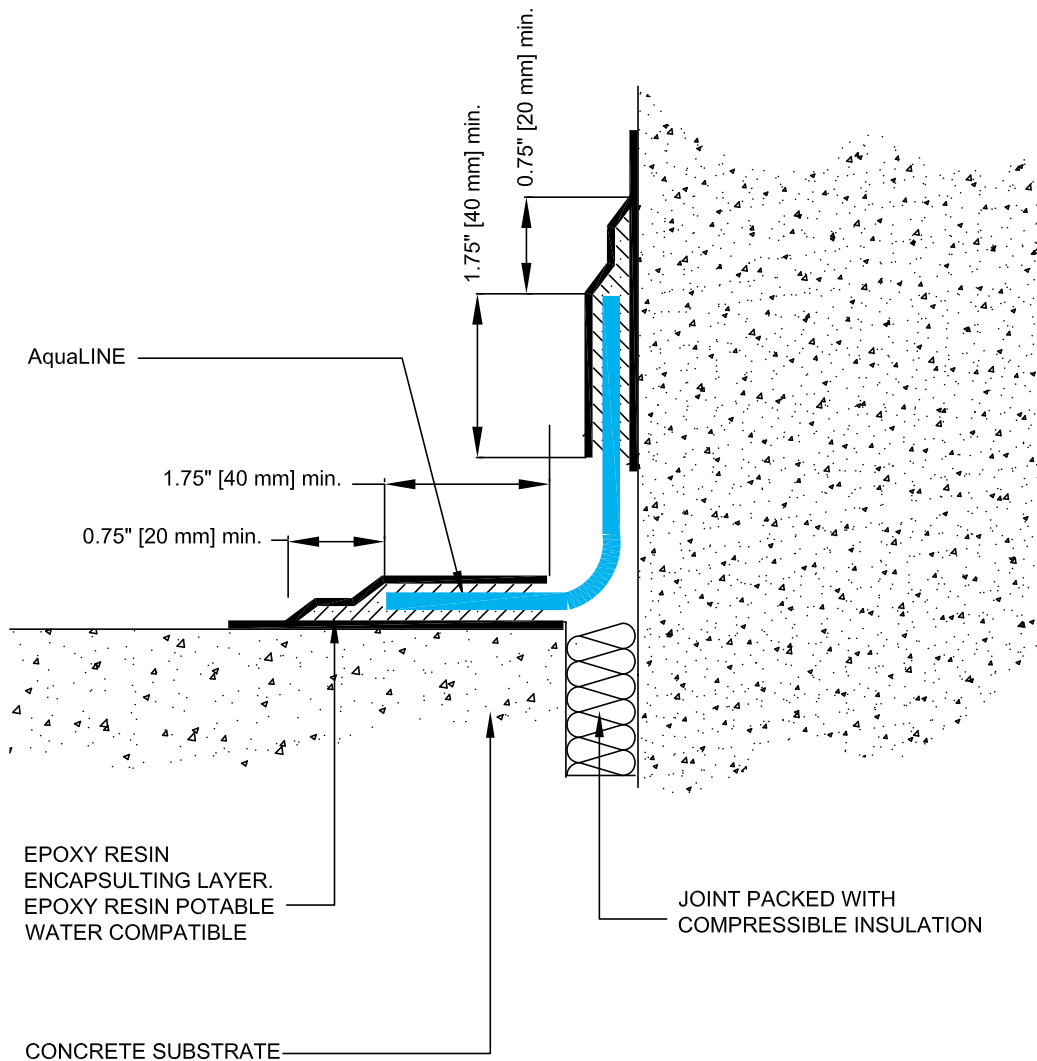
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1 OF 1

## AquaLINE Application with Epoxy Resin (ER-PW) Deck to Wall Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL  
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PROJECT NAME:

## EPOXY RESIN WALL APPLICATION WITH AquaLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

ERA/TD-02/PW

SCALE:

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DATE:

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1 OF 1

## **SHORT FORM SPECIFICATION: RedLINE Tie-In Specification for an Asphalt Membrane to a Thermoset Single Ply Membrane**

**Overview:** Short form specification for the installation of a Tie-in waterproofing material between an Asphalt based membrane and a Thermoset Single Ply Membrane.

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

A. Provide factory fabricated elastomeric waterproof tie in joint, to connect two incompatible roof systems as indicated on the architects/engineers drawings. All items in this section shall be furnished by, and be the responsibility of, the roofing/waterproofing contractor.

1. Asphaltic Membrane/Thermoset Membrane Tie-in Detail.

B. Roofing/Waterproofing System Description (*typical but not limited to*)

1. Built-Up-Roofing System: Four ply hot asphalt applied membrane system and a thermoset (EPDM type) Single Ply membrane.

2. Modified Bitumen System: Mopped/torched membrane system and a thermoset (EPDM type) Single Ply membrane.

3. Cold Applied Adhesive System: Multiple ply cold applied membrane system and a thermoset (EPDM type) Single Ply membrane.

4. Coal Tar Pitch System: Multiple ply Coal Tar Pitch membrane system and a thermoset (EPDM type) Single Ply membrane.

#### **1.02 SUBMITTALS**

A. Submit product data under the applicable provisions of Section 01300.

B. Submit manufacturer's installation instructions, product literature and specifications.

C. Submit to tie in joint manufacturer drawings indicating location of tie in and configuration.

#### **1.03 DELIVERY, STORAGE AND HANDLING**

A. Deliver products to site under provisions of Section 01600 and 01650.

B. Store and protect products under provisions of Section 01600 and 01660.

C. Store products in accordance with manufacturer's instructions in weather protected environment, clear of ground and moisture.

D. Keep the RedLINE Tie-in material dry and free of debris.



## PART 2 PRODUCTS

### 2.01 DESCRIPTION

- A. RedLINE Tie-in joint is a flat, zero profile, tie-in joint waterproofing system that is used to join two incompatible roof membrane systems e.g. BUR/EPDM. The RedLINE joint waterproofing system is installed in a matter of minutes, and incorporates the site specific pre-fabricated details. The flat profile of the tie in does not obstruct the flow of water. The RedLINE material is joined by vulcanization. Specific shapes are manufactured and joined together to form a monolithic waterproof tie in joint material.

### 2.02 MATERIAL CHARACTERISTICS

- A. RedLINE material is an extruded elastomer with polyester fleece embedded externally. It is resistant to the effects of UV, ozone, high temperatures, and chemicals such as; alkalis, acids, saline solutions, alcohol and ketones. The high quality and purity of the elastomer makes vulcanization of the tie-in joint pieces possible. Vulcanization allows the construction of details around unique shapes without the use of glue, caulking or tape.

### 2.03 MATERIAL

- A. Appearance
  - 1. Color: Orange Red.
- B. Material Chemistry
  - 1. RedLINE base material an elastomer with a saturated polymethylene chain.
  - 2. Externally reinforced with polyester fleece.
- C. RedLINE Tie-in joint waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).

### 2.04 ADHESIVE MATERIAL

- A. Use a self curing structural adhesive.

## PART 3 EXECUTION

### 3.01 INSTALLATION GENERAL

- A. Install components in accordance with manufacturer's installation instructions and conventional roofing/waterproofing practices.
- B. Coordinate the installation of components of this section with the installation of the waterproofing membrane.
- C. Coordinate the completion of flashing in and stripping the RedLINE Tie-in joint material as work progresses with the work of this section to ensure watertightness.
- D. The uninstalled RedLINE Tie-in joint material must be kept dry and clean at all times.

### 3.02 RedLINE TIE-IN JOINT THERMOSET MEMBRANE SIDE INSTALLATION

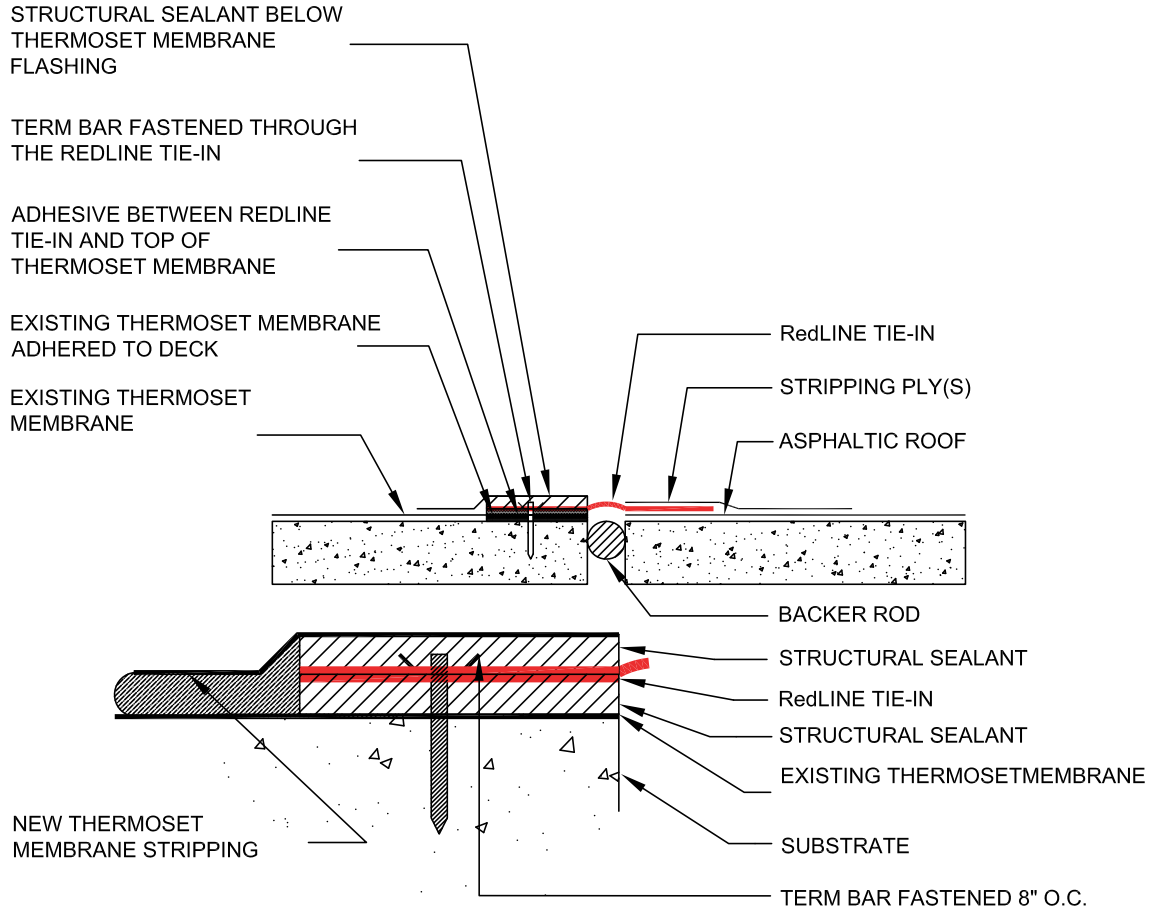
- A. Identify the location of the tie-in detail. Roll out the RedLINE Tie-in and allow it to relax prior to application. Make sure that the substrate is clean and free of debris. Align the side of the RedLINE with the selvage edge over the installed thermoset roof membrane, in such a manner that the entire selvage edge width is over the thermoset roof membrane, (either on top or the bottom).
- B. Fold back the RedLINE Tie-in on itself and prepare the thermoset membrane in accordance to the thermoset membrane manufacturer's requirements. Once the thermoset roof membrane has been cleaned, primed and allowed to dry, carefully apply the structural grade adhesive on the thermoset membrane. Carefully fold the RedLINE Tie-in selvage edge onto the surface of the thermoset membrane and apply pressure by hand, this action must be followed by applying pressure using a metal roller. This action ensures the proper adhesion of the tie-in to the thermoset roof membrane. Once the RedLINE Tie-in has been adhered to the thermoset roof, install the opposite selvage end to the adjacent roof, as if installing a regular RedLINE expansion joint.
- C. Additionally a termination bar maybe used to further secure the RedLINE Tie-in to the substrate. The fastening bar must be secured with flat head fasteners and subsequently flashed in with a compatible thermoset membrane stripping ply.

### 3.03 RedLINE TIE-IN JOINT ASPHALTIC ROOF SIDE INSTALLATION

- A. The RedLINE can be used with Self Adhered Membranes. Set the RedLINE in a bed of asphalt based mastic, which has been applied to the substrate. Prime the RedLINE top surface with a compatible asphalt primer. The primer must be allowed to flash off.
- B. Encapsulate the RedLINE material by applying the Self Adhered Membrane to the primed to surface. Do not apply the Self Adhered Membrane over the gland of the RedLINE material. The RedLINE must be completely stripped in. The RedLINE joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier. If necessary flat head fasteners can be used with a 14 ga. (min.) stainless steel fastening bar, fastened at 8" [200 mm] on center staggered.

**END OF SECTION**

## RedLINE Tie-in - Asphaltic Membrane to a Thermoset Single Ply Membrane Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

**THERMOSET MEMBRANE TIE-IN DETAIL  
REDLINE TIE-IN STRUCTURE ADHESIVE VERSION  
WITH RedLINE® WATERPROOF EXPANSION JOINT.**

### APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

**TST/TD-01**

SCALE:

**N.T.S.**

DATE:

**06/01/07**

CHECKED BY:

**KMZ**

SHEET:

**1 OF 1**

## **SHORT FORM SPECIFICATION: RedLINE Tie-In Specification for an Asphaltic Membrane to a Thermoplastic Single Ply Membrane**

**Overview:** Short form specification for the installation of a Tie-in waterproofing material between an Asphalt based membrane and a Thermoplastic Single Ply Membrane.

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. Provide factory fabricated elastomeric waterproof tie in joint, to connect two incompatible roof systems as indicated on the architects/engineers drawings. All items in this section shall be furnished by, and be the responsibility of, the roofing/waterproofing contractor.

1. Asphaltic Membrane/Thermoplastic Membrane Tie-in Detail

- B. Roofing/Waterproofing System Description (*typical but not limited to*)

1. Built-Up-Roofing System: Four ply hot asphalt applied membrane system and a thermoplastic (PVC type) Single Ply membrane.
2. Modified Bitumen System: Mopped/torched membrane system and a thermoplastic (PVC type) Single Ply membrane.
3. Cold Applied Adhesive System: Multiple ply cold applied membrane system and a thermoplastic (PVC type) Single Ply membrane.
4. Coal Tar Pitch System: Multiple ply Coal Tar Pitch membrane system and a thermoplastic (PVC type) Single Ply membrane.

#### **1.02 SUBMITTALS**

- A. Submit product data under the applicable provisions of Section 01300.
- B. Submit manufacturer's installation instructions, product literature and specifications.
- C. Submit to tie in joint manufacturer drawings indicating location of tie in and configuration.

#### **1.04 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products to site under provisions of Section 01600 and 01650.
- B. Store and protect products under provisions of Section 01600 and 01660.
- C. Store products in accordance with manufacturer's instructions in weather protected environment, clear of ground and moisture.
- D. Keep the RedLINE Tie-in material dry and free of debris.

## PART 2 PRODUCTS

### 2.01 DESCRIPTION

- A. RedLINE Tie-in joint is a flat, zero profile, tie-in joint waterproofing system that is to be used to join two incompatible roof membrane systems e.g. Modified Bitumen/PVC. The RedLINE joint waterproofing system is installed in a matter of minutes, and incorporates the site specific prefabricated details. The flat profile of the tie in does not obstruct the flow of water. The RedLINE material is joined by vulcanization. Specific shapes are manufactured and joined together to form a monolithic waterproof tie in joint material.

### 2.02 MATERIAL CHARACTERISTICS

- A. RedLINE material is an extruded elastomer with polyester fleece embedded externally. It is resistant to the effects of UV, ozone, high temperatures, and chemicals such as; alkalis, acids, saline solutions, alcohol and ketones. The high quality and purity of the elastomer makes vulcanization of the tie-in joint pieces possible. Vulcanization allows the construction of details around unique shapes without the use of glue, caulking or tape.

### 2.03 MATERIAL

- A. Appearance
  - 1. Color: Orange Red.
- B. Material Chemistry
  - 1. RedLINE base material an elastomer with a saturated polymethylene chain.
  - 2. Externally reinforced with polyester fleece.
- C. RedLINE Tie-in joint waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).

### 2.04 ADHESIVE MATERIAL

- A. Use a self curing structural adhesive.

## PART 3 EXECUTION

### 3.01 INSTALLATION GENERAL

- A. Install components in accordance with manufacturer's installation instructions and conventional roofing/waterproofing practices.
- B. Coordinate the installation of components of this section with the installation of the waterproofing membrane.
- C. Coordinate the completion of flashing in and stripping the RedLINE Tie-in joint material as work progresses with the work of this section to ensure watertightness.

- D. The uninstalled RedLINE Tie-in joint material must be kept dry and clean at all times.

### 3.02 RedLINE TIE-IN JOINT THERMOPLASTIC MEMBRANE SIDE INSTALLATION

- A. Identify the location of the tie-in detail. Roll out the RedLINE Tie-in and allow it to relax prior to application. Make sure that the substrate is clean and free of debris. Align the side of the RedLINE with the selvage edge over the installed thermoplastic roof membrane, in such a manner that the entire selvage edge width is over the thermoplastic roof membrane, (either on top or the bottom).
- B. Fold back the RedLINE Tie-in on itself and prepare the thermoplastic membrane in accordance to the thermoplastic membrane manufacturer's requirements. Once the thermoplastic roof membrane has been cleaned, primed and allowed to dry, carefully apply the structural grade adhesive on the thermoplastic membrane. Carefully fold the RedLINE Tie-in selvage edge onto the surface of the thermoplastic membrane and apply pressure by hand, this action must be followed by applying pressure using a metal roller. This action ensures the proper adhesion of the tie-in to the thermoplastic roof membrane. Once the RedLINE Tie-in has been adhered to the thermoplastic roof, install the opposite selvage end to the adjacent roof, as if installing a regular RedLINE expansion joint.
- C. Additionally a termination bar maybe used to further secure the RedLINE Tie-in to the substrate. The fastening bar must be secured with flat head fasteners and subsequently flashed in with a compatible thermoplastic membrane stripping ply.

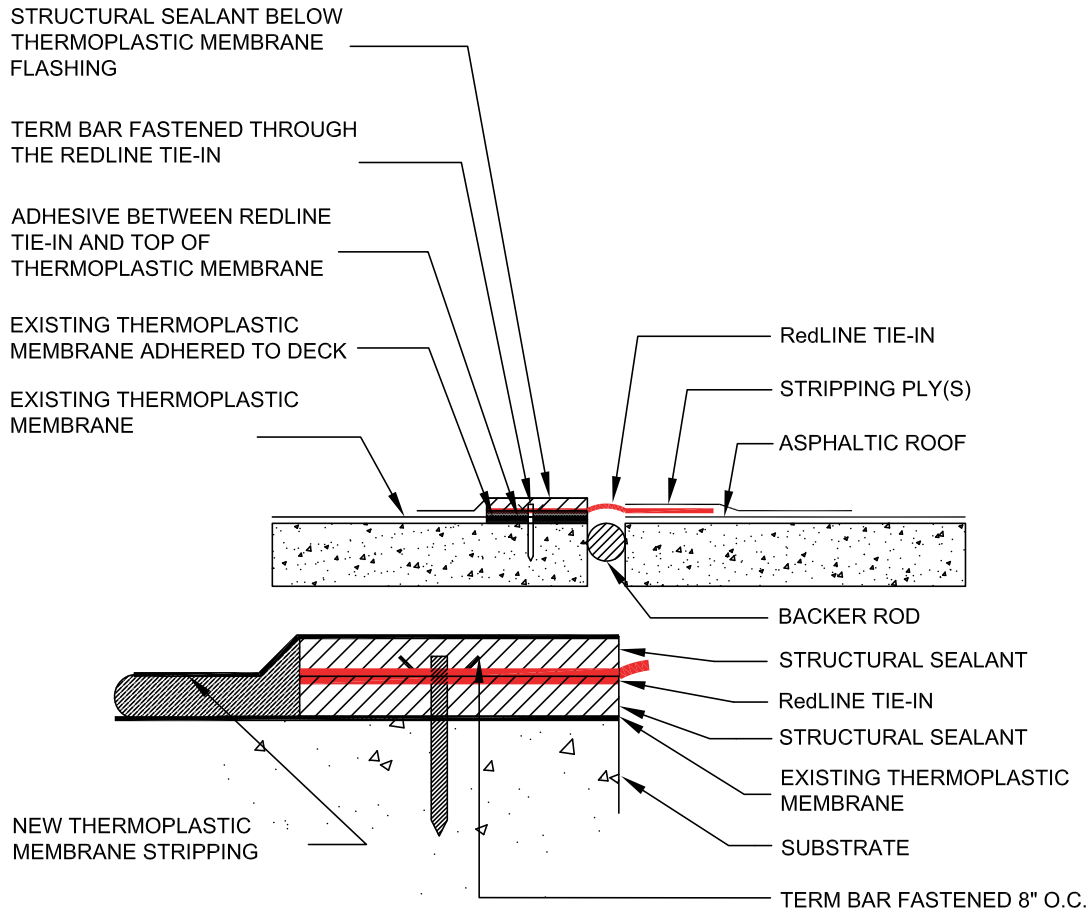
### 3.03 RedLINE TIE-IN JOINT ASPHALTIC ROOF SIDE INSTALLATION

- A. The RedLINE can be used with Self Adhered Membranes. Set the RedLINE in a bed of asphalt based mastic, which has been applied to the substrate. Prime the RedLINE top surface with a compatible asphalt primer. The primer must be allowed to flash off.
- B. Encapsulate the RedLINE material by applying the Self Adhered Membrane to the primed to surface. Do not apply the Self Adhered Membrane over the gland of the RedLINE material. The RedLINE must be completely stripped in. The RedLINE joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier. If necessary flat head fasteners can be used with a 14 ga. (min.) stainless steel fastening bar, fastened at 8" [200 mm] on center staggered.

## END OF SECTION



# RedLINE Tie-in - Asphaltic Membrane to a Thermoplastic Single Ply Membrane Typical Detail



## NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

**THERMOPLASTIC MEMBRANE TIE-IN DETAIL  
REDLINE TIE-IN STRUCTURE ADHESIVE VERSION  
WITH RedLINE® WATERPROOF EXPANSION JOINT.**

## APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

TPL/TD-01

SCALE:

N.T.S.

DATE:

06/01/07

CHECKED BY:

KMZ

SHEET:

1 OF 1

## **SHORT FORM SPECIFICATION: FlamLINE Tie-In Specification for a Torched Asphaltic Membrane or a Self Adhered Membrane to a Thermoset Single Ply Membrane**

***Overview:** Short form specification for the installation of a Tie-in waterproofing material between a Torched Asphalt based membrane or a Self Adhered membrane and a Thermoset Single Ply Membrane.*

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. Provide factory fabricated elastomeric waterproof tie in joint, to connect two incompatible roof systems as indicated on the architects/engineers drawings. All items in this section shall be furnished by, and be the responsibility of, the roofing/waterproofing contractor.
  - 1. Asphaltic Membrane/Thermoset Membrane Tie-in Detail.
- B. Roofing/Waterproofing System Description *(typical but not limited to)*
  - 1. Modified Bitumen System: Torched membrane system and a thermoset EPDM type) Single Ply membrane.
  - 2. Self Adhered Membrane and a thermoset (EPDM type) Single Ply membrane.

#### **1.02 SUBMITTALS**

- A. Submit product data under the applicable provisions of Section 01300.
- B. Submit manufacturer's installation instructions, product literature and specifications.
- C. Submit to tie in joint manufacturer drawings indicating location of tie in and configuration.

#### **1.03 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products to site under provisions of Section 01600 and 01650.
- B. Store and protect products under provisions of Section 01600 and 01660.
- C. Store products in accordance with manufacturer's instructions in weather protected environment, clear of ground and moisture.
- D. Keep the FlamLINE Tie-in material dry and free of debris.

## PART 2 PRODUCTS

### 2.01 DESCRIPTION

- A. FlamLINE Tie-in joint is a flat, zero profile, tie-in joint waterproofing system that is used to join two incompatible roof membrane systems e.g. Modified Bitumen/EPDM. The FlamLINE joint waterproofing system is installed in a matter of minutes, and incorporates the site specific prefabricated details. The flat profile of the tie in does not obstruct the flow of water. The FlamLINE material is joined by vulcanization. Specific shapes are manufactured and joined together to form a monolithic waterproof tie in joint material.

### 2.02 MATERIAL CHARACTERISTICS

- A. FlamLINE material is an elastomer with polyester fleece embedded internally. It is resistant to the effects of UV, ozone, high temperatures, and chemicals such as; alkalis, acids, saline solutions, alcohol and ketones. The high quality and purity of the elastomer makes vulcanization of the tie-in joint pieces possible. Vulcanization allows the construction of details around unique shapes without the use of glue, caulking or tape.
- A. Appearance
  - 1. Color: Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.
- B. Material Chemistry
  - 1. FlamLINE base material elastomer halo butyl with a proprietary fire retardant package.
  - 2. Internally reinforced with woven polyester fibers.
- C. FlamLINE Tie-in joint waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).

### 2.04 ADHESIVE MATERIAL

- A. Use a self curing structural adhesive.

## PART 3 EXECUTION

### 3.01 INSTALLATION GENERAL

- A. Install components in accordance with manufacturer's installation instructions and conventional roofing/waterproofing practices.
- B. Coordinate the installation of components of this section with the installation of the waterproofing membrane.
- C. Coordinate the completion of flashing in and stripping the FlamLINE Tie-in joint material as work progresses with the work of this section to ensure watertightness.

- D. The uninstalled FlamLINE Tie-in joint material must be kept dry and clean at all times.

### 3.02 FlamLINE TIE-IN JOINT THERMOSET MEMBRANE SIDE INSTALLATION

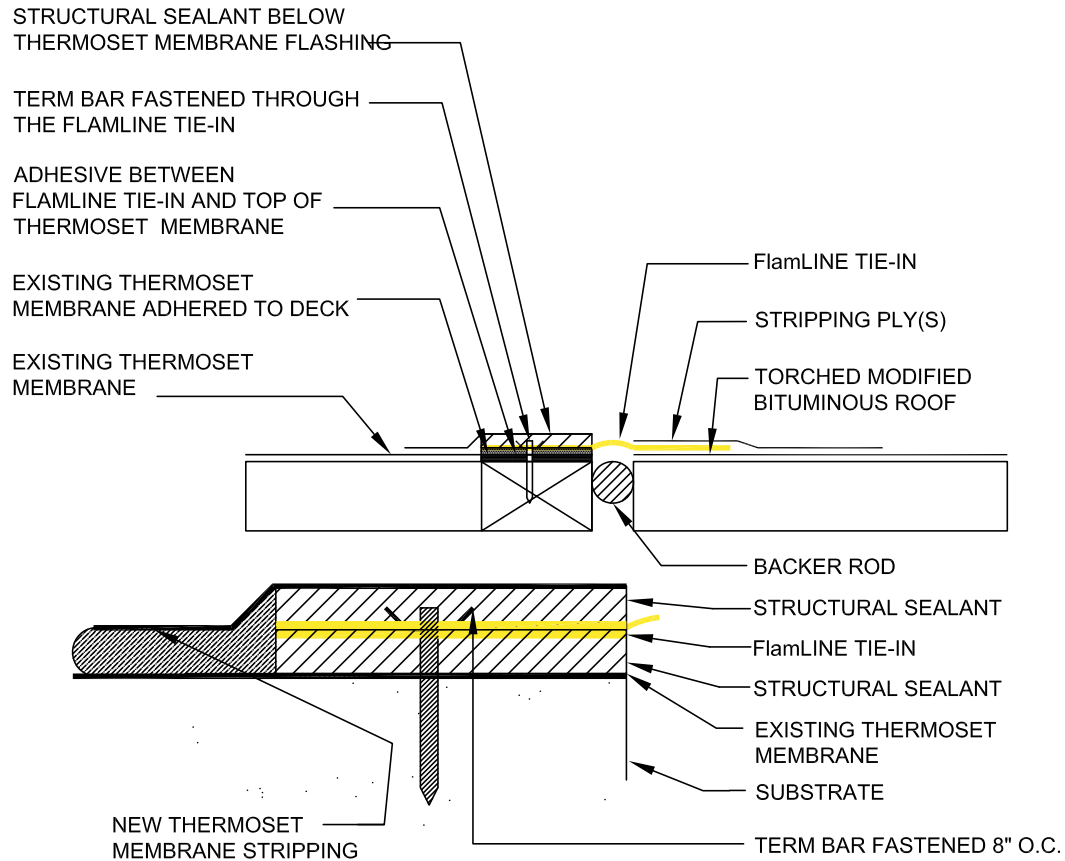
- A. Identify the location of the tie-in detail. Roll out the FlamLINE Tie-in and allow it to relax prior to application. Make sure that the substrate is clean and free of debris. Align the side of the FlamLINE with the selvage edge over the installed thermoset roof membrane, in such a manner that the entire selvage edge width is over the thermoset roof membrane, (either on top or the bottom).
- B. Fold back the FlamLINE Tie-in on itself and prepare the thermoset membrane in accordance to the thermoset membrane manufacturer's requirements. Once the thermoset roof membrane has been cleaned, primed and allowed to dry, carefully apply the structural grade adhesive on the thermoset membrane. Carefully fold the FlamLINE Tie-in selvage edge onto the surface of the thermoset membrane and apply pressure by hand, this action must be followed by applying pressure using a metal roller. This action ensures the proper adhesion of the tie-in to the thermoset roof membrane. Once the FlamLINE Tie-in has been adhered to the thermoset roof, install the opposite selvage end to the adjacent roof, as if installing a regular FlamLINE expansion joint.
- C. Additionally a termination bar maybe used to further secure the FlamLINE Tie-in to the substrate. The fastening bar must be secured with flat head fasteners and subsequently flashed in with a compatible thermoset membrane stripping ply.

### 3.03 FlamLINE TIE-IN JOINT ASPHALTIC ROOF SIDE INSTALLATION

- A. The FlamLINE can be used with Self Adhered Membranes. Set the FlamLINE in a bed of asphalt based mastic, which has been applied to the substrate. Prime the FlamLINE top surface with a compatible asphalt primer. The primer must be allowed to flash off.
- B. Encapsulate the FlamLINE material by applying the Self Adhered Membrane to the primed to surface. Do not apply the Self Adhered Membrane over the gland of the FlamLINE material. The FlamLINE must be completely stripped in. The FlamLINE joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier. If necessary flat head fasteners can be used with a 14 ga. (min.) stainless steel fastening bar, fastened at 8" [200 mm] on center staggered.

**END OF SECTION**

## FlamLINE Tie-in - Torched Membrane to a Thermoset Single Ply Membrane Typical Detail



### NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

**THERMOSET MEMBRANE TIE-IN DETAIL**  
**FlamLINE TIE-IN STRUCTURE ADHESIVE VERSION**  
 WITH FlamLINE® WATERPROOF EXPANSION JOINT.

### APPROVALS & SIGN OFFS

DESCRIPTION:	DATE:	SIGNED BY:
REVISION #1		
REVISION #2		
FABRICATION APPROVAL		

DETAIL NUMBER:

TST/TD-01

SCALE:

N.T.S.

CHECKED BY:

KMZ

DATE:

06/01/07

SHEET:

1 OF 1

## **SHORT FORM SPECIFICATION: FlamLINE Tie-In Specification for a Torched Asphaltic Membrane or a Self Adhered Membrane to a Thermoplastic Single Ply Membrane**

**Overview:** Short form specification for the installation of a Tie-in waterproofing material between a Torched Asphalt based membrane or a Self Adhered membrane and a Thermoplastic Single Ply Membrane.

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. Provide factory fabricated elastomeric waterproof tie in joint, to connect two incompatible roof systems as indicated on the architects/engineers drawings. All items in this section shall be furnished by, and be the responsibility of, the roofing/waterproofing contractor.
  - 1. Asphaltic Membrane/Thermoplastic Membrane Tie-in Detail
- B. Roofing/Waterproofing System Description (*typical but not limited to*)
  - 1. Modified Bitumen System: Torched membrane system and a thermoplastic (PVC/TPO type) Single Ply membrane.
  - 2. Self Adhered Membrane and a thermoplastic (PVC/TPO type) Single Ply membrane.

#### **1.02 SUBMITTALS**

- A. Submit product data under the applicable provisions of Section 01300.
- B. Submit manufacturer's installation instructions, product literature and specifications.
- C. Submit to tie in joint manufacturer drawings indicating location of tie in and configuration.

#### **1.04 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products to site under provisions of Section 01600 and 01650.
- B. Store and protect products under provisions of Section 01600 and 01660.
- C. Store products in accordance with manufacturer's instructions in weather protected environment, clear of ground and moisture.
- D. Keep the FlamLINE Tie-in material dry and free of debris.

## PART 2 PRODUCTS

### 2.01 DESCRIPTION

- A. FlamLINE Tie-in joint is a flat, zero profile, tie-in joint waterproofing system that is to be used to join two incompatible roof membrane systems e.g. Modified Bitumen/PVC. The FlamLINE joint waterproofing system is installed in a matter of minutes, and incorporates the site specific prefabricated details. The flat profile of the tie in does not obstruct the flow of water. The FlamLINE material is joined by vulcanization. Specific shapes are manufactured and joined together to form a monolithic waterproof tie in joint material.

### 2.02 MATERIAL CHARACTERISTICS

- A. FlamLINE material is an extruded elastomer with internally polyester reinforcing. It is resistant to the effects of UV, ozone, high temperatures, and chemicals such as; alkalis, acids, saline solutions, alcohol and ketones. The high quality and purity of the elastomer makes vulcanization of the tie-in joint pieces possible. Vulcanization allows the construction of details around unique shapes without the use of glue, caulking or tape.

### 2.03 MATERIAL

- A. Appearance
  - 1. Color: Yellow (top and bottom), gland area is identified with reverse color or delineated with lines.
- B. Material Chemistry
  - 1. FlamLINE base material elastomer halo butyl with a proprietary fire retardant package.
  - 2. Internally reinforced with woven polyester fibers.
- C. FlamLINE Tie-in joint waterproofing system is supplied by SITURA INC., 1-888-4-SITURA (1-888-474-8872).

### 2.04 ADHESIVE MATERIAL

- A. Use a self curing structural adhesive.

## PART 3 EXECUTION

### 3.01 INSTALLATION GENERAL

- A. Install components in accordance with manufacturer's installation instructions and conventional roofing/waterproofing practices.
- B. Coordinate the installation of components of this section with the installation of the waterproofing membrane.



- C. Coordinate the completion of flashing in and stripping the FlamLINE Tie-in joint material as work progresses with the work of this section to ensure watertightness.
- D. The uninstalled FlamLINE Tie-in joint material must be kept dry and clean at all times.

### 3.02 FlamLINE TIE-IN JOINT THERMOPLASTIC MEMBRANE SIDE INSTALLATION

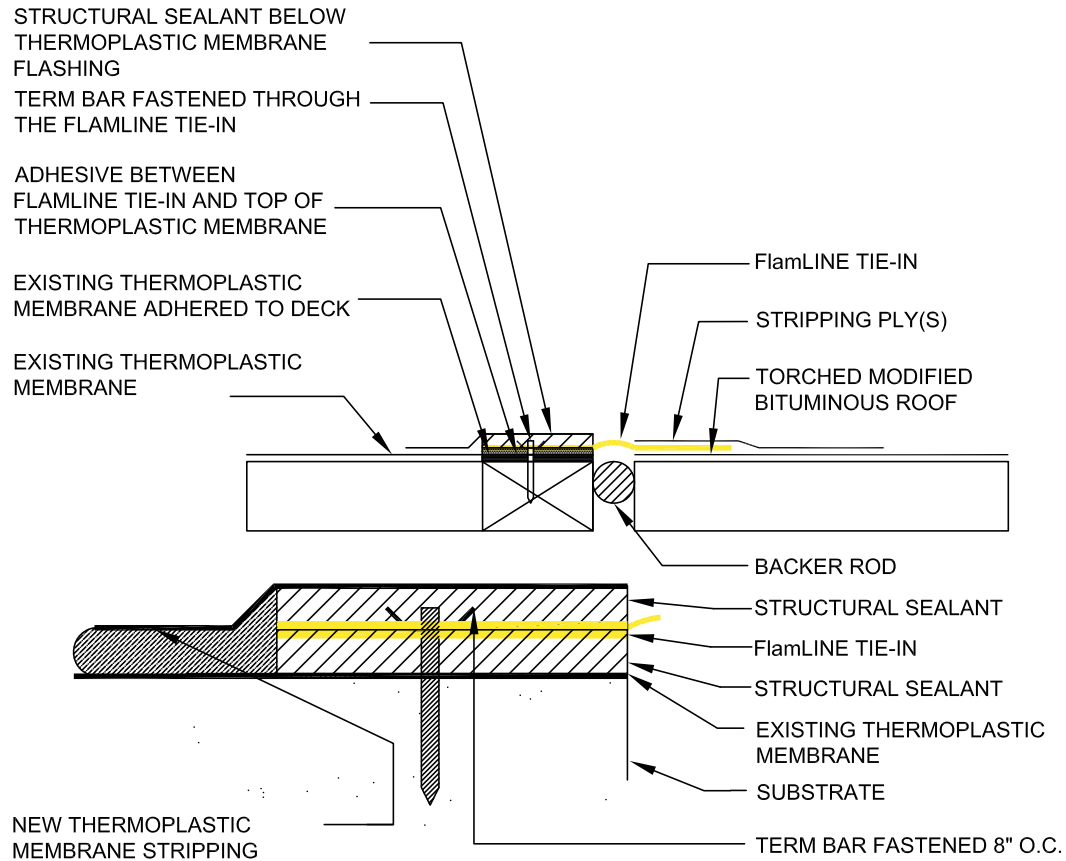
- A. Identify the location of the tie-in detail. Roll out the FlamLINE Tie-in and allow it to relax prior to application. Make sure that the substrate is clean and free of debris. Align the side of the FlamLINE with the selvage edge over the installed thermoplastic roof membrane, in such a manner that the entire selvage edge width is over the thermoplastic roof membrane, (either on top or the bottom).
- B. Fold back the FlamLINE Tie-in on itself and prepare the thermoplastic membrane in accordance to the thermoplastic membrane manufacturer's requirements. Once the thermoplastic roof membrane has been cleaned, primed and allowed to dry, carefully apply the structural grade adhesive on the thermoplastic membrane. Carefully fold the FlamLINE Tie-in selvage edge onto the surface of the thermoplastic membrane and apply pressure by hand, this action must be followed by applying pressure using a metal roller. This action ensures the proper adhesion of the tie-in to the thermoplastic roof membrane. Once the FlamLINE Tie-in has been adhered to the thermoplastic roof, install the opposite selvage end to the adjacent roof, as if installing a regular FlamLINE expansion joint.
- C. Additionally a termination bar maybe used to further secure the FlamLINE Tie-in to the substrate. The fastening bar must be secured with flat head fasteners and subsequently flashed in with a compatible thermoplastic membrane stripping ply.

### 3.03 FlamLINE TIE-IN JOINT ASPHALTIC ROOF SIDE INSTALLATION

- A. The FlamLINE can be used with Self Adhered Membranes. Set the FlamLINE in a bed of asphalt based mastic, which has been applied to the substrate. Prime the FlamLINE top surface with a compatible asphalt primer. The primer must be allowed to flash off.
- B. Encapsulate the FlamLINE material by applying the Self Adhered Membrane to the primed to surface. Do not apply the Self Adhered Membrane over the gland of the FlamLINE material. The FlamLINE must be completely stripped in. The FlamLINE joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier. If necessary flat head fasteners can be used with a 14 ga. (min.) stainless steel fastening bar, fastened at 8" [200 mm] on center staggered.

## END OF SECTION

# FlamLINE Tie-in - Torched Membrane to a Thermoplastic Single Ply Membrane Typical Detail



## NOTES:

- 1.) FOR TECHNICAL SUPPORT PLEASE CALL SITURA INC. AT 1-888-4-SITURA (474-8872)
- 2.)
- 3.)

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PROJECT NAME:

## THERMOPLASTIC MEMBRANE TIE-IN DETAIL FlamLINE TIE-IN STRUCTURE ADHESIVE VERSION WITH FlamLINE® WATERPROOF EXPANSION JOINT.

## APPROVALS & SIGN OFFS

DESCRIPTION: DATE: SIGNED BY:

REVISION #1

REVISION #2

FABRICATION  
APPROVAL

DETAIL NUMBER:

TST/TD-01

SCALE:

N.T.S.

DATE:

06/01/07

CHECKED BY:

KMZ

SHEET:

1 OF 1

## TECHNICAL SERVICE AND SUPPORT

The SITURA expansion joint product line offers a comprehensive solution to joint waterproofing problems. Please call SITURA INC., toll free at **1-888-4-SITURA** (1-888-474-8872) for assistance in specifying, detailing and installing a waterproof expansion joint.

# Chapter 4.

## SITURA Expansion Joints

### Technical Features & Estimating

Quantity	Description	Part #
8 pcs.	RL 240 Left or Right Turn 46 to 90 degrees	50481040
12 pcs.	RL 240 "T" Junction Piece	50482040
16 pcs.	RL 240 End Piece	50438040
36 pcs.	RL 240 Outside Corner 90 degrees	50478090
19 pcs.	RL 240 Inside Corner 90 degrees	50458090
12 per day	Site Vulcanization - Out of Town	99999903
90 pcs.	RL 240 Vulcanization	50498040
7 pcs.	RL 240 "T" Junction Piece- Special	40482045
3,500 lbs	TRUCKING FREIGHT	00000000
3,894 ft.	RL 240/40 G RedLINE 240 Straight Lineal Footage	40408045

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*Please turn over*

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*The information and specifications presented herein, represent the applicable information available at the time of publication. All information and statements herein are expressions of opinion, which by performance and testing are believed to be accurate and reliable.*

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# Chapter 4.

## Technical Features & Estimating

### EXPANSION JOINT ESTIMATING

Each SITURA Waterproof Expansion Joint is custom manufactured for each project. No two buildings have exactly the same expansion joint configurations. It is important to gather all joint configuration information so that a correct joint layout and quotation can be provided.

Sources of expansion joint layout information are the original building drawings, as-built drawings or survey reports. However, the best way to confirm the information is to visit the site and take off the actual joint measurements.

Accurate information will ensure a correct fit and eliminate any additional calls to the site. The expansion joint layout information is forwarded to SITURA for a quotation and a shop drawing of the actual joint, similar to tapered insulation layouts.

### SITURA JOINT LAYOUT INFORMATION REQUIREMENTS

To aid in the collection of the required data, a project work sheet has been compiled. **Complete the SITURA Project Work Sheet** (see page 4-18) **and fax it to SITURA INC. at (905) 248-3441** or email it to [situra@situra.com](mailto:situra@situra.com). It is very important to attach a sketch of the expansion joint layout with measurements. All measurements are center line to center line.



If drawings are in electronic format, please send the file by e-mail to [situra@situra.com](mailto:situra@situra.com). The acceptable formats are AutoCAD® and PDF files. If further assistance is required please call SITURA toll free at 1-888-4-SITURA (474-8872).

### SITURA JOINTS TECHNICAL COMPARISONS

There are many types of expansion joints in use today. A vast majority of these expansion joints are manufactured from materials that are not well suited for this use. A brief comparison of SITURA expansion joints, RedLINE®, FlamLINE®, AquaLINE®, to the various types of joints is outlined in the next few pages; these include the following:-


- RedLINE vs. BUTYL TYPE JOINTS TECHNICAL COMPARISON
- RedLINE vs. BELLOWS TYPE JOINTS TECHNICAL COMPARISON
- RedLINE vs. NEOPRENE TYPE JOINTS TECHNICAL COMPARISON
- RedLINE vs. MODIFIED BITUMEN MEMBRANE TYPE JOINTS TECHNICAL COMPARISON
- RedLINE vs. EPDM MEMBRANE TYPE JOINTS TECHNICAL COMPARISON
- RedLINE vs. CAULKED TYPE JOINTS TECHNICAL COMPARISON
- RedLINE vs. CURBED TYPE JOINTS TECHNICAL COMPARISON
- FlamLINE vs. BELLOWS TYPE JOINTS TECHNICAL COMPARISON
- FlamLINE vs. CURBED TYPE JOINTS TECHNICAL COMPARISON
- FlamLINE vs. CAULKED TYPE JOINTS TECHNICAL COMPARISON
- FlamLINE vs. MODIFIED BITUMEN MEMBRANE TYPE JOINTS TECHNICAL COMPARISON

**RedLINE vs. BUTYL TYPE JOINTS TECHNICAL COMPARISON**

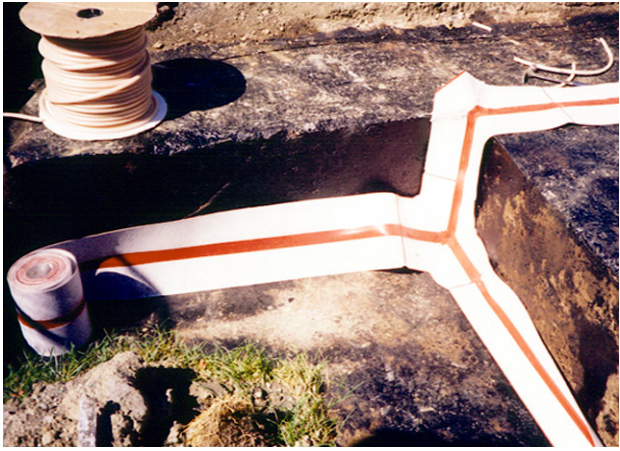

RedLINE	Butyl Type
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from a piece of material.	
RedLINE is monolithic and seamless for its entire length.	The expansion joint constructed out of butyl requires lap seams every 50 feet [15 m].
<b>Movement:</b> An expansion joint moves by expanding and contracting.	
RedLINE moves up to 10" [250 mm].	Butyl moves a maximum of ½" [13 mm] before it breaks.
<b>Bond Breaking:</b> The waterproofing material over the expansion joint gap must be free to move that is it cannot be stuck to the substrate.	
RedLINE does not stick to asphalt over the expansion part and no special separation is necessary.	Butyl has no ability to separate and therefore will bond to the waterproofing membrane and restrict the movement at the expansion joint.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
RedLINE details are prefabricated and ready for installation.	Butyl has to be worked around details, which includes considerable detail work.
<b>Drainage:</b> Water must free to evacuate without ponding, which can be detrimental to the waterproofing membrane.	
RedLINE is flat, and does not obstruct water flow.	A Butyl joint has a loop, which provides a place for water to pond.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
RedLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%.	Butyl Elongation at Break @ - 0 °F [-17 °C] is 20.0%.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses its flexibility and becomes brittle.	
RedLINE Low Temperature Flex is - 70 °F [-57 °C].	Butyl Low Temperature Flex is - 10 °F [-23 °C].
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
RedLINE Thickness is 0.118" [3.0 mm].	Butyl Thickness is 0.038" [0.96 mm].



**RedLINE vs. BELLOWS TYPE JOINTS TECHNICAL COMPARISON**

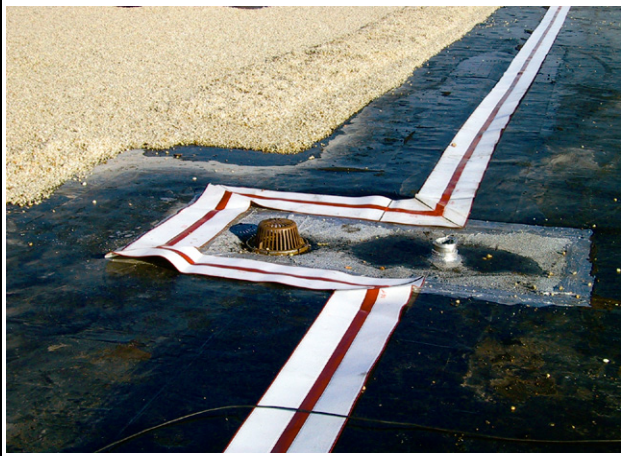

RedLINE	Bellows
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from a piece of material.	
RedLINE is monolithic and seamless for its entire length.	Bellow type expansion joints need to be seamed every 10 feet [3 meters] with glues or adhesives.
<b>Movement:</b> An expansion joint moves by expanding and contracting	
RedLINE moves up to 10" [250 mm].	Movement in a Bellows Joint is as a result of bunched up material.
<b>Construction:</b> The waterproofing material over the expansion joint gap must be weatherproof and continuous with the building envelope.	
RedLINE is impervious to moisture drive and is continuous with the building envelope.	Bellow type expansion joints are just joint covers. They do not prevent the egress of moisture and flow of air in/out of the building. No building envelope continuity.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
RedLINE details are prefabricated and ready for installation.	Bellow joints have to be worked around details, which includes considerable detail work on site by seaming with solvent adhesives.
<b>Drainage:</b> Water must free to evacuate without ponding which can be detrimental to the waterproofing membrane	
RedLINE is flat, and does not obstruct water flow.	A Bellow type joint is raised and provides a place for water to pond
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
RedLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%	Typical Bellow material Elongation at Break @ 0 °F [-17 °C] is less than 1%. Relies purely on loose material to move.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses its flexibility and becomes brittle.	
RedLINE Low Temperature Flex is - 70 °F [-57 °C]	Bellow Material Low Temperature Flex is - 10 °F [-23 °C]
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
RedLINE Thickness is 0.118" [3.0 mm]	Bellow material thickness is 0.048" [1.2 mm]

**RedLINE vs. NEOPRENE TYPE JOINTS TECHNICAL COMPARISON**



RedLINE	Neoprene Joints
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
RedLINE is monolithic and seamless for its entire length.	The expansion joint constructed out of neoprene requires lap seams every 10 feet [3 m].
<b>Movement:</b> An expansion joint moves by expanding and contracting	
RedLINE moves up to 10" [250 mm].	Neoprene does not move, it requires excess material to move.
<b>Bond Breaking:</b> The waterproofing material over the expansion joint gap must be free to move, that is it cannot be stuck to the substrate.	
RedLINE does not stick to asphalt over the expansion part and no special separation is necessary.	Neoprene has no ability to separate and therefore will bond to the waterproofing membrane and restrict the movement at the expansion joint.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
RedLINE details are prefabricated and ready for installation.	Neoprene has to be worked around details which includes considerable detail work.
<b>Drainage:</b> Water must be free to evacuate without ponding which can be detrimental to the waterproofing membrane	
RedLINE is flat, and does not obstruct water flow.	A neoprene joint is typically raised on wood curbs or cants restricting the flow of water to drain.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
RedLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%	Neoprene Elongation at Break @ 0 °F [-17 °C] is 10.0%
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses its flexibility and becomes brittle.	
RedLINE Low Temperature Flex is - 70 °F [-57 °C].	Neoprene Low Temperature Flex is - 20 °F [-29 °C].
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
RedLINE Thickness is 0.118" [3.0 mm],	Neoprene Thickness is 0.038" [0.96 mm].



**RedLINE vs. MODIFIED BITUMEN MEMBRANE TYPE JOINTS TECHNICAL COMPARISON**

RedLINE	Modified Bitumen Membrane
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
RedLINE is monolithic and seamless for it's entire length.	The expansion joint constructed out of Modified Bitumen requires lap seams every 10 feet [3 m].
<b>Movement:</b> An expansion joint moves by expanding and contracting.	
RedLINE moves up to 10" [250 mm].	Modified Bitumen does not move, it requires excess material to move.
<b>Bond Breaking:</b> The waterproofing material over the expansion joint gap must be free to move that is it cannot be stuck to the substrate.	
RedLINE does not stick to asphalt over the expansion part and no special separation is necessary.	Modified Bitumen has no ability to separate and therefore will bond to the waterproofing membrane and restrict the movement at the expansion joint.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
RedLINE details are prefabricated and ready for installation.	Modified Bitumen has to be worked around details, which includes considerable detail work.
<b>Drainage:</b> Water must free to evacuate without ponding, which can be detrimental to the waterproofing membrane.	
RedLINE is flat, and does not obstruct water flow.	A Modified Bitumen joint is typically raised on wood curbs or cants restricting the flow of water to drain.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
RedLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%	Modified Bitumen Elongation at Break @ 0 °F [-17 °C] is 4%
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses it flexibility and becomes brittle.	
RedLINE Low Temperature Flex is - 70 °F [-57 °C].	Modified Bitumen Low Temperature Flex is - 10 °F [-23°C]
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
RedLINE Thickness is 0.118" [3.0 mm]	Modified Bitumen Thickness is 0.090" [2.3 mm].

**RedLINE vs. EPDM MEMBRANE TYPE JOINTS TECHNICAL COMPARISON**



RedLINE	EPDM Roof Membrane
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
RedLINE is monolithic and seamless for its entire length.	The expansion joint constructed out of EPDM requires lap seams every 10 to 50 feet [3 m to 15 m].
<b>Movement:</b> An expansion joint moves by expanding and contracting.	
RedLINE moves up to 10" [250 mm].	EPDM is reinforced, it requires excess material to move.
<b>Bond Breaking:</b> The waterproofing material over the expansion joint gap must be free to move that is it cannot be stuck to the substrate.	
RedLINE does not stick to asphalt over the expansion part and no special separation is necessary.	EPDM has no ability to separate and therefore will bond to the waterproofing membrane and restrict the movement at the expansion joint.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
RedLINE details are prefabricated and ready for installation.	EPDM has to be worked around details, which includes considerable detail work.
<b>Drainage:</b> Water must free to evacuate without ponding, which can be detrimental to the waterproofing membrane.	
RedLINE is flat, and does not obstruct water flow.	An EPDM joint is typically raised on wood curbs or cants restricting the flow of water to drain.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
RedLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%	Reinforced EPDM Elongation Break @ 0 °F [-17 °C] is 80%
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses its flexibility and becomes brittle.	
RedLINE Low Temperature Flex is - 70 °F [-57 °C].	EPDM Low Temperature Flex is - 40 °F [-40 °C]
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
RedLINE Thickness is 0.118" [3.0 mm].	EPDM Thickness is 0.045" [1.0 mm].




**RedLINE vs. CAULKED TYPE JOINTS TECHNICAL COMPARISON**

RedLINE	Caulked Joint
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
RedLINE is monolithic and seamless for it's entire length.	Caulked expansion joints are simply filled with compressible material.
<b>Movement:</b> An expansion joint moves by expanding and contracting	
RedLINE moves up to 10" [250 mm].	Movement is as a result of the elasticity of the caulked material, moves only as long as the material has flexibility.
<b>Construction:</b> The waterproofing material over the expansion joint gap must be weatherproof and continuous with the building envelope.	
RedLINE is impervious to moisture drive and is continuous with the building envelope.	Caulked type expansion joints are just joint fillers. Caulked joints cannot assure continuity across different substrates, i.e. roof to wall. No building envelope continuity.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
RedLINE details are prefabricated and ready for installation.	Caulked joints need a prepared cavity or well to be poured in so they are "fitted in". They do not lend themselves well to details.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
RedLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%.	Although caulked joints have good initial elongation they are prone to cohesive failure by debonding from the substrate.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses it flexibility and becomes brittle.	
RedLINE Low Temperature Flex is - 70 °F [-57 °C].	Caulked joints by their very nature lose flexibility over time as they weather.

**RedLINE vs. CURBED TYPE JOINTS TECHNICAL COMPARISON**



RedLINE	Curbed Type Joint
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
RedLINE is monolithic and seamless for it's entire length.	Prefabricated Curb type expansion joints need to be seamed every 10 feet [3 m] with glues or adhesives.
<b>Movement:</b> An expansion joint moves by expanding and contracting	
RedLINE moves up to 10" [250 mm].	Movement in a Prefabricated Curb Joint is as a result of bunched up material.
<b>Construction:</b> The waterproofing material over the expansion joint gap must be weatherproof and continuous with the building envelope.	
RedLINE is impervious to moisture drive and is continuous with the building envelope.	Curb type expansion joints are just joint covers. They do not prevent the egress of moisture and flow of air in/out of the building. No building envelope continuity.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
RedLINE details are prefabricated and ready for installation.	Curbed joints have to be worked around details, which includes considerable detail work on site by seaming with solvent adhesives.
<b>Drainage:</b> Water must free to evacuate without ponding which can be detrimental to the waterproofing membrane	
RedLINE is flat, and does not obstruct water flow.	A Curb type joint is raised and provides a place for water to pond
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
RedLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%	Typical material used in curbed joints has an Elongation at Break @ - 0 °F [-17 °C] is less then 1.0%. Relies purely on bunched up material to move.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses it flexibility and becomes brittle.	
RedLINE Low Temperature Flex is - 70 °F [-57 °C].	The prefabricated curb Material Low Temperature Flex is -10°F [-27 °C].
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
RedLINE Thickness is 0.118" [3.0 mm].	Curb prefabricated material thickness is 0.048" [1.2 mm].

**FlamLINE vs. BELLOWS TYPE JOINTS TECHNICAL COMPARISON**

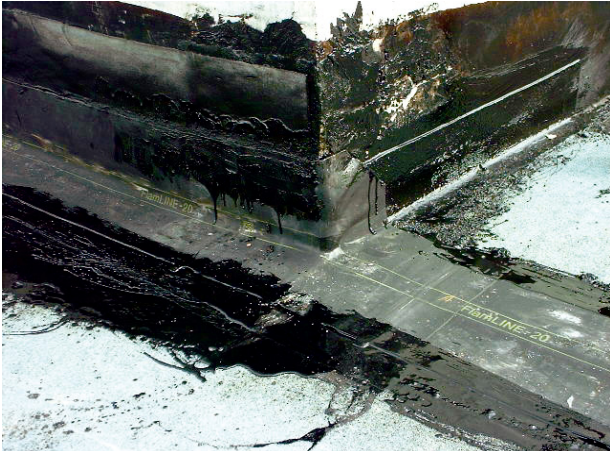

FlamLINE	Bellows
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from a piece of material.	
<b>FlamLINE</b> is monolithic and seamless for its entire length.	Bellow type expansion joints need to be seamed every 10 feet with glues or adhesives.
<b>Movement:</b> An expansion joint moves by expanding and contracting	
<b>FlamLINE</b> moves up to 10" [250 mm].	Movement in a Bellows Joint is as a result of bunched up material.
<b>Construction:</b> The waterproofing material over the expansion joint gap must be weatherproof and continuous with the building envelope.	
<b>FlamLINE</b> is impervious to moisture drive and is continuous with the building envelope.	Bellow type expansion joints are just joint covers. They do not prevent the egress of moisture and flow of air in/out of the building. No building envelope continuity.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
<b>FlamLINE</b> details are prefabricated and ready for installation.	Bellow joints have to be worked around details, which includes considerable detail work on site by seaming with solvent adhesives.
<b>Drainage:</b> Water must be free to evacuate without ponding which can be detrimental to the waterproofing membrane	
<b>FlamLINE</b> is flat, and does not obstruct water flow.	A Bellow type joint is raised and provides a place for water to pond
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
<b>FlamLINE</b> Elongation at Break @ - 70 °F [-57 °C] is 700.0%	Typical Bellow material Elongation at Break @ 0 °F [-17 °C] is less than 1.0%. Relies purely on bunched up material.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses its flexibility and becomes brittle.	
<b>FlamLINE</b> Low Temperature Flex is - 70 °F [-57 °C]	Bellow Material Low Temperature Flex is - 10 °F [-23 °C]
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
<b>FlamLINE</b> Thickness is 0.118" [3.0 mm]	Bellow material thickness is 0.048" [1.2 mm]



**FlamLINE vs. CURBED TYPE JOINTS TECHNICAL COMPARISON**

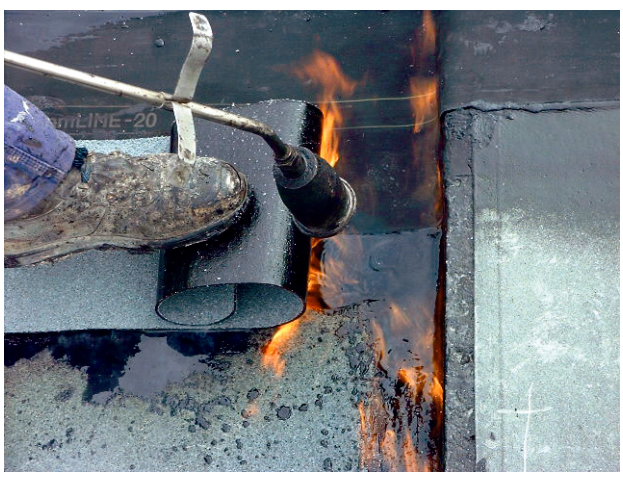

FlamLINE	Curbed Type Joint
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
FlamLINE is monolithic and seamless for it's entire length.	Prefabricated Curb type expansion joints need to be seamed every 10 feet with glues or adhesives.
<b>Movement:</b> An expansion joint moves by expanding and contracting	
FlamLINE moves up to 10" [250 mm].	Movement in a Prefabricated Curb Joint is as a result of bunched up material.
<b>Construction:</b> The waterproofing material over the expansion joint gap must be weatherproof and continuous with the building envelope.	
FlamLINE is impervious to moisture drive and is continuous with the building envelope.	Curb type expansion joints are just joint covers. They do not prevent the egress of moisture and flow of air in/out of the building. No building envelope continuity.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
FlamLINE details are prefabricated and ready for installation.	Curbed joints have to be worked around details, which includes considerable detail work on site by seaming with solvent adhesives.
<b>Drainage:</b> Water must free to evacuate without ponding which can be detrimental to the waterproofing membrane	
FlamLINE is flat, and does not obstruct water flow.	A Curb type joint is raised and provides a place for water to pond
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
FlamLINE Elongation at Break @ - 70 °F [-57 °C] is 700.0%	Typical material used in curbed joints has an Elongation at Break @ 0 °F [- 17 °C] is less then 1.0%. Relies purely on bunched up material to move.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses it flexibility and becomes brittle.	
FlamLINE Low Temperature Flex is - 70 °F [-57 °C]	The prefabricated curb Material Low Temperature Flex is - 10 °F [-23°C]
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
FlamLINE Thickness is 0.118" [3.0 mm]	Curb prefabricated material thickness is 0.048" [1.2 mm]

**FlamLINE vs. CAULKED TYPE JOINTS TECHNICAL COMPARISON**

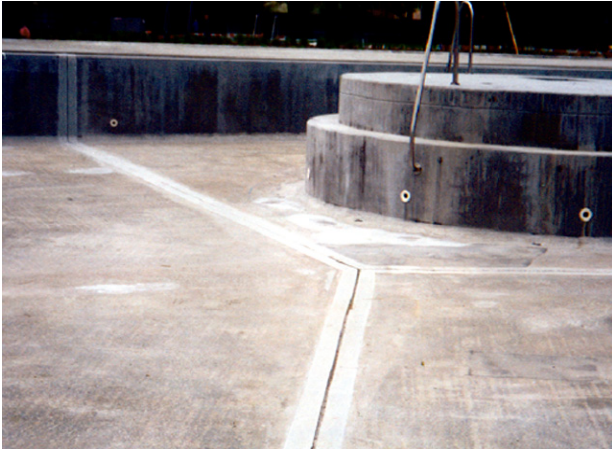

FlamLINE	Caulked Joint
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
<b>FlamLINE</b> is monolithic and seamless for it's entire length.	Caulked expansion joints are simply filled with compressible material.
<b>Movement:</b> An expansion joint moves by expanding and contracting	
<b>FlamLINE</b> moves up to 10" [250 mm].	Movement is as a result of the elasticity of the caulked material, moves only as long as the material has flexibility.
<b>Construction:</b> The waterproofing material over the expansion joint gap must be weatherproof and continuous with the building envelope.	
<b>FlamLINE</b> is impervious to moisture drive and is continuous with the building envelope.	Caulked type expansion joints are just joint fillers. Caulked joints cannot assure continuity across different substrates, i.e. roof to wall. No building envelope continuity.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
<b>FlamLINE</b> details are prefabricated and ready for installation.	Caulked joints need a prepared cavity or well to be poured in so they are "fitted in". They do not lend themselves well to details.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
<b>FlamLINE</b> Elongation at Break @ - 70 °F [-57 °C] is 700.0%	Although caulked joints have good initial elongation they are prone to cohesive failure by debonding from the substrate.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses it flexibility and becomes brittle.	
<b>FlamLINE</b> Low Temperature Flex is - 70 °F [-57 °C]	Caulked joints by their very nature lose flexibility over time as they weather.



**FlamLINE vs. MODIFIED BITUMEN MEMBRANE TYPE JOINTS TECHNICAL COMPARISON**

FlamLINE	Modified Bitumen Membrane
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
FlamLINE is monolithic and seamless for it's entire length.	The expansion joint constructed out of Modified Bitumen requires lap seams every 10 feet [3 meters].
<b>Movement:</b> An expansion joint moves by expanding and contracting.	
FlamLINE moves up to 10" [250 mm].	Modified Bitumen does not move, it requires excess material to move.
<b>Bond Breaking:</b> The waterproofing material over the expansion joint gap must be free to move that is it cannot be stuck to the substrate.	
FlamLINE does not stick to asphalt over the expansion part and no special separation is necessary.	Modified Bitumen has no ability to separate and therefore will bond to the waterproofing membrane and restrict the movement at the expansion joint.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
FlamLINE details are prefabricated and ready for installation.	Modified Bitumen has to be worked around details, which includes considerable detail work.
<b>Drainage:</b> Water must free to evacuate without ponding, which can be detrimental to the waterproofing membrane.	
FlamLINE is flat, and does not obstruct water flow.	A Modified Bitumen joint is typically raised on wood curbs or cants restricting the flow of water to drain.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
FlamLINE Elongation at Break @ - 70 °F [-57 °C] is 700.0%	Modified Bitumen Elongation at Break @ 0 °F [-17 °C] is 4%
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses it flexibility and becomes brittle.	
FlamLINE Low Temperature Flex is - 70 °F [-57 °C]	Modified Bitumen Low Temperature Flex is - 10 °F [-23 °C]
<b>Material Thickness:</b> This is a geometric property of a manufactured material, it is indicative of the material's toughness and puncture resistance.	
FlamLINE Thickness is 0.118" [3.0 mm]	Modified Bitumen Thickness is 0.090" [2.3 mm]

**AquaLINE vs. CAULKED TYPE JOINTS TECHNICAL COMPARISON**

AquaLINE	Caulked Joint
	
<b>Seaming and Joints:</b> The method of creating a continuous waterproof barrier from piece of material.	
AquaLINE is monolithic and seamless for it's entire length.	Caulked expansion joints are simply filled with compressible material. Subject to cohesive/adhesive failures.
<b>Movement:</b> An expansion joint moves by expanding and contracting	
AquaLINE moves up to 2" [50 mm].	Movement is as a result of the elasticity of the caulked material, moves only as long as the material has flexibility.
<b>Construction:</b> The waterproofing material over the expansion joint gap must be weatherproof and continuous with the building envelope.	
AquaLINE is impervious to moisture drive and is continuous with the building envelope.	Caulked type expansion joints are just joint fillers. Caulked joints cannot assure continuity across different substrates, i.e. roof to wall. No building envelope continuity.
<b>Details:</b> Frequently expansion joints have turns or wrap around columns. These details are the source of the greatest material stress and leaks, which are a result of seam failure.	
AquaLINE details are prefabricated and ready for installation.	Caulked joints need a prepared cavity or well to be poured in so they are "fitted in". They do not lend themselves well to details.
<b>Elongation at Break:</b> This is a physical material property that measures how much a material can be stretched (like a piece of bubble gum) before it breaks. This property is dependant upon the material temperature, the lower the temperature the less elastic the material. The elongation is expressed as a percentage of a set gauge length.	
AquaLINE Elongation at Break @ - 70 °F [-57 °C] is 500.0%	Although caulked joints have good initial elongation they are prone to cohesive failure by debonding from the substrate.
<b>Low Temperature Flex:</b> This is a physical material property that measures the temperature at which the material loses it flexibility and becomes brittle.	
AquaLINE Low Temperature Flex is - 70 °F [-57 °C]	Caulked joints by their very nature lose flexibility over time as they weather.

## INSTALLED COST CALCULATIONS

Points to note when estimating a SITURA expansion joints installed cost, use the following chart as a component guide:

Material Estimate Takeoff for a SITURA Expansion Joint Installation	
Wood Nailers, 2" by 4", on both sides of the joint up to a height of 8"	Not Required
Metal Cap Flashings	Not Required
Fasteners	Not Required
Caulking and Adhesives	Not Required
Cant Strip	Not Required
Flashing Plies	Required
RedLINE or FlamLINE Material	Required
Labor & Workmanship Estimate Takeoff for SITURA Expansion Joint Installation	
Labor for Carpentry	Not Required
Labor for Sheet Metal Work	Not Required
Labor for Detailing on Site	Not Required
Labor for Roofing including flashing and stripping in plies. (1 hour per 100 feet of RedLINE or FlamLINE)	Required
Trade Coordination	Not Required

SITURA Expansion Joints do not require a number of materials and labor commonly associated with expansion joint covers. Since SITURA expansion joints are installed without these materials and labor, this translates into **significant savings**.

All SITURA joints are simply encapsulated into the roofing and waterproofing system and are installed as the roofing/waterproofing membrane is installed. The flat profile of a SITURA waterproof expansion joint does not obstruct water drainage, therefore eliminating the need for additional drains resulting from ponded water. SITURA has prepared a number of sample cost comparisons of neoprene, conventional and bellow type expansion joints against RedLINE® and FlamLINE®, for both the US and Canadian markets these are available by request, sample comparisons include the following:-

1. RedLINE vs. NEOPRENE TYPE EXPANSION JOINTS (US MARKET DATA)
2. RedLINE vs. CONVENTIONAL TYPE EXPANSION JOINTS (US MARKET DATA)
3. RedLINE vs. BELLOWS TYPE EXPANSION JOINTS (US MARKET DATA)
4. FlamLINE vs. CONVENTIONAL TYPE EXPANSION JOINTS (US MARKET DATA)
5. FlamLINE vs. BELLOWS TYPE EXPANSION JOINTS (US MARKET DATA)
6. RedLINE vs. NEOPRENE TYPE EXPANSION JOINTS (CANADIAN MARKET DATA)
7. RedLINE vs. CONVENTIONAL TYPE EXPANSION JOINTS (CANADIAN MARKET DATA)
8. RedLINE vs. BELLOWS TYPE EXPANSION JOINTS (CANADIAN MARKET DATA)
9. FlamLINE vs. CONVENTIONAL TYPE EXPANSION JOINTS (CANADIAN MARKET DATA)
10. FlamLINE vs. BELLOWS TYPE EXPANSION JOINTS (CANADIAN MARKET DATA)

## SITURA EXPANSION JOINT ESTIMATING GUIDELINES

SITURA waterproof expansion joint is custom manufactured for each project. No two buildings have exactly the same expansion joint configurations. It is important to gather information so that a correct quotation can be calculated.

Sources of expansion joint layout information are the original building drawings, as-built drawings or survey reports. However, the best way to confirm the information is to visit the site and take off the actual measurements.

Accurate information will ensure a correct fit and eliminate any additional calls to the site. The expansion joint layout information is forwarded to SITURA for a quotation.

## LAYOUT INFORMATION REQUIREMENTS

To aid in the collection of the required data, a project work sheet has been compiled. Copies are available on-line at [www.situra.com](http://www.situra.com), or the sample copy overleaf can be used.

**Complete the Project Work Sheet and fax it back to SITURA INC. at (905) 248-3441 or via e-mail at [situra@situra.com](mailto:situra@situra.com).** It is very important to attach a sketch of the expansion joint layout with measurements. All measurements are center line to center line.

If drawings are in electronic format, please send the file by e-mail to [situra@situra.com](mailto:situra@situra.com). The acceptable formats are AutoCAD® and generic PDF files. If further assistance is required please call SITURA toll free at 1-888-4-SITURA (474-8872).

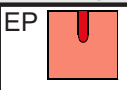
### Key:

- ① Project Data
- ② Contact Information
- ③ Shipping Address
- ④ Technical Information
- ⑤ Standard Details
- ⑥ Quantities
- ⑦ Take off Check List
- ⑧ Office CheckList
- ⑨ Sketch Area

SITURA Project Worksheet		Technical Information																														
<b>Project Name:</b> _____ <b>Project Location:</b> _____ <b>City:</b> _____ <b>State/Prov.:</b> _____ <b>Zip/P.C.:</b> _____ <b>Phone:</b> ( ) _____ <b>Fax:</b> ( ) _____		<b>Joint Type:</b> 06 20 20G 40 40G 240 <b>Expansion Joint Gap:</b> _____ <b>Movement:</b> 0" to 1" 1" to 2" >2"																														
<b>Contact Information:</b> _____ <b>Name:</b> _____ <b>Street Address:</b> _____ <b>City:</b> _____ <b>State/Prov.:</b> _____ <b>Zip/P.C.:</b> _____ <b>Phone:</b> ( ) _____ <b>Fax:</b> ( ) _____		<b>④</b> Built-Up/Roofing Coal Tar Pitch Modified Bitumen Membrane Mop Application Torch Application Hot Rubberized Asphalt Spray Polyurethane Foam Cold Applied Adhesive Epoxy Resin <div style="float: right; border: 1px solid black; padding: 2px;"> <b>SITURA JOINT</b>              Roof              Plaza Deck              Parking Deck              Foundation Wall              Aquat./P.E.           </div>																														
<b>Shipping Address:</b> _____ <b>Contact:</b> _____ <b>Street Address:</b> _____ <b>City:</b> _____ <b>State/Prov.:</b> _____ <b>Zip/P.C.:</b> _____ <b>Phone:</b> ( ) _____ <b>Fax:</b> ( ) _____																																
<b>Standard Detail Shapes</b> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <b>FT</b>              Flat Turn         </div> <div style="width: 50%;"> <b>EP</b>              End Piece         </div> <div style="width: 50%;"> <b>XJ</b>              "X" Junction         </div> <div style="width: 50%;"> <b>TJ</b>              "T" Junction         </div> <div style="width: 50%;"> <b>OC</b>              Outside Corner         </div> <div style="width: 50%;"> <b>IC</b>              Inside Corner         </div> <div style="width: 50%;"> <b>3WC</b>              3 Way Corner         </div> <div style="width: 50%;"> <b>CP</b>              Curb Piece         </div> </div>		<b>Expansion Joint Layout Diagram &amp; Comments</b> (indicate the expansion joint as a dashed line)																														
<b>Quantities</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Flat Turn (FT)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>End Piece (EP)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>"X" Junction (XJ)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>"T" Junction (TJ)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>Outside Corner (OC)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>Inside Corner (IC)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>3 Way Corner (3WC)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>Curb Piece (CP)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td>Vulcanization (V)</td> <td>90°</td> <td>Other</td> </tr> <tr> <td colspan="3">Total Joint Length: _____</td> </tr> </table>			Flat Turn (FT)	90°	Other	End Piece (EP)	90°	Other	"X" Junction (XJ)	90°	Other	"T" Junction (TJ)	90°	Other	Outside Corner (OC)	90°	Other	Inside Corner (IC)	90°	Other	3 Way Corner (3WC)	90°	Other	Curb Piece (CP)	90°	Other	Vulcanization (V)	90°	Other	Total Joint Length: _____		
Flat Turn (FT)	90°		Other																													
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3 Way Corner (3WC)	90°	Other																														
Curb Piece (CP)	90°	Other																														
Vulcanization (V)	90°	Other																														
Total Joint Length: _____																																
<b>Check List</b> Note All Elevations and Curbs Note All Changes in Plane Indicate Angles if different than 90° Mark All Terminations All Dimensions Center to Center All Dimensions Accurate to 1/4"																																
<b>Office Use</b> <b>Project Number:</b> _____ <b>Entered:</b> _____ <b>Data Verified:</b> _____ <b>Technical Site Visit:</b> Yes No		<b>⑨</b> <div style="text-align: right; font-size: small;">Rev. 04-09/02</div>																														

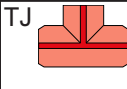
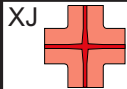



## Standard Detail Shapes



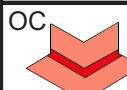
## Flat Turn

## End Piece



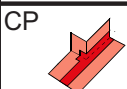
 "X" Junction

## “T” Junction



Outside Corner

Inside Corner



### 3 Way Corner

Curb Piece

## Quantities

Flat Turn (FT)	90°	Other:
End Piece (EP)		
"X" Junction (XJ)	90°	Other:
"T" Junction (TJ)	90°	Other:
Outside Corner (OC)	90°	Other:
Inside Corner (IC)	90°	Other:
3 Way Corner (3WC)	90°	Other:
Curb Piece (CP)	90°	Other:
Vulcanization (V)		
Total Joint Length:		

## Check List

- ☐ Note All Elevations and Curbs
- ☐ Note All Changes in Plane
- ☐ Indicate Angles if different than 90°
- ☐ Mark All Terminations
- ☐ All Dimensions Center to Center
- ☐ All Dimensions Accurate to 1/4"

## Office Use

Project Number:

Entered:

**Data Verified:**

Technical Site Visit: ☐ Yes ☐ No

## Expansion Joint Layout Diagram & Comments

(indicate the expansion joint as a dashed line)

Joint Type: ☐06 ☐20 ☐20G  
☐40 ☐40G ☐240

Expansion Joint Gap: \_\_\_\_\_

**Movement:** ☐ 0" to 1"

☐ 1" to 2"

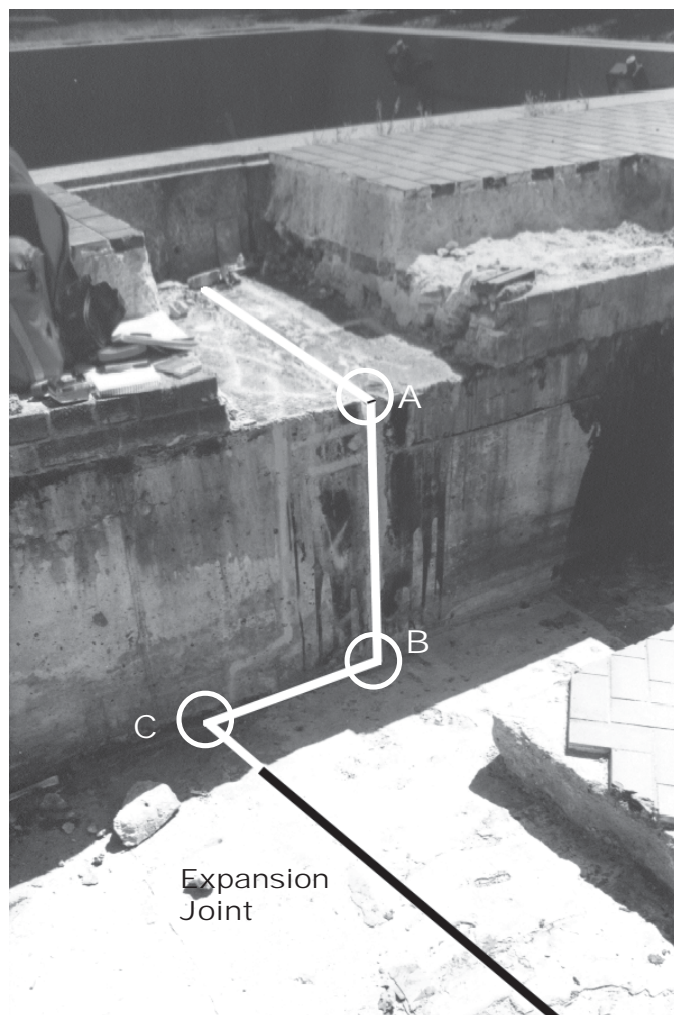
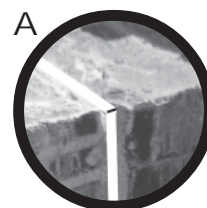
$\square > 2''$

- ☐ Built-Up-Roofing/Coal Tar Pitch
- ☐ Modified Bitumen Membrane
  - ☐ Mop Application
  - ☐ Torch Application
- ☐ Hot Rubberized Asphalt
- ☐ Spray Polyurethane Foam
- ☐ Cold Applied Adhesive
- ☐ Epoxy Resin

- ☐ Roof
- ☐ Plaza Deck
- ☐ Parking Deck
- ☐ Foundation Wall

## SITURA JOINT

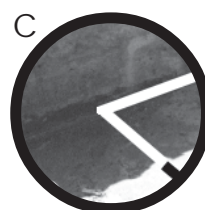
- ☐ RedLINE  
☐ FlamLINE  
☐ AquaLINE

**Example 1: Foundation Wall Take-off Site Details****Key Points**

*Change in plane  
horizontal to  
vertical.*



*Change in direction  
and plane, from  
vertical to  
horizontal.*



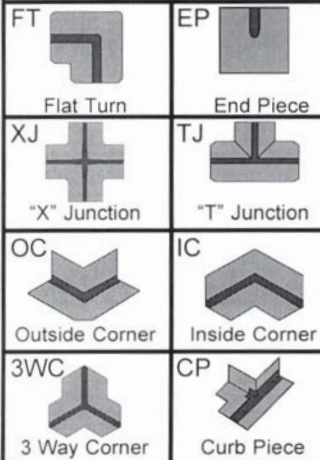
*Change in  
expansion joint  
direction.*

**TAKE NOTE...****THINGS TO DO ON SITE**

- Record all key points as shown above.
- Record all distances center to center between key points.
- Record Expansion joint gap dimension.
- Record any unusual movement.
- Record type of substrate.

**Example 1: Project Worksheet**

RedLINE Project Worksheet		Technical Information
Project Name: <u>THE FRANCES YERKINS BUILDING</u>		RedLINE: <input type="checkbox"/> 06 <input type="checkbox"/> 20 <input type="checkbox"/> 20G
Project Location: <u>SOUTH SIDE FOUNDATION WALL</u>		<input checked="" type="checkbox"/> 40 <input type="checkbox"/> 40G <input type="checkbox"/> 240
Street Address: <u>3 and C STREETS</u>		Expansion Joint Gap: <u>1 1/2"</u>
City: <u>WASHINGTON DC</u> State/Prov.: <u>DC</u> Zip/P.C.: <u>20572</u>		Movement: <input checked="" type="checkbox"/> 0" to 1"
Phone: <u>(710) 555-1234</u> Fax: <u>(710) 555-3487</u>		<input type="checkbox"/> 1" to 2"
		<input type="checkbox"/> >2"
Contact Information:		<input type="checkbox"/> Built-Up-Roofing/Coal Tar Pitch <input type="checkbox"/> Modified Bitumen Membrane <input type="checkbox"/> Mop Application <input type="checkbox"/> Torch Application <input type="checkbox"/> Hot Rubberized Asphalt <input type="checkbox"/> Spray Polyurethane Foam <input type="checkbox"/> Cold Applied Adhesive <input checked="" type="checkbox"/> Epoxy Resin
Name: <u>BOB SMITH</u>		<input type="checkbox"/> Roof
Street Address: <u>14 ALLWAY ST, UNIT 4</u>		<input type="checkbox"/> Plaza Deck
City: <u>WASHINGTON DC</u> State/Prov.: <u>DC</u> Zip/P.C.: <u>20533</u>		<input type="checkbox"/> Parking Deck
Phone: <u>(710) 555-8410</u> Fax: <u>(710) 555-7489</u>		<input checked="" type="checkbox"/> Foundation Wall
Shipping Address:		
Contact: <u>BOB SMITH</u>		
Street Address: <u>3 and C STREET</u>		
City: <u>WASHINGTON DC</u> State/Prov.: <u>DC</u> Zip/P.C.: <u>20533</u>		
Phone: <u>(710) 555-8491</u> Fax: <u>( )</u>		

**Standard Detail Shapes****Quantities**

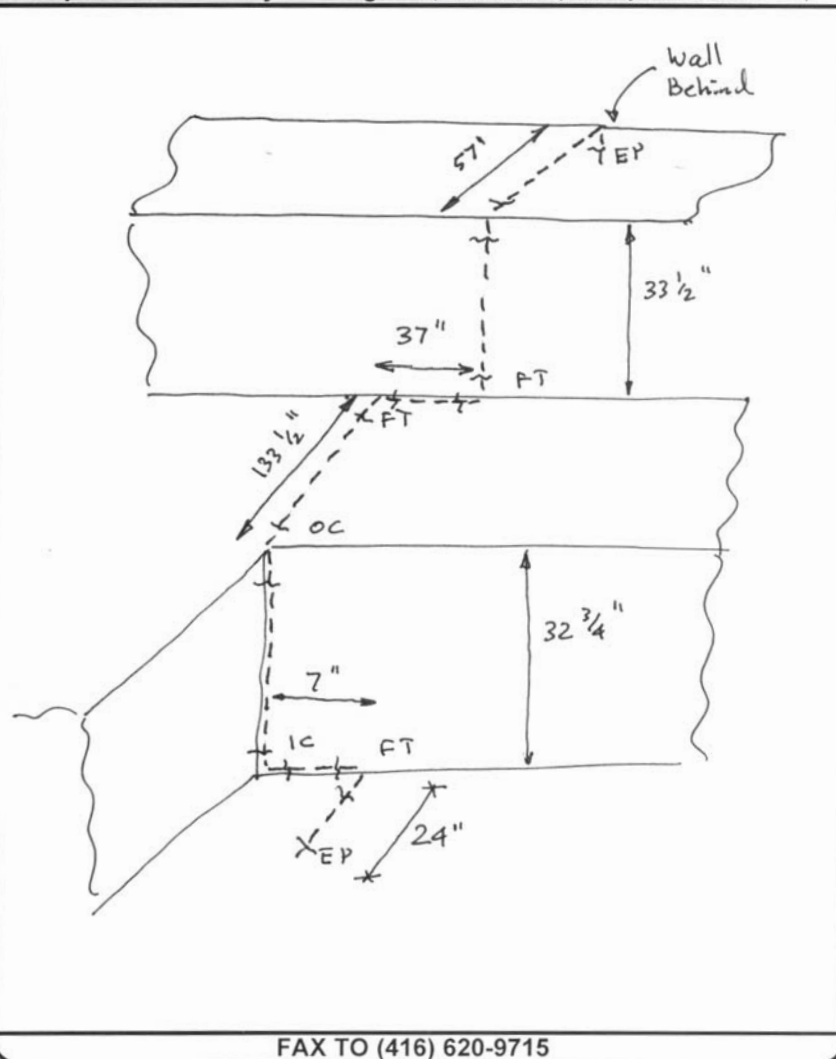
Flat Turn (FT)	90°	x 3	Other:
End Piece (EP)		x 2	
"X" Junction (XJ)			
"T" Junction (TJ)			
Outside Corner (OC)	90°	x 1	Other:
Inside Corner (IC)	90°	x 1	Other:
3 Way Corner (3WC)			
Curb Piece (CP)	90°		Other:
Vulcanization (V)		x 14 x 12	
Total Joint Length:			

**Check List**

- ☐ Note All Elevations and Curbs
- ☐ Note All Changes in Plane
- ☐ Indicate Angles if different than 90°
- ☐ Mark All Terminations
- ☐ All Dimensions Center to Center
- ☐ All Dimensions Accurate to 1/4"

**Office Use**

Project Number: 99-021  
 Entered: K2  
 Data Verified: K2  
 Technical Site Visit: ☒ Yes ☐ No

**Expansion Joint Layout Diagram (indicate the expansion joint as a dashed line)**

**Example 1: Layout Drawings for Approval**

APPROVALS AND SIGN OFFS		
DESCRIPTION	DATE	SIGNED BY:
REVISION # 1		
REVISION # 2		
REVISION # 3		
FABRICATION APPROVAL	05/20/99	Bill Mcarthy

133.5"

57"

33.5"

6"


37"

32.75"

7"

24"

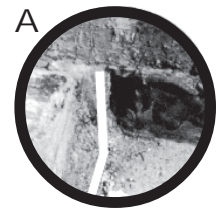
 <b>SITURA INC.</b> Building Envelope Components	PROJECT NAME:
	FRANCES PERKINS BUILDING SOUTH FOUNDATION WALL
As a supplier of finished products only, SITURA INC., does not assume responsibility for errors in design, engineering or dimensions. The architect or owner's representative must verify all dimensions and suitability of details.	PROJECT NUMBER:
	99-021
SCALE: NTS	CHECKED BY: KMZ
	DATE: 05/14/99
	SHEET: 1 of 1



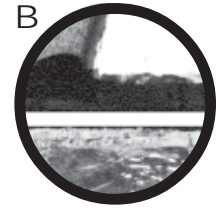
**Example 2: Plaza Deck Take-off Site Details**



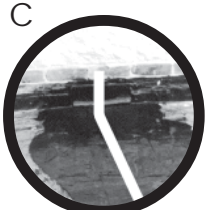
**Key Points**



*Change in direction and plane horizontal to vertical corner detail.*











*Detail at a concrete step up slab - a curb detail.*



*Termination detail at the far end (at a masonry wall) of the expansion joint.*

**Example 2: Project Worksheet**

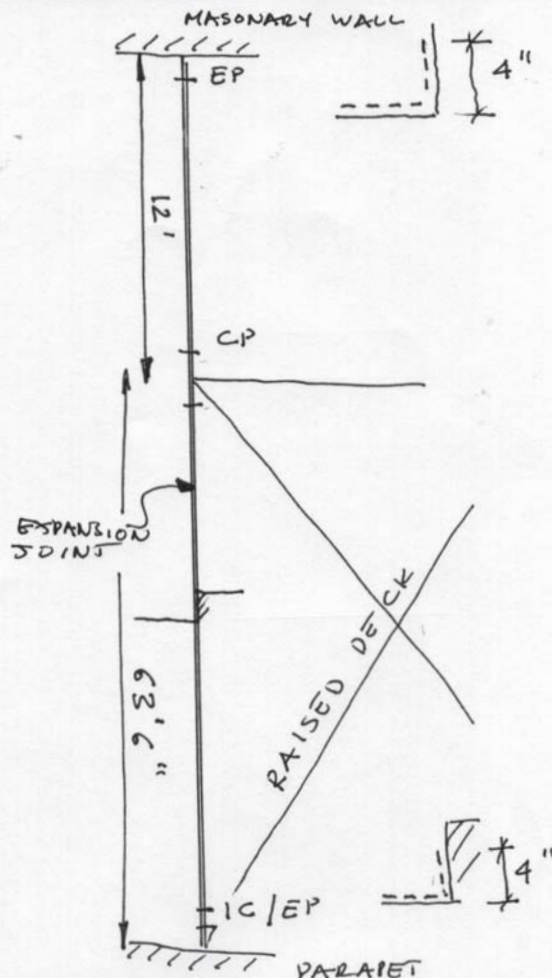
RedLINE Project Worksheet		Technical Information
Project Name: <u>Mount SINAI HOSPITAL</u>		RedLINE: <input type="checkbox"/> 06 <input checked="" type="checkbox"/> 20 <input type="checkbox"/> 20G
Project Location: <u>NORTH PARKING DECK</u>		<input type="checkbox"/> 40 <input type="checkbox"/> 40G <input type="checkbox"/> 240
Street Address: <u>52 WEST BOWEN STREET</u>		Expansion Joint Gap: <u>1"</u>
City: <u>BALTIMORE</u> State/Prov.: <u>MD</u> Zip/P.C.: <u>21220</u>		Movement: <input checked="" type="checkbox"/> 0" to 1"
Phone: <u>(701) 555-3689</u> Fax: <u>(701) 555-3690</u>		<input type="checkbox"/> 1" to 2"
		<input type="checkbox"/> >2"
Contact Information:		<input type="checkbox"/> Built-Up-Roofing/Coal Tar Pitch
Name: <u>PERMATIC L.T.A., ANDY BROWN</u>		<input type="checkbox"/> Modified Bitumen Membrane
Street Address: <u>28 SMITH FALLS BLVD</u>		<input type="checkbox"/> Mop Application
City: <u>BALTIMORE</u> State/Prov.: <u>MD</u> Zip/P.C.: <u>21220</u>		<input type="checkbox"/> Torch Application
Phone: <u>(701) 555-4835</u> Fax: <u>(701) 555-3945</u>		<input checked="" type="checkbox"/> Hot Rubberized Asphalt
		<input type="checkbox"/> Spray Polyurethane Foam
Shipping Address:		<input type="checkbox"/> Cold Applied Adhesive
Contact: <u>ANDY BROWN</u>		<input checked="" type="checkbox"/> Epoxy Resin
Street Address: <u>52 WEST BOWEN STREET</u>		<input type="checkbox"/> Roof
City: <u>BALTIMORE</u> State/Prov.: <u>MD</u> Zip/P.C.: <u>21220</u>		<input type="checkbox"/> Plaza Deck
Phone: <u>(701) 555-3223</u> Fax: <u>( )</u>		<input checked="" type="checkbox"/> Parking Deck
		<input type="checkbox"/> Foundation Wall

Standard Detail Shapes	
FT 	EP 
Flat Turn	End Piece
XJ 	TJ 
"X" Junction	"T" Junction
OC 	IC 
Outside Corner	Inside Corner
3WC 	CP 
3 Way Corner	Curb Piece

Quantities	
Flat Turn (FT)	90° <u>  </u> Other: <u>  </u>
End Piece (EP)	<u>  x 2  </u>
"X" Junction (XJ)	<u>  </u>
"T" Junction (TJ)	<u>  </u>
Outside Corner (OC)	90° <u>  </u> Other: <u>  </u>
Inside Corner (IC)	90° <u>  x 1  </u> Other: <u>  </u>
3 Way Corner (3WC)	<u>  </u>
Curb Piece (CP)	90° <u>  x 1  </u> Other: <u>  </u>
Vulcanization (V)	<u>  x 5  </u>
Total Joint Length:	<u>  </u>

Check List
<input type="checkbox"/> Note All Elevations and Curbs
<input type="checkbox"/> Note All Changes in Plane
<input type="checkbox"/> Indicate Angles if different than 90°
<input type="checkbox"/> Mark All Terminations
<input type="checkbox"/> All Dimensions Center to Center
<input type="checkbox"/> All Dimensions Accurate to 1/4"

Office Use
Project Number: <u>99-019</u>
Entered: <u>KZ</u>
Data Verified: <u>KZ</u>
Technical Site Visit: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

**Expansion Joint Layout Diagram** (Indicate the expansion joint as a dashed line)

FAX TO (416) 620-9715



Example 2: Layout Drawings for Approval

APPROVALS AND SIGN OFFS		
DESCRIPTION	DATE	SIGNED BY:
REVISION # 1		
REVISION # 2		
REVISION # 3		
APPROVAL	05/15/99	Bob Smith

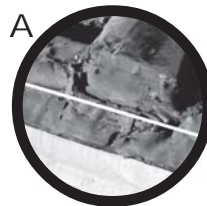
The diagram shows a cross-section of a lower slab. A vertical line on the left is hatched with diagonal lines. To the right of this line, there are two vertical dimension lines. The top one is labeled '63.5'' and the bottom one is labeled '12''. The text 'Lower Slab - 6"' is written vertically between the two dimension lines.

<p><b>SITURA INC.</b> Building Envelope Components</p> <p><small>As a supplier of finished products only, SITURA INC., does not assume responsibility for errors in design, engineering or dimensions. The architect or owner's representative must verify all dimensions and suitability of details.</small></p>	PROJECT NAME: <b>Mt. SINAI HOSPITAL PARKING DECK</b> Baltimore, MD		
	PROJECT NUMBER: <b>99-019</b>		
SCALE: <b>NTS</b>	CHECKED BY: <b>KMZ</b>	DATE: <b>05/14/99</b>	SHEET: <b>1 of 1</b>

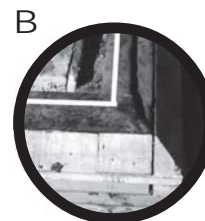
## Example 3: Roofing Take-off Site Details



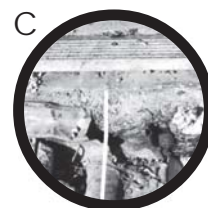
### Key Points



*Close up of a curb detail along the expansion joint.*











*A 90 degree change in direction.*



*Termination of the expansion joint at the door threshold.*

**Example 3: Project Worksheet**

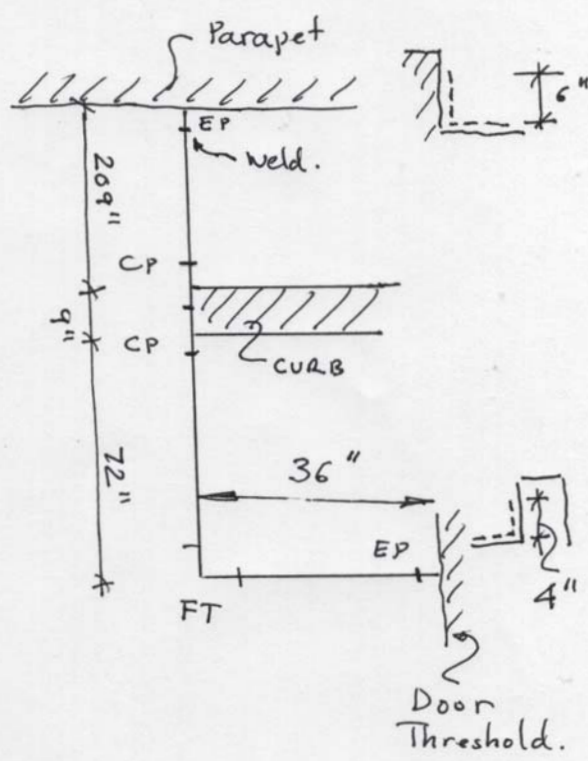
RedLINE Project Worksheet		Technical Information
Project Name: <u>PEEL HOUSING - APARTMENT BLDG.</u>		RedLINE: <input type="checkbox"/> 06 <input type="checkbox"/> 20 <input type="checkbox"/> 20G
Project Location: <u>ROOF OF BUILDING.</u>		<input checked="" type="checkbox"/> 40 <input type="checkbox"/> 40G <input type="checkbox"/> 240
Street Address: <u>990 RILEY COURT</u>		Expansion Joint Gap: <u>1 1/2"</u>
City: <u>MISSISSAUGA</u> State/Prov.: <u>ON</u> Zip/P.C.: <u>L4W 2P4</u>		Movement: <input type="checkbox"/> 0" to 1"
Phone: <u>(416) 555-1212</u> Fax: <u>(416) 555-8843</u>		<input checked="" type="checkbox"/> 1" to 2"
		<input type="checkbox"/> >2"
Contact Information:		<input checked="" type="checkbox"/> Built-Up-Roofing/Coal Tar Pitch
Name: <u>CONCEPT CONSULTANTS - BOB MACARTHY</u>		<input type="checkbox"/> Modified Bitumen Membrane
Street Address: <u>2 DUNDAS STREET</u>		<input type="checkbox"/> Mop Application
City: <u>DUNDAS</u> State/Prov.: <u>ON</u> Zip/P.C.: <u>M4T 1V5</u>		<input type="checkbox"/> Torch Application
Phone: <u>(416) 555-1234</u> Fax: <u>(416) 925-8433</u>		<input type="checkbox"/> Hot Rubberized Asphalt
		<input type="checkbox"/> Spray Polyurethane Foam
Shipping Address:		<input type="checkbox"/> Cold Applied Adhesive
Contact: <u>JOE SMITH</u>		<input type="checkbox"/> Epoxy Resin
Street Address: <u>990 RILEY COURT</u>		<input checked="" type="checkbox"/> Roof
City: <u>MISSISSAUGA</u> State/Prov.: <u>ON</u> Zip/P.C.: <u>L4W 2P4</u>		<input type="checkbox"/> Plaza Deck
Phone: <u>(416) 555-1234</u> Fax: <u>(416) 555-1212</u>		<input type="checkbox"/> Parking Deck
		<input type="checkbox"/> Foundation Wall

Standard Detail Shapes	
FT  Flat Turn	EP  End Piece
XJ  "X" Junction	TJ  "T" Junction
OC  Outside Corner	IC  Inside Corner
3WC  3 Way Corner	CP  Curb Piece

Quantities		
Flat Turn (FT)	90° <u>x 1</u>	Other:
End Piece (EP)	<u>x 2</u>	
"X" Junction (XJ)		
"T" Junction (TJ)		
Outside Corner (OC)	90°	Other:
Inside Corner (IC)	90°	Other:
3 Way Corner (3WC)		
Curb Piece (CP)	90° <u>x 2</u>	Other:
Vulcanization (V)	<u>x 7</u>	
Total Joint Length:	<u>28'</u>	

Check List
<input type="checkbox"/> Note All Elevations and Curbs
<input type="checkbox"/> Note All Changes in Plane
<input type="checkbox"/> Indicate Angles if different than 90°
<input type="checkbox"/> Mark All Terminations
<input type="checkbox"/> All Dimensions Center to Center
<input type="checkbox"/> All Dimensions Accurate to 1/4"

Office Use
Project Number: <u>98-039</u>
Entered: <u>KZ</u>
Data Verified: <u>KZ</u>
Technical Site Visit: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Expansion Joint Layout Diagram (indicate the expansion joint as a dashed line)
 <p>The diagram illustrates the layout of an expansion joint on a roof. It shows a parapet wall on the left and a door threshold on the right. The joint runs vertically, with a horizontal section at the bottom. Key components and dimensions are labeled: a 20'9" vertical section, a 9" horizontal section, a 72" vertical section, a 36" horizontal section, and a 4" vertical section. The joint is terminated with an FT (Flat Turn) at the bottom left and an EP (End Piece) at the bottom right. A weld is indicated on the parapet wall. The joint passes through a curb (CURB) and a door threshold. The diagram also shows a dashed line indicating the expansion joint location.</p>
FAX TO (416) 620-9715




**Example 3: Layout Drawings for Approval**

APPROVALS AND SIGN OFFS		
DESCRIPTION	DATE	SIGNED BY:
REVISION # 1		
REVISION # 2		
REVISION # 3		
FABRICATION APPROVAL	05/20/99	Bill Mcarthy

**RedLINE 40  
Expansion Joint**

 <b>SITURA INC.</b> Building Envelope Components	PROJECT NAME: <b>PEEL HOUSING - RILEY COURT MISSISSAUGA, ON</b>		
	PROJECT NUMBER: <b>98-038</b>		
As a supplier of finished products only, SITURA INC., does not assume responsibility for errors in design, engineering or dimensions. The architect or owner's representative must verify all dimensions and suitability of details.	SCALE: <b>NTS</b>	CHECKED BY: <b>KMZ</b>	DATE: <b>03/20/99</b>
SHEET: <b>1 of 1</b>			

## **SITURA JOINT ORDERING AND DELIVERY**

Once the type of expansion joint has been selected and specified, it can be ordered from SITURA. A layout sketch is submitted for verification and approval. Once approved, the expansion joint is manufactured exactly to the approved expansion joint layout. Upon receipt of an order, SITURA will forward a confirmation.

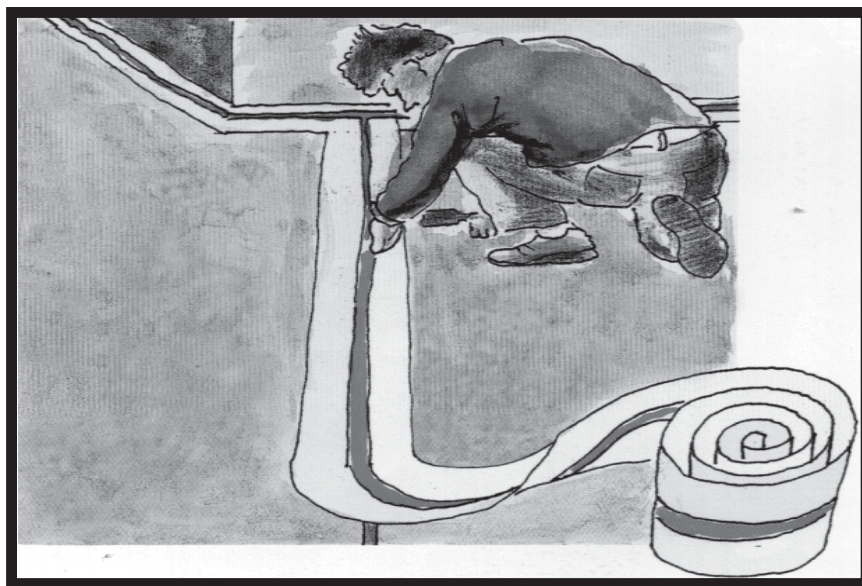
Once the expansion joint has been fabricated to the specified requirements it is ready for delivery. Each SITURA order has an accompanying layout drawing confirming the layout dimensions. The layout drawing will also indicate the starting installation location and the location of field welds if any. If site field welding is required please notify SITURA's Technical Department for scheduling, so arrangements can be made for a technician to be available on site.

## **TECHNICAL SERVICE AND SUPPORT**

The SITURA expansion joint product line offers a comprehensive solution to joint waterproofing problems. Please call SITURA INC., toll free at **1-888-4-SITURA** (1-888-474-8872) for assistance in specifying, detailing and installing a waterproof expansion joint.

# Chapter 5.

## SITURA Expansion Joints Installation Guidelines



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*Please turn over*



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*The information and specifications presented herein, represent the applicable information available at the time of publication. All information and statements herein are expressions of opinion, which by performance and testing are believed to be accurate and reliable.*

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# Chapter 5.

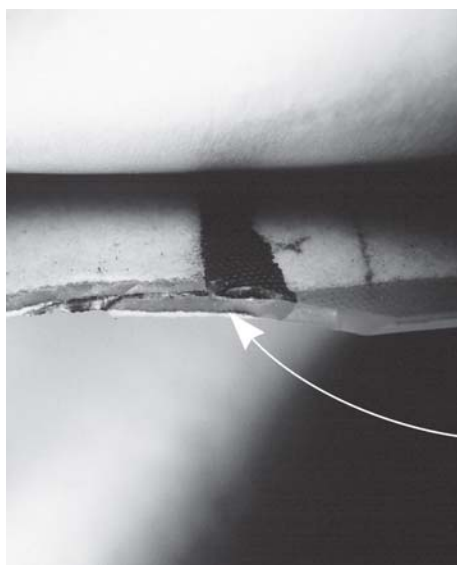
## Installation Guidelines

### INTRODUCTION

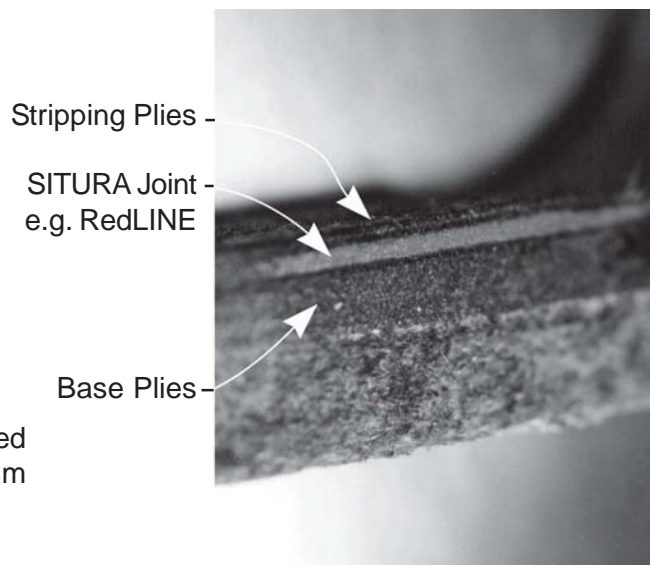
The function of the SITURA expansion joint material is to provide a waterproof layer that is able to accommodate movement and simultaneously remain waterproof. **The process of installing the joint is simple and requires little time.** The installed system provides a long-term performance solution to expansion joint waterproofing.

The SITURA product is designed to be installed on both vertical and horizontal surfaces, above and below grade on most construction type substrates. The **unprecedented versatility** of the SITURA expansion joint system offers several advantages to the roofing/waterproofing professional, among them are the following:

1. Provides an integral and continuous waterproofing layer with the waterproofing membrane.
2. Eliminates expensive wood blocking, roofing/waterproofing membrane flashing, metal coping, and expensive concrete nosing compounds.
3. The system's flat profile allows free drainage and unobstructed flow of water across the joint. The uncomplicated nature of the flat profile joint translates into a maintenance free, simple solution.
4. Factory manufactured to suit specific site conditions. The possibility of on site vulcanization eliminates problems associated with difficult details and unusual conditions. The process of vulcanization is one that joins two piece components while maintaining a constant and uniform rate of elongation across the expansion joint waterproofing material.



*Cross-section close up of a vulcanized seam.*



*Cross-section showing encapsulation.*

## **METHODS OF RedLINE® INSTALLATION**

The RedLINE expansion joint system can be installed by mopping, torching, encapsulation, or a combination thereof.

RedLINE direct mopping application is used for Built-Up-Roofing (BUR), Hot Rubberized Asphalt (HRA), Coal Tar Pitch (CTP), and Mopped SBS/APP Modified Bitumen Membranes (MBM). Torched Modified Bitumen Membranes can also be installed on an asphalt coated RedLINE. Substrates such as concrete require RedLINE to be encapsulated in an Epoxy Resin (ER). Other RedLINE applications include Spray Polyurethane Foam (SPF), Liquid Applied Membranes (LAM) and Cold Applied Adhesives (CAA).

The installer must always follow the recommendations and guidelines of the roofing/waterproofing membrane manufacturer when installing RedLINE with a particular roofing/waterproofing system.

## **METHODS OF FlamLINE® INSTALLATION**

The FlamLINE expansion joint system can be installed by torching, encapsulation in epoxy resin or self adhered membrane, or a combination thereof.

FlamLINE direct application is used with **torched** SBS/APP Modified Bitumen Membranes (MBM). Substrates such as concrete require FlamLINE to be encapsulated in an Epoxy Resin (ER). Other FlamLINE applications are with Self Adhered Membranes (SAM).

The installer must always follow the recommendations and guidelines of the roofing/waterproofing membrane manufacturer when installing FlamLINE with a particular roofing/waterproofing system.

## **METHODS OF AquaLINE® INSTALLATION**

The AquaLINE expansion joint system is developed specifically for potable water applications and can be installed by encapsulation in an epoxy resin. The epoxy resin must meet the regulatory requirements for the application.

## RedLINE® MOPPING INSTALLATION

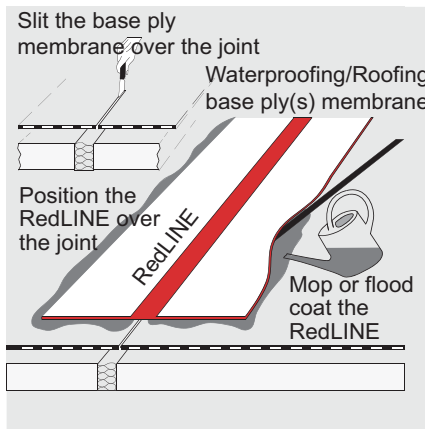
**FOR USE WITH:  
HOT ASPHALT, COAL TAR PITCH,  
OR MODIFIED BITUMEN**

### INTRODUCTION

This installation technique is used predominantly in roofing and waterproofing systems that are asphalt/bitumen or coal tar pitch-based. The process of installing the RedLINE waterproofing joint system is simple. The complete expansion joint material is shipped in a roll with all detailing prefabricated. Installation takes place as roofing/waterproofing progresses. The installation procedure is described as follows:

#### STEP 1: SUBSTRATE PREPARATION

Clean and dry the substrate ensuring it is free of debris and dirt. Install the base plies (in a BUR/Coal Tar Pitch\*/Modified Bitumen). Slit the installed membrane along the building expansion joint, when the base plies span the joint gap, making sure that the cut is clean and continuous. Pack the expansion joint gap with compressible batt insulation.



#### STEP 2: ALIGNMENT

Unroll the RedLINE material and position it over the expansion joint. Verify the correct fit of the roll. The starting location is indicated on the drawings supplied with the RedLINE.

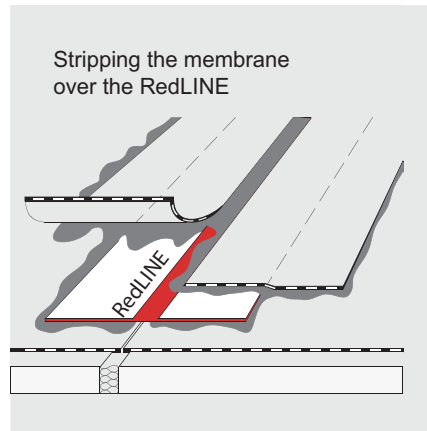
#### STEP 3: ADHESION

The polyester fleece on the RedLINE material must be kept dry at all times. A wet fleece surface will result in blisters, once hot liquid is applied to it. Apply a flood coat of asphalt/bitumen or coal tar pitch. Lay the RedLINE material, in the flood coat of asphalt, and press it in with a smoothing action. The asphalt/bitumen or coal tar pitch must be at its Equiviscous Temperature (EVT) when being applied to the fleece. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot material. Do not lay the RedLINE in cold material.

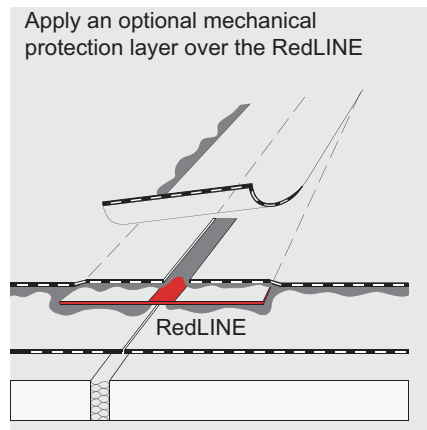
\* Coal Tar Pitch membranes require ply envelopes to prevent coal tar drippage into the building interior see the appropriate RedLINE detail.

**STEP 4: STRIPPING IN**

Coat the top side polyester fleece with asphalt/bitumen or coal tar pitch. Install the top ply in the flood coat of asphalt/bitumen or coal tar pitch; the use of a mop is acceptable. Note that the asphalt/bitumen and coal tar pitch is at the correct EVT at the point of application. Fully coat the RedLINE fleece with asphalt/bitumen; an indication of this is a bleed visible along the ply's edge and no white fleece showing. Ensure proper fleece encapsulation, by "smoothing down" the RedLINE in asphalt/bitumen.

**STEP 5: PROTECTION LAYER (OPTIONAL)**

If an additional protection layer is required, mop or torch a compatible strip of modified bitumen membrane to one side of the joint, covering the exposed part of the RedLINE material. This allows for the free movement of the protection layer.

**TAKE NOTE...**
**POINTS TO NOTE WHEN MOPPING RedLINE IN ASPHALT, COAL TAR PITCH OR MODIFIED BITUMEN**

1. Ensure that the RedLINE material fleece is dry. If by chance it is exposed to moisture, dry it out prior to application either by hot air drying or laying it out in the sun.
2. The asphalt/bitumen, coal tar pitch used must be at its EVT when applied to the RedLINE fleece.
3. Ensure that the RedLINE fleece is fully encapsulated within the asphalt/bitumen or coal tar pitch.
4. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot material. Do not lay the RedLINE in cold material.

## A MOPPING RedLINE® APPLICATION ON A PROTECTED MEMBRANE BUR ROOFING PROJECT



◀ Prior to the commencement of roofing the roof expansion cover is reviewed and examined. The photo on the left shows the covered expansion joint running across the roof. Note the skylights butting the expansion joint. The expansion cover was leaking and obstructed the flow of water across the roof to the drains on the right, resulting in water ponding between the skylights and compounding the leakage.



▲ Close up of the condition of the expansion cover at the corner of each of the skylights on the roof.



▲ Close up of the expansion cover termination at the edge of the building. Note the direction change on the roof parapet.





◀ The existing expansion joint, exposed. The joint was raised, hence obstructing the drainage of water. Over the years cutouts were made in the expansion joint in an attempt to alleviate the drainage problem.

Building expansion joint exposed, running along the skylight. ➤



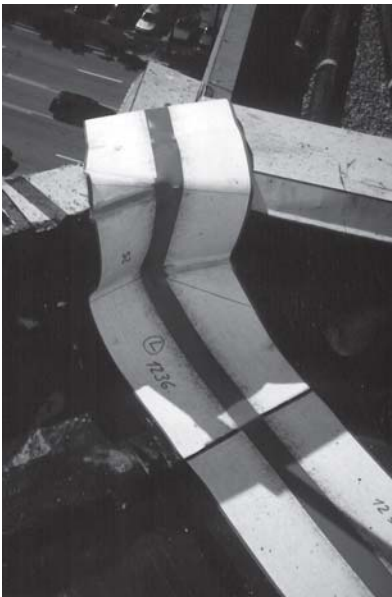
➤ The RedLINE waterproof expansion joint shipped to the site in a roll with site drawing, indicating starting point of installation and any other special features.





◀ The RedLINE expansion joint being unrolled on site to verify fit.

The RedLINE expansion joint custom corner detail at the roof skylight. ▶



◀ The RedLINE expansion joint custom edge corner detail. The expansion joint changes both planes (from horizontal to vertical) and direction (twice).



◀ Joint waterproofing is laid out along the roof expansion joint. Note the roofing base ply(s) have already been installed and cut along the building joint gap.

Asphalt in a bucket being readied. The asphalt was hot and at its recommended EVT. ▶



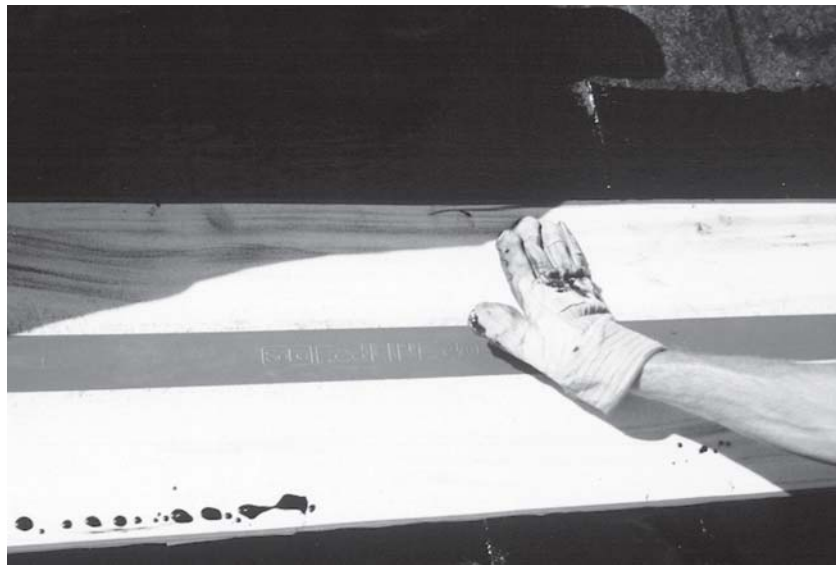
◀ Mopping the RedLINE expansion joint down. Note that both the base plies and the underside of the RedLINE are coated with asphalt.





◀ A strong bond forms between the RedLINE fleece and the roof surface, totally encapsulating the fleece.

▶ The RedLINE expansion joint is smoothed down.



▶ The versatility of the RedLINE expansion joint allows the installer to easily work around details, such as this roof anchor.





◀ The mopped down RedLINE at the skylight corner. The RedLINE material conforms to the shape of the skylight corner.

▶ Stripping in of the top surface of the RedLINE. Asphalt was applied by mop.



◀ RedLINE mopping in asphalt continues.





◀ The RedLINE expansion joint installed along the roof skylight. Note the cold applied modified bitumen flashing.

► The completed roof installation. Use of the RedLINE expansion joint achieved the two primary objectives initially set. A high performance expansion joint which addressed the difficult skylight curb condition and eliminated the ponding water problem. The roof now has positive drainage.





## RedLINE® MOPPING INSTALLATION

**FOR USE WITH:  
HOT RUBBERIZED ASPHALT**

### INTRODUCTION

This installation technique is used predominantly in waterproofing systems that are on green roofs, below grade or on plaza decks. The process of installing the RedLINE waterproofing joint system is simple. The complete expansion joint material is shipped in a roll with all detailing prefabricated. Installation takes place as waterproofing progresses. The installation procedure is described as follows:

#### STEP 1: SUBSTRATE PREPARATION

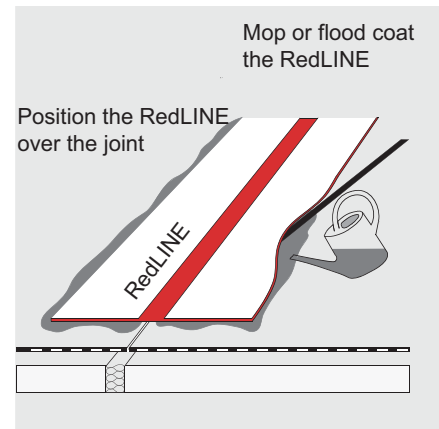
Clean and dry the substrate ensuring it is free of debris and dirt. Pack the expansion joint gap with compressible batt insulation or preferably with a polystyrene backer rod.

#### STEP 2: ALIGNMENT

Unroll the RedLINE material and position it over the expansion joint. Verify the correct fit of the roll. The starting location is indicated on the drawings supplied with the RedLINE.

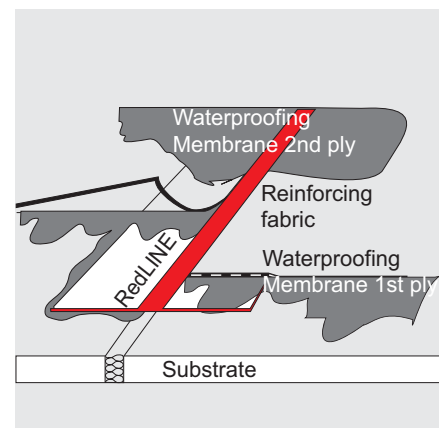
#### STEP 3: ADHESION

The polyester fleece on the RedLINE material must be kept dry at all times. A wet fleece surface will result in blisters, once hot liquid is applied to it. Apply the first coat of Hot Rubberized Asphalt at the manufacturer's recommended minimum thickness, immediately embed the RedLINE waterproof expansion joint material, making sure that the bottom polyester fleece is in full contact with the hot asphalt. Press the RedLINE material into the hot asphalt. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot asphalt material. Do not lay the RedLINE in cold asphalt. The asphalt must stick to both the RedLINE fleece and substrate without delaminating from either surface.



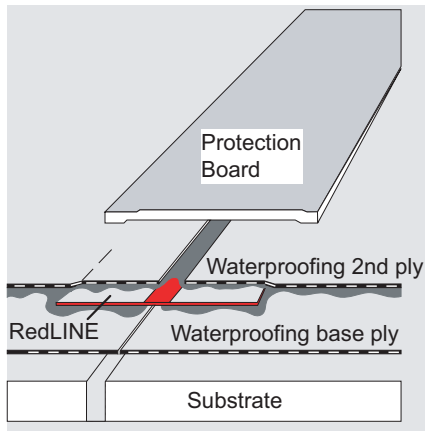
#### STEP 4: STRIPPING IN

Spread an even coat of Hot Rubberized Asphalt on the top surface of the RedLINE expansion joint ensuring the top white polyester fleece is completely covered; embed a reinforcing fabric mesh overlapping the edge of the RedLINE by 2"- 3" [50 mm to 75 mm] and ensuring full contact. Apply a second coat of Hot Rubberized Asphalt on top of the reinforcing fabric mesh at the manufacturer's minimum recommended thickness. Ensure that the asphalt is at the correct EVT at the point of application. Fully coat the RedLINE fleece with asphalt an indication of this is no white fleece showing.



**STEP 5: PROTECTION LAYER****(RECOMMENDED FOR OVERBURDEN APPLICATIONS)**

If an additional protection layer is required, mop or torch a compatible strip of modified bitumen membrane to one side of the joint, covering the exposed part of the RedLINE material. Alternatively, a standard high density polypropylene (HDPB) board can be used as protection by simply placing it over the RedLINE joint prior to the placement of any overburden.

**TAKE NOTE...****POINTS TO NOTE WHEN MOPPING RedLINE IN HOT RUBBERIZED ASPHALT**

1. Ensure that the RedLINE material fleece is dry. If by chance it is exposed to moisture, dry it out prior to application either by hot air drying or laying it out in the sun.
2. The Hot Rubberized Asphalt used must be at its EVT when applied to the RedLINE fleece.
3. Ensure that the RedLINE fleece is fully encapsulated within the Hot Rubberized Asphalt.
4. Always lay the RedLINE expansion joint material only in lengths which allow for immediate contact with the hot material. Do not lay the RedLINE in cold material.
5. Install a protection board for any waterproofing application which will require overburden placement over the RedLINE expansion joint system.

## A MOPPING RedLINE® APPLICATION WITH HOT RUBBERIZED ASPHALT



▲ The cleaned expansion joint cavity and primed concrete substrate.

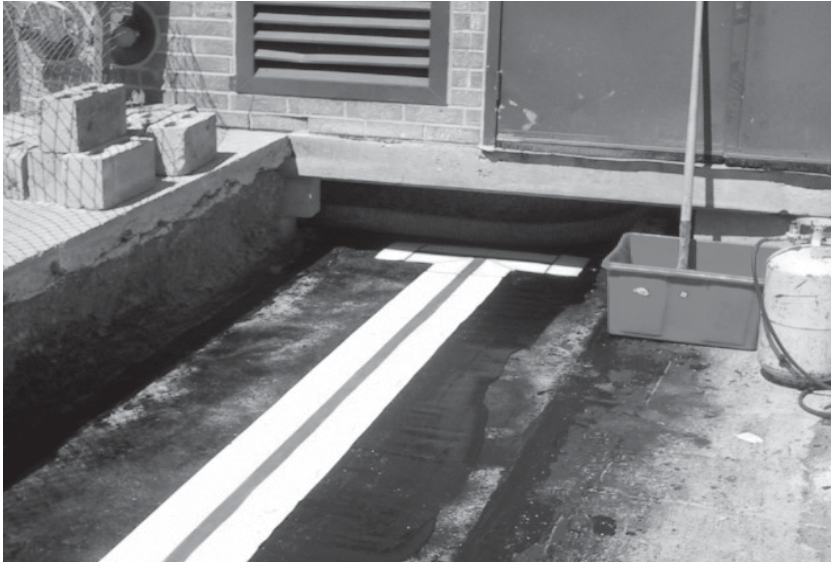


▲ Applying hot asphalt onto the concrete substrate.

▼ The RedLINE is being rolled out into the hot asphalt.

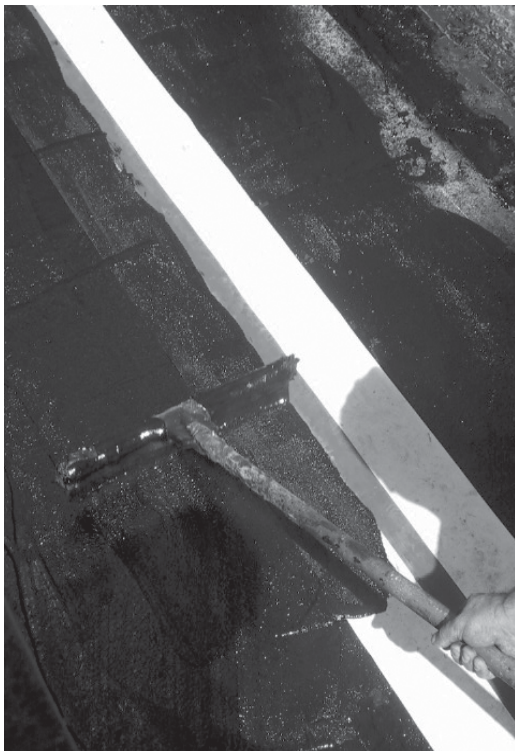






▲ The RedLINE in place set in hot rubberized asphalt.

- ▼ Applying the first coat on top of the RedLINE.



- ▼ Setting out the membrane reinforcing fabric over the first coat.





▲ Reinforcing fabric applied to one side of the RedLINE joint (joint termination shown).



▲ Applying the HRA reinforcing fabric on to the RedLINE as per the hot rubber manufacturer requirements.

▼ The applied reinforcing fabric, note the RedLINE gland is not covered.







▲ Applying the second coat of hot rubberized asphalt over the reinforcing fabric.



▲ The protection board being installed over the joint shingle fashion.

▼ The completed installation.





## RedLINE® MOPPING/TORCHING INSTALLATION

### FOR USE WITH: MODIFIED BITUMEN MEMBRANES

#### INTRODUCTION

This installation technique is used predominantly in roofing and waterproofing systems. The process of installing the RedLINE expansion joint by torching requires experience and finesse as the RedLINE material cannot be subjected to any prolonged contact with open flame. In this type of installation technique, the top side surface of the RedLINE can be torched to. Prior to the application there is some preparatory work.

#### STEP 1: RedLINE PREPARATION

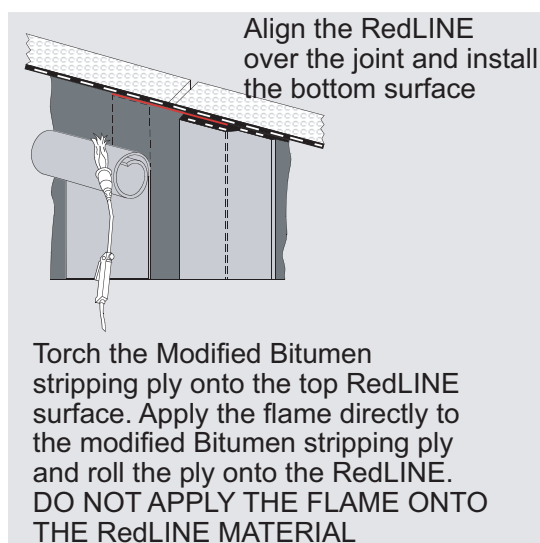
It is assumed that the RedLINE has already been mopped to the substrate. Coat the top surface of the RedLINE with asphalt/bitumen as if mopping the RedLINE and stripping it in. Coat the entire top surface of the RedLINE including the gland area.

#### STEP 2: FLASHING PREPARATION

Cut two strips of modified bitumen with the width of each strip being at least 10" [250 mm] wider than the fleece edge.

#### STEP 3: TORCHING

Unroll the modified bitumen strip with one side edge extending past the fleece onto the middle area of the RedLINE material. Heat the modified bitumen as it is unrolled with a flame or hot air torch. As the heated modified bitumen liquefies, it is rolled into contact with the RedLINE fleece material. Repeat for both edges of the RedLINE expansion joint material. Bond the modified bitumen material to the substrate extending 10" [250 mm] past the RedLINE expansion joint material.



*Torching flashing membrane onto asphalt coated RedLINE.*

#### **STEP 4: ADDITIONAL PROTECTION (OPTIONAL)**

If an additional protective layer is required, spot torch a strip of modified bitumen material to one side of the RedLINE joint covering the exposed part of the RedLINE material. This allows for free movement of the protection layer.

#### **TAKE NOTE...**

#### **POINTS TO NOTE WHEN TORCHING DOWN TO RedLINE MATERIAL**

1. Ensure that the top surface of the RedLINE material is completely coated with asphalt.
2. Do not apply open flame directly to the RedLINE material for a prolonged period (can have open flame applied intermediately).
3. Follow all manufacturer's recommendations as they pertain to asphalt/bitumen primers or torchable adhesives.

## A MODIFIED BITUMEN SHEET TORCHED TO A MOPPED IN PLACE RedLINE®



▲ The RedLINE is being rolled out.



▲ The RedLINE is being fitted in to the joint cavity, the underside of the RedLINE is being laid into hot asphalt.

The top side of the RedLINE is being coated with hot asphalt, in preparation for torching. ➤







▲ Modified bitumen cap sheet being prepared for torching.



▲ Modified bitumen cap sheet is torched down to the asphalt primed RedLINE fleece.

▼ The torched down modified bitumen cap sheet being installed.



## **RedLINE® ENCAPSULATION INSTALLATION**

### **FOR USE WITH: EPOXY RESIN ON CONCRETE AND METAL SURFACES**

## **INTRODUCTION**

Use this installation technique on concrete walls and slabs such as slab joints and parking garage expansion joints. The process of installing the RedLINE waterproof joint in epoxy resin is simple and does not require any specialized tools or training.

The RedLINE joint waterproofing material is shipped to the job site in a roll. The description of the technique given is valid for all “hard” substrates, although this method of installation is used mainly on concrete substrates. Particular attention must be paid to the application on concrete, as the quality of a concrete substrate can vary significantly. The installation procedure is described as follows:

### **STEP 1: SUBSTRATE EVALUATION**

Ascertain the condition and suitability of the concrete substrate. Ensure that the substrate is free of any contaminants.

#### **Acceptable Condition of Concrete:**

- Concrete aged minimum 4 - 6 weeks.
- Maximum allowable moisture content 3%.
- Surface to be free of dust, oil, grease and other debris.

#### **Acceptable Condition of Other Substrates:**

- Other surfaces such as metal must be free of dirt, rust, oils and grease.

### **STEP 2: LAYING OUT**

Snap a straight edge using a chalk line approximately 6” [150 mm] on each side of the building expansion joint.

### **STEP 3: SUBSTRATE PREPARATION**

This step is very critical, especially for concrete surfaces. The preparation of the concrete surface will determine the strength of the epoxy bond.

#### **Preparation of Concrete Substrates:**

- a) Remove any cement film by grinding, pointing or sandblasting loose and damaged concrete. Use a grinding machine with a brush attachment. Clean the concrete surface thoroughly, (as a guide, spend about 10 minutes cleaning per 3 feet [1 m] of concrete surface).
- b) Roughen smooth concrete surfaces using a grinding tool to ensure a proper bond.
- c) Repair large recesses and spalled concrete using grouting mortar mix, with a rough surface finish.



**Preparation of Other Substrates:**

- a) Remove rust by either sanding or filing. Remove grease using a commercial degreasing agent such as TSP.

**STEP 4: EPOXY RESIN PREPARATION**

Prepare the epoxy resin mixture in accordance to the epoxy manufacturer's instructions. Recommended amount of epoxy; 8.6 oz./ft. [800 g/m].

**STEP 5: APPLICATION**

Apply a generous layer of the epoxy resin to the prepared surface, with a notched trowel. Keep the layer a uniform 1/8" [4 mm] thick. Press the RedLINE firmly into the epoxy; do not coat the underside of the RedLINE material with epoxy. Use a spatula tool to press the RedLINE into the epoxy. The epoxy must wholly encapsulate a minimum of 1 3/4" [40 mm] of the RedLINE fleece edging and extend a minimum of 3/4" [20 mm] onto the substrate. No RedLINE fleece must be left exposed.

Apply a 1/16" [2 mm] coat of epoxy on the top side surface of the RedLINE, making sure to completely cover the visible RedLINE fleece. Once the epoxy top coat starts to gel, sprinkle quartz sand while wet or roughen the surface by sanding it with sand paper (medium grade), when dry to touch. Recommended amount of sand; 0.6 oz./ft. [60 g/m].

**STEP 6: TOOL CLEAN UP**

Clean epoxy tools using an epoxy cleaner (acetone).

**TAKE NOTE...**
**POINTS TO NOTE WHEN INSTALLING RedLINE IN EPOXY RESIN**

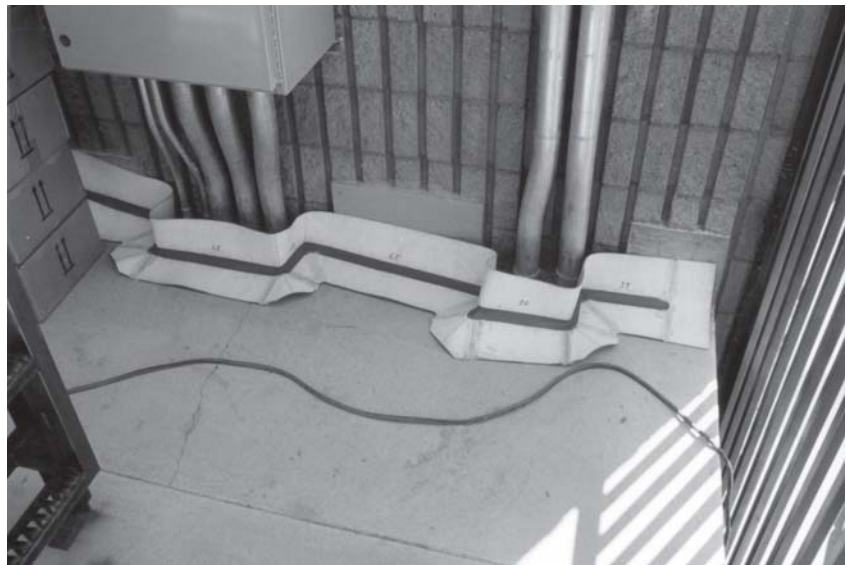
1. Ensure that the RedLINE material fleece is dry. If by chance it is exposed to moisture, dry it out prior to application either by hot air drying or laying it out in the sun.
2. Ensure that the RedLINE fleece is fully encapsulated within the epoxy matrix.
3. Always follow the epoxy manufacturer's recommendations.
4. Do not allow the epoxy on either surface to dry, always apply epoxy onto a wet epoxy layer.

## RedLINE® ENCAPSULATION INSTALLATION WITH EPOXY RESIN ON CONCRETE



◀ The RedLINE with epoxy resin is best suited for concrete substrates.

The RedLINE being checked for proper fit. ➤



◀ Mixing the epoxy material. The open pot time must always be observed.

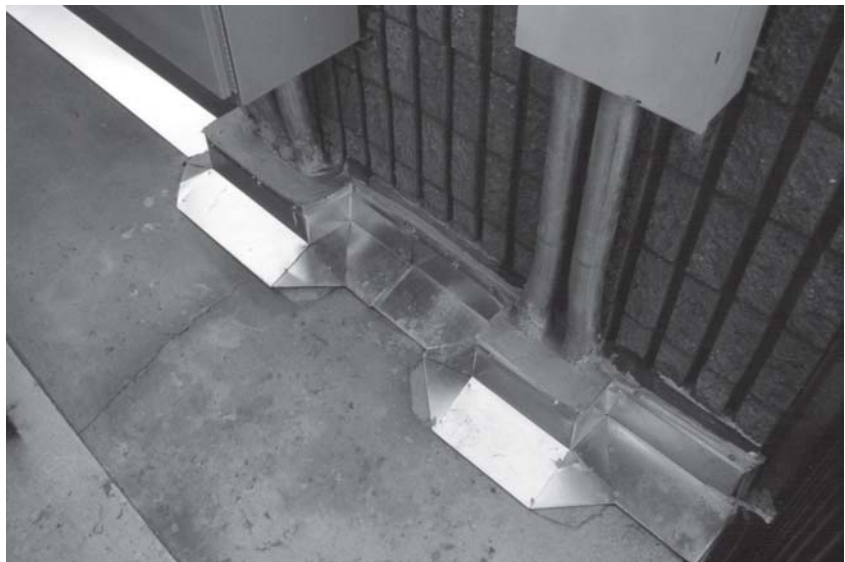


▲ The RedLINE adhered with epoxy to the substrate.



▲ The epoxy resin is applied on to the substrate with a bolt cartridge gun and the RedLINE is laid into the bed of epoxy.

The completed RedLINE installation with a protective metal flashing in place. ➤



## **RedLINE® ENCAPSULATION INSTALLATION**

### **FOR USE WITH: SPRAY POLYURETHANE FOAM APPLICATION**

#### **INTRODUCTION**

This installation technique is used predominantly in roofing. The process of installing the RedLINE is dependant upon the cure time of the polyurethane. Certain types of polyurethane cure longer, thus allowing for the embedment of RedLINE into the base coat of the polyurethane, others cure quicker. For quicker curing times the RedLINE must be embedded into the coating of the polyurethane roof. Regardless of the embedment medium, the procedure of RedLINE encapsulation is very similar. The applicator is advised to contact the manufacturer and SITURA prior to commencing the installation.

#### **STEP 1: SUBSTRATE PREPARATION**

Clean and dry the substrate and ensure it is free of any debris or dirt in accordance with the spray polyurethane manufacturer's recommendations. Pack the expansion joint gap with compressible batt insulation.

#### **STEP 2: ALIGNMENT**

Unroll the RedLINE material and position it over the expansion joint. The polyester fleece on the RedLINE material must be kept dry at all times. Position the RedLINE in such a manner as to verify the correctness of the fit of all its supplied components. The starting location is indicated on the drawings supplied with the RedLINE roll.

#### **STEP 3: ADHESION & ENCAPSULATION**

Typically the RedLINE is encapsulated in the coating layer of the polyurethane foam. The coating layer is applied once the base coat of the urethane has set. Coat the base layer of the polyurethane foam with the manufacturer's recommended coating and lay in the RedLINE material. Immediately coat the top surface of the RedLINE, thus encapsulating the RedLINE in the coating layer of the Spray Polyurethane Foam roof assembly.

#### **TAKE NOTE...**

#### **POINTS TO NOTE WHEN INSTALLING RedLINE IN SPRAY POLYURETHANE FOAM**

1. Ensure that the RedLINE material fleece is dry. If by chance it is exposed to moisture, dry it out prior to application either by hot air drying or laying it out in the sun.
2. Ensure that the RedLINE fleece is fully encapsulated within the polyurethane matrix.
3. Always follow the spray polyurethane membrane manufacturer's recommendations.



## RedLINE® ENCAPSULATION INSTALLATION WITH SPRAY POLYURETHANE FOAM ON CONCRETE



▲ An expansion joint gap at a foundation wall.



▲ The RedLINE joint is laid into a bed of freshly sprayed polyurethane.

The RedLINE is secured to the concrete substrate with termination bars. This securement is necessary for heights over 4 ft. [1.2 m].







▲ The RedLINE is secured to the concrete substrate with termination bars all the throughout its height.



▲ The RedLINE being covered with the polyurethane.

▼ The completed RedLINE installation in a sprayed polyurethane material.



## RedLINE® ENCAPSULATION INSTALLATION

### FOR USE WITH: LIQUID APPLIED MEMBRANES

#### INTRODUCTION

The process of installing the RedLINE in a liquid applied membrane is similar to the embedment in asphalt. The liquid membrane is applied to the prepared substrate. The curing time of the liquid membrane is dependant upon the weather conditions. The applicator is advised to contact the liquid membrane manufacturer and SITURA prior to commencing the installation. In general the installation procedure is described as follows:

#### STEP 1: SUBSTRATE PREPARATION

Clean and dry the substrate and ensure it is free of any debris or dirt in accordance with the liquid membrane manufacturer's recommendations. Pack the expansion joint gap with compressible batt insulation.

#### STEP 2: ALIGNMENT

Unroll the RedLINE material and position it over the expansion joint. The polyester fleece on the RedLINE material must be kept dry at all times. Position the RedLINE in such a manner as to verify the correctness of the fit of all its supplied components. The starting location is indicated on the drawings supplied with the RedLINE roll.

#### STEP 3: ADHESION & ENCAPSULATION

The application of RedLINE in a liquid applied membrane is dependant upon weather conditions. The manufacturer's application guidelines must be followed. Typically the RedLINE is encapsulated in the liquid applied membrane. A coat of the membrane is applied to the substrate, and the RedLINE is laid into the liquid membrane while wet. The manufacturers' recommendation with regards to the flash off time must be observed, before the RedLINE is laid in. Following the substrate embedment, the top fleece surface of the RedLINE material is coated with the liquid membrane and allowed to cure as per the membrane manufacturers requirements.

#### STEP 4: PROTECTION LAYER (OPTIONAL)

If an additional protection layer is required, adhere with the liquid membrane a compatible strip of protection board to one side of the joint, covering the exposed part of the RedLINE material. This allows for the free movement of the protection layer.

#### TAKE NOTE...

#### POINTS TO NOTE WHEN INSTALLING RedLINE IN A LIQUID MEMBRANE

1. Ensure that the RedLINE material fleece is dry. If by chance it is exposed to moisture, dry it out prior to application either by hot air drying or laying it out in the sun.
2. Ensure that the RedLINE fleece is fully encapsulated within the liquid membrane matrix.
3. Apply sufficient quantities of liquid taking into account the absorption of the RedLINE fleece.

## RedLINE® ENCAPSULATION INSTALLATION IN A LIQUID APPLIED MEMBRANE



▲ The expansion joint cavity exposed at a detail, prior to membrane application.



▲ The RedLINE is unrolled to check for fit.

▼ RedLINE laid out at a detail on site prior to encapsulation.







▲ Rolling in the liquid membrane on to the RedLINE.



▲ The RedLINE being encapsulated on the top surface in a liquid membrane.

▼ The completed RedLINE expansion joint encapsulated in liquid membrane.



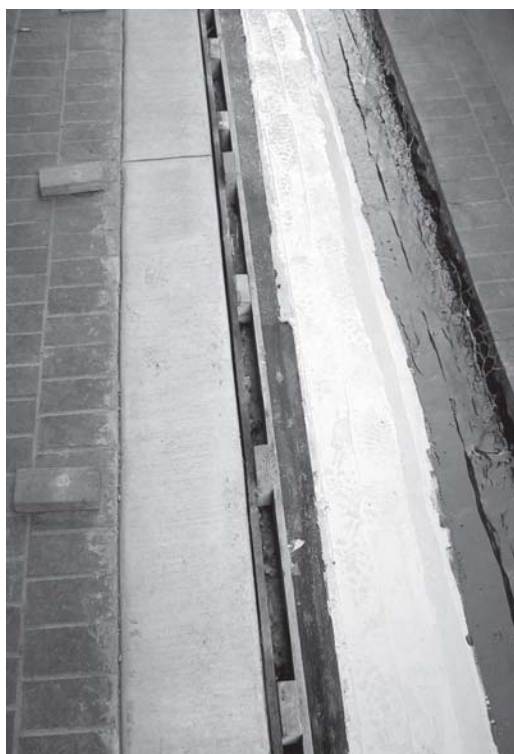


▲ A close up of the RedLINE expansion joint encapsulated in liquid membrane.



▲ A drain detail next to the RedLINE, note the liquid membrane continuity.

▼ Finishing surface being constructed over the RedLINE joint.





## **RedLINE® ENCAPSULATION INSTALLATION**

### **FOR USE WITH: COLD APPLIED ADHESIVES**

#### **INTRODUCTION**

The process of installing the RedLINE in cold adhesive is similar to the embedment in asphalt. The cold adhesive is applied to the prepared substrate. The curing time of the cold adhesive is dependant upon the weather conditions. The applicator is advised to contact the cold adhesive manufacturer and SITURA prior to commencing the installation. In general the installation procedure is described as follows:

#### **STEP 1: SUBSTRATE PREPARATION**

Clean and dry the substrate and ensure it is free of any debris or dirt in accordance with the cold adhesive manufacturer's recommendations. Pack the expansion joint gap with compressible batt insulation.

#### **STEP 2: ALIGNMENT**

Unroll the RedLINE material and position it over the expansion joint. The polyester fleece on the RedLINE material must be kept dry at all times. Position the RedLINE in such a manner as to verify the correctness of the fit of all its supplied components. The starting location is indicated on the drawings supplied with the RedLINE roll.

#### **STEP 3: ADHESION & ENCAPSULATION**

The application of RedLINE in a cold adhesive is dependant upon weather conditions. The manufacturer's application guidelines must be followed. Typically the RedLINE is encapsulated in the cold adhesive. A coat of the adhesive is applied directly to the substrate, and the RedLINE is laid into the adhesive. The manufacturers' recommendation with regards to the flash off time must be observed, before the RedLINE is laid in.

Following this application, it is always recommended that the RedLINE be secured to the substrate with flat headed nails spaced at 8" [200 mm] on center staggered. This mechanical fixation is a temporary measure to allow for the curing of the cold adhesive and retain the RedLINE in place should any expansion or contraction movement take place during the curing adhesive process. Following the mechanical securement, the top fleece surface of the RedLINE material is coated with the cold adhesive and the roofing/waterproofing membrane is laid into the adhesives.

Always follow the manufacturer's application guidelines regarding the application of membrane in a cold adhesive.

#### **STEP 4: PROTECTION LAYER (OPTIONAL)**

If an additional protection layer is required, adhere with the cold adhesive a compatible strip of modified bitumen membrane to one side of the joint, covering the exposed part of the RedLINE material. This allows for the free movement of the protection layer.

**TAKE NOTE...**

**POINTS TO NOTE WHEN INSTALLING RedLINE IN  
A COLD APPLIED ADHESIVE**

1. Ensure that the RedLINE material fleece is dry. If by chance it is exposed to moisture, dry it out prior to application either by hot air drying or laying it out in the sun.
2. Ensure that the RedLINE fleece is fully saturated with the cold adhesive. Adjust quantities to allow for saturation and flash off.
3. If necessary secure the RedLINE with flat headed nails to allow the cold adhesive to flash off and reach its full strength.
4. Always follow the cold adhesive manufacturer's recommendations.

## RedLINE® ENCAPSULATION INSTALLATION WITH COLD APPLIED ADHESIVE



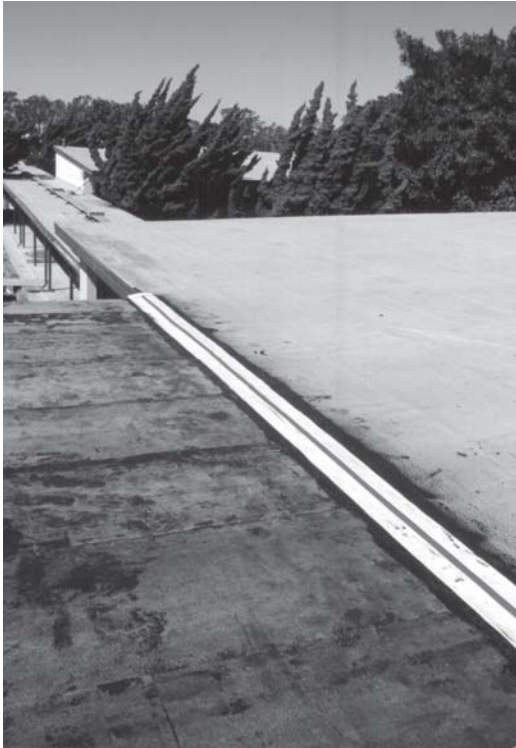
- ▲ The expansion joint is identified on site and the RedLINE is checked for proper fit.



- ▲ Prior to the application of the RedLINE the surface needs to be primed.

A bed of cold adhesive is applied onto the primed surface for the RedLINE to be laid into. ➤





▲ The RedLINE is embedded in the cold adhesive bed.

▼ The RedLINE is secured in place using flat headed nail. This necessary for temporary fixation.



▲ Pressure is applied over the RedLINE so the fleece is fully coated with the adhesive.

▼ The top side of the RedLINE is coated with the cold adhesive to provide waterproofing continuity.



## FlamLINE® TORCHING INSTALLATION

### FOR USE WITH: TORCHED MODIFIED BITUMEN

#### INTRODUCTION

This installation technique is used predominantly in torched roofing and waterproofing systems that are modified bitumen based. The process of installing the FlamLINE waterproofing joint system is simple, note that the FlamLINE material contains no asphalt. The complete expansion joint material is shipped in a roll with all detailing prefabricated. Installation takes place as roofing/waterproofing progresses. The installation procedure is described as follows:

#### STEP 1: SUBSTRATE PREPARATION

Identify the start installation location from the plan accompanying the roll of FlamLINE waterproof expansion joint material. Roll out the FlamLINE and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed.

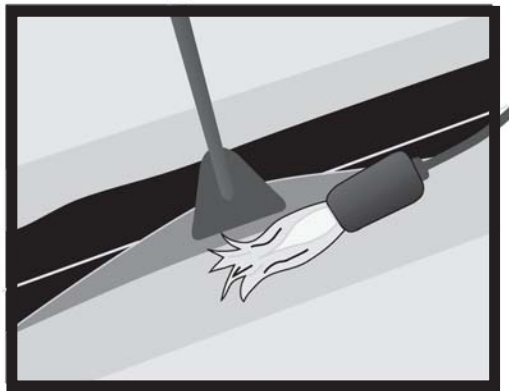
#### STEP 2: ALIGNMENT

Align the center line of the expansion joint gap or gap with the centre line of the FlamLINE waterproof expansion joint material, and verify the FlamLINE conformance to site details prior to the torching application.

#### STEP 3: TORCHING

There two methods of torching the FlamLINE:

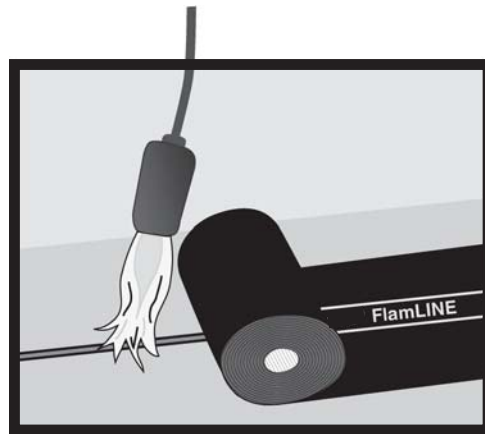
**Method A.** Apply heat to the waterproofing ply and embed the FlamLINE into it, using the “torch and flop” technique. Press the FlamLINE into the hot waterproofing with a blunt putty knife.



*Fig. 1: Torching Method “A”.*



**Method B.** Apply heat to the waterproofing ply and unroll the FlamLINE into it. Press the FlamLINE into the hot waterproofing with a blunt putty knife.



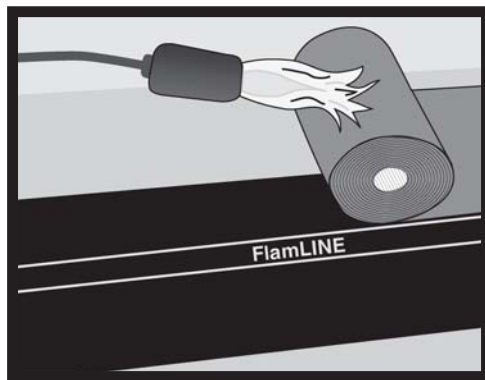
*Fig . 2: Torching Method “B”.*

#### **STEP 4: FLASHING PREPARATION**

Cut two strips of modified bitumen with the width of each strip being at least 10” [250 mm] wider than the fleece edge.

#### **STEP 5: FLASHING**

Flash in the FlamLINE with a compatible torch down flashing ply, completely encapsulating the FlamLINE selvage edge. After installation, if required, provide mechanical protection for the FlamLINE waterproof expansion joint.



*Fig. 3: Flashing in the FlamLINE.*

## **STEP 6: ADDITIONAL PROTECTION (OPTIONAL)**

If an additional protective layer is required, spot torch a strip of modified bitumen material to one side of the FlamLINE joint covering the exposed part of the FlamLINE material. This allows for free movement of the protection layer.

### **TAKE NOTE...**

#### **POINTS TO NOTE WHEN TORCHING DOWN FlamLINE MATERIAL**

1. Ensure that the bottom surface of the FlamLINE material is completely bonded to the base ply, with bleed out evident at the material edge.
2. Ensure that the top surface of the FlamLINE material is completely bonded to the flashing (cap) ply, with bleed out evident at the material selvage edge.
3. Do not apply open flame directly to the FlamLINE gland material for a prolonged period.
4. Follow all manufacturer's recommendations as they pertain to the installation of torched modified bitumen membranes.

## FlamLINE® INSTALLATION WITH TORCHED MODIFIED BITUMEN MEMBRANES



▲ The joint cavity is open and batt insulation is placed in it.



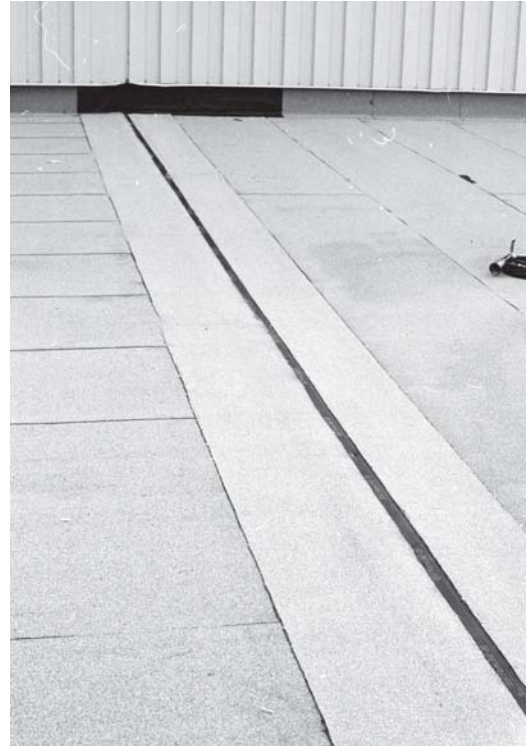
▲ The FlamLINE roll centered over the joint.

The FlamLINE roll being torched to the modified bitumen cap sheet the method shown is "Method B" as described in the installation guide.





▲ The modified bitumen cap sheet being torched to the FlamLINE.



▲ The completed FlamLINE expansion joint installation.

The FlamLINE gland is left exposed, note the bleed out along the stripping ply edges. ➤



## **FlamLINE® ADHERED INSTALLATION**

### **FOR USE WITH: SELF ADHERED MEMBRANES**

#### **INTRODUCTION**

This installation technique is used predominantly in roofing and waterproofing systems that use a self adhered membrane. The process of installing the FlamLINE waterproofing joint system is simple, note that the FlamLINE material contains no asphalt. The complete expansion joint material is shipped in a roll with all detailing prefabricated. Installation takes place as roofing/waterproofing progresses. The installation procedure is described as follows:

#### **STEP 1: SUBSTRATE PREPARATION**

Identify the start installation location from the plan accompanying the roll of FlamLINE waterproof expansion joint material. Roll out the FlamLINE and allow it to relax, until flat, prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed.

#### **STEP 2: ALIGNMENT**

Align the center line of the expansion joint gap or gap with the centre line of the FlamLINE waterproof expansion joint material, and verify the FlamLINE conformance to site details prior to the torching application.

#### **STEP 3: FlamLINE PREPARATION**

FlamLINE material does not contain any asphalt, it therefore has to be set in a bed of asphalt based adhesive, prior to the application of the self adhered membrane. A coat of cold adhesive such as polybitumen can be used, consult roofing/waterproofing membrane manufacturer for a compatible product. Note the substrate may be need to be primed.

#### **STEP 4: PRIMING**

Apply a compatible primer recommended by the self adhered membrane manufacturer, to the FlamLINE top surface. Allow the primer to flash off.

#### **STEP 5: APPLICATION**

Align the center line of the expansion joint gap with the centre line of the FlamLINE waterproof expansion joint material and set the FlamLINE in the pre applied bed of adhesive. The FlamLINE maybe additionally secured to the substrate with a flat termination bar (stainless 16 ga. min) fastened at 8" [200 mm] on center staggered. The requirement for additional securement would depend on site conditions and design performance requirements. Apply the self adhered membrane to the primed FlamLINE surface, covering the termination bars if installed. Use a roller to apply uniform pressure to the self adhered membrane to achieve a good bond.



**TAKE NOTE...**

**POINTS TO NOTE WHEN ADHERING TO FlamLINE MATERIAL**

1. The FlamLINE must be adhered to the substrate with an adhesive or a self adhered membrane.
2. Ensure that the top surface of the FlamLINE material is completely bonded to the stripped in self adhered membrane.
3. On vertical heights over 4 feet [1.20 m] use metal bars to secure the FlamLINE prior to stripping in.
4. Follow all manufacturer's recommendations as they pertain to the installation of self adhered membranes.

## FlamLINE® ENCAPSULATION INSTALLATION WITH SELF ADHERED MEMBRANES



▲ A base ply installation.

▼ The FlamLINE is being stripped in with a ply of the self adhered membrane.



▲ The FlamLINE roll being unrolled and positioned over the joint cavity.

▼ Partially completed installation ready for stripping on the opposite selvage edge.



## **AquaLINE® INSTALLATION IN POTABLE WATER**

### **FOR USE WITH: APPROVED POTABLE WATER EPOXY RESINS**

## **INTRODUCTION**

Use this installation technique on concrete walls and slabs for structures that contain potable water. All material used in this installation must be certified for use with potable water. The description of the method of installation is for concrete substrates. Particular attention must be paid to the application on concrete, as the quality of a concrete substrate can vary significantly. The installation procedure is described as follows:

### **STEP 1: SURFACE PREPARATION**

All surfaces must be dry and clean of debris, prior to application. The typical application is on a concrete surface. If the application is on new concrete, the following criteria define an acceptable condition of the concrete surface, concrete age 4 - 6 weeks, maximum allowable moisture content 3% and the concrete must be free of all scaling and bleed. Existing concrete surfaces must be free of all oils and debris. An acceptable surface is one that has been sand blasted. If the existing concrete surface has been wet and saturated with water, an epoxy primer must be used to ensure a good adhesion bond. Refer to the epoxy resin manufacturer printed literature.

### **STEP 2: APPLICATION**

Identify the start installation location from the plan accompanying the roll of AquaLINE waterproof expansion joint material. Roll out the AquaLINE and allow it to relax prior to application. Make sure that the building expansion joint is clean and free of debris and has been packed with compressible batt insulation or a backer rod installed. Align the center line of the expansion joint gap or gap with the centre line of the AquaLINE waterproof expansion joint material, and verify the AquaLINE conformance to site details prior to the epoxy application.

### **STEP 3: INSTALLATION WITH AN AquaLINE COMPATIBLE EPOXY RESIN**

AquaLINE is installed on a concrete substrate using an epoxy resin. The epoxy resin must meet all local health and contamination requirements. The epoxy resin must meet current FDA and NSF approvals for potable water, consult the labeling on the epoxy resin for the latest approval information and material preparation guidelines.

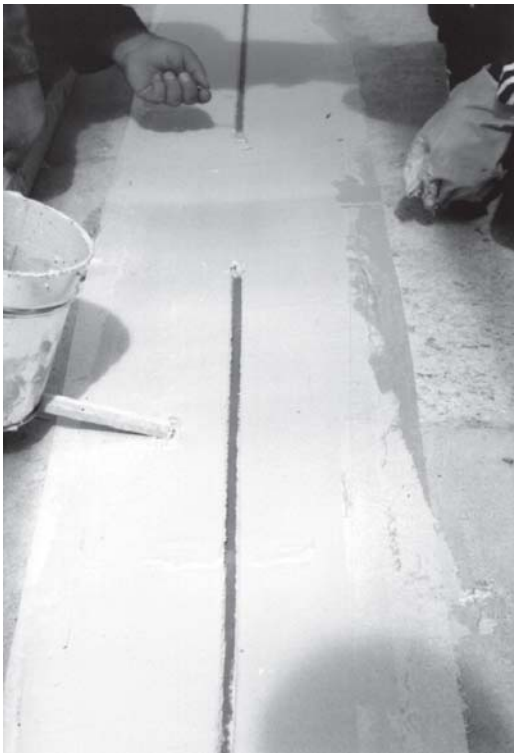
The AquaLINE material is laid down in a prepared 1/8" [4 mm] thick bed of epoxy. The underside surface of the AquaLINE is **NOT** coated. The AquaLINE is pressed firmly into the epoxy, to wholly come in contact with the epoxy bed. A smooth tool is recommended to press the AquaLINE into the epoxy resin bed. Once the underside surface of the AquaLINE has been laid into the epoxy resin bed, the top side surface is coated. A uniform layer 1/16" [2 mm] thick is applied to the top side surface of the AquaLINE, using a feathering tool such as a notched trowel. All the exposed AquaLINE material must be covered. The epoxy must encapsulate wholly a minimum of 1 3/4" [40 mm] of the AquaLINE edging and extend a minimum of 3/4" [20 mm] onto the substrate. A typical quantity of epoxy resin used for a normal AquaLINE application is 8.6 oz./ft. [800g/m]. Once installed the epoxy resin must be cured for at least 72 hours before submerging underwater. A flood test is also recommended prior to final use.

**TAKE NOTE...**

**POINTS TO NOTE WHEN INSTALLING AquaLINE IN EPOXY RESIN**

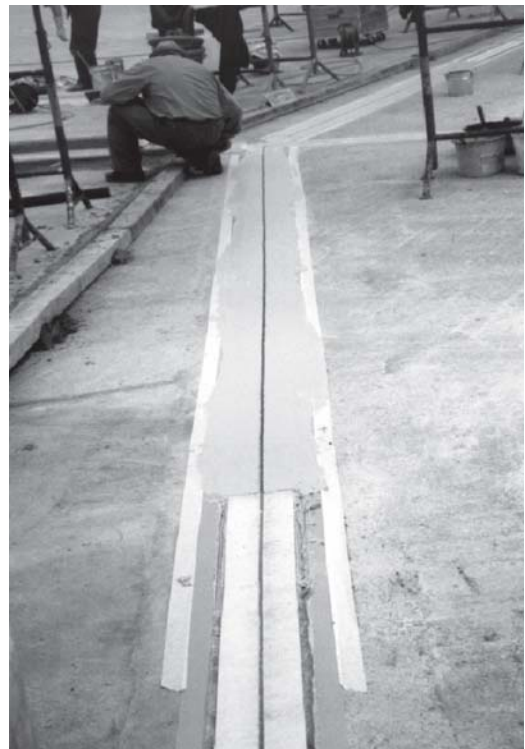
1. Ensure that the AquaLINE is fully encapsulated within the epoxy matrix.
2. Always follow the epoxy manufacturer's recommendations.
3. Do not allow the epoxy on either surface to dry, always apply epoxy onto a wet epoxy layer.

**AquaLINE® ENCAPSULATION INSTALLATION  
FOR A POTABLE WATER TANK**



◀ *The joint is primed and a coat of compatible epoxy is applied.*

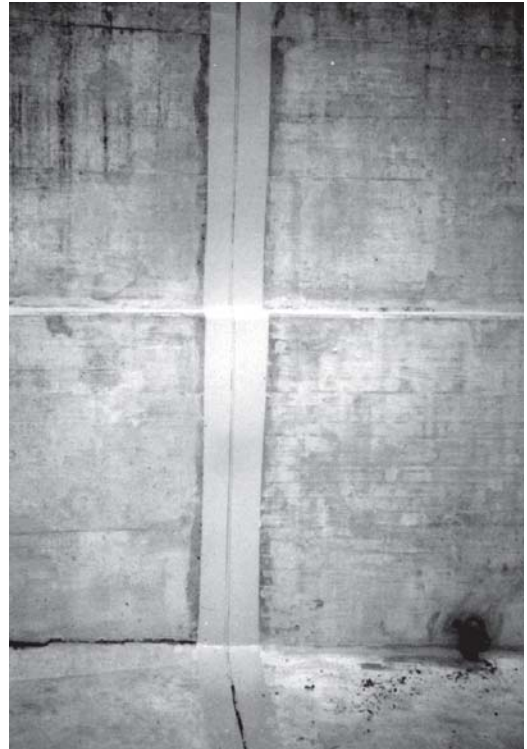
*The AquaLINE is laid into the bed of epoxy, the top surface is covered with epoxy.*







◀ The AquaLINE roll is vulcanized on site to produce a seamless monolithic joint.



▶ A picture of the AquaLINE installation on a vertical wall with a seamless transition from vertical to horizontal.



◀ The completed AquaLINE expansion joint.



## **TECHNICAL SERVICE AND SUPPORT**

The SITURA expansion joint product line offers a comprehensive solution to joint waterproofing problems. Please call SITURA INC., toll free at **1-888-4-SITURA** (1-888-474-8872) for assistance in specifying, detailing and installing a waterproof expansion joint.

# Chapter 6.

## SITURA Expansion Joints References, Updates & Samples



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	RedLINE®	
	FlamLINE®	
	AquaLINE®	

*The information and specifications presented herein, represent the applicable information available at the time of publication. All information and statements herein are expressions of opinion, which by performance and testing are believed to be accurate and reliable.*

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# Chapter 6.

## SITURA Reference Projects, Updates & Samples

### PROJECT REFERENCE LIST

The SITURA waterproof expansion joint system has been installed all over the world in various climates and different roofing/waterproofing systems. Designers, specifiers, contractors and building owners have specified and installed SITURA Expansion Joints with confidence time and time again. The following project list is a cross section of some of our more technically challenging projects and installations. This list is by no means complete, it continues to grow and expand as our company grows. SITURA products are compatible with all types of roofing and waterproofing membranes as well as being recognized by major roofing and waterproofing membrane manufacturers. If you would like a detailed listing of projects in your immediate area please contact SITURA INC., toll free at 1-888-4-SITURA (1-888-474-8872) or visit the SITURA web site at [www.situra.com](http://www.situra.com).

### PROJECT LIST

The list of completed projects is arranged alphabetically by state or province and each installation is arranged by date of installation. Listed is also the roof membrane type, building use, expansion joint type grade and approximate footage.

#### USA

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
<b>AL</b>	Warehouse	Attalla	BUR	2000	219 [68]	RedLINE 240
AL	Mall	Decatur	BUR	2004	490 [149]	RedLINE 20
AL	Warehouse	Decatur	BUR	2004	490 [149]	RedLINE 20
AL	Mall	Oxmoor	HRA	2005	611 [186]	RedLINE 100
AL	Warehouse	Theodore	BUR	2005	170 [52]	RedLINE 240
AL	Warehouse	Mobile	BUR	2006	283 [86]	RedLINE 240
AL	Warehouse	Mobile	BUR	2006	202 [62]	RedLINE 240
AL	School	Birmingham	BUR	2007	56 [17]	RedLINE 20
AL	Office	Montgomery	BUR	2007	56 [17]	RedLINE 20
AL	Court	Montgomery	HRA/VER	2010	872 [266]	RedLINE 40
AL	Warehouse	Attalla	BUR	2012	15 [5]	RedLINE 240
AL	Warehouse	Attalla	BUR	2013	200 [61]	RedLINE 240
AL	Office	Montgomery	BUR	2013	145 [44]	RedLINE 20
<b>AR</b>	Warehouse	Jonesboro	BUR	2002	1267 [386]	RedLINE 240
AR	Museum	Bentonville	ER	2011	80 [24]	FlamLINE 40
AR	Museum	Bentonville	ER	2011	470 [143]	FlamLINE 20
<b>AZ</b>	Office	Phoenix	BUR	2001	200 [61]	RedLINE 40
AZ	Waterworks	Phoenix	BUR	2001	20 [6]	FlamLINE 20
AZ	Condominium	Phoenix	BUR	2004	200 [61]	RedLINE 20
AZ	Office	Phoenix	APP	2008	233 [71]	RedLINE 40
AZ	Office	Phoenix	BUR	2009	245 [75]	RedLINE 20

*APP=APP Modified Bitumen(MBM); BUR=Built-Up-Roofing; ER=Epoxy Resin; HRA=Hot Rubberized Asphalt; PMR=Protected Membrane Roof Installation; SBS=SBS Modified Bitumen(MBM); LAM=Liquid Applied Membrane; SAM=Self Adhered Membrane; CAA=Cold Applied Adhesive; CTP=Coal Tar Pitch; SPF=Spray Polyurethane Foam*

## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
AZ	Hotel	Phoenix	HRA	2011	114 [35]	RedLINE 40
AZ	Office	Tempe	CAA	2011	90 [27]	RedLINE 20
CA	Warehouse	Mira Loma	BUR	1998	640 [195]	RedLINE 240
CA	Factory	Lodi	BUR	1999	225 [69]	RedLINE 20
CA	Cathedral	San Francisco	ER	2000	86 [27]	RedLINE 240
CA	School	Hemet	CAA	2001	404 [123]	RedLINE 20
CA	Warehouse	Mira Loma	BUR	2001	790 [241]	RedLINE 240
CA	Cathedral	San Francisco	ER	2001	82 [25]	RedLINE 240
CA	School	Torrance	CAA	2001	100 [30]	RedLINE 20
CA	Warehouse	Mira Loma	BUR	2002	790 [241]	RedLINE 240
CA	Office	Oakland	LAM	2002	900 [274]	RedLINE 40
CA	Seaport	San Francisco	SPF	2002	90 [27]	RedLINE 40
CA	Court	Glendale	HRA	2003	214 [65]	RedLINE 40
CA	Bridge	San Francisco	SBS	2003	60 [18]	RedLINE 20
CA	Office	San Francisco	ER	2003	80 [24]	RedLINE 240
CA	Factory	Lodi	BUR	2004	263 [80]	RedLINE 20
CA	Warehouse	Manteca	BUR	2004	1300 [396]	RedLINE 240
CA	Warehouse	Manteca	BUR	2004	1300 [396]	RedLINE 240
CA	Condominium	Palo Alto	SAM	2004	240 [73]	FlamLINE 240
CA	Hotel	Palo Alto	SAM	2004	240 [73]	FlamLINE 240
CA	Condominium	City of Industry	HRA	2005	400 [122]	RedLINE 20
CA	Condominium	San Jose	HRA	2005	878 [268]	RedLINE 100
CA	Condominium	Los Angeles	HRA	2006	208 [63]	RedLINE 100
CA	Hospital	Gardena	HRA	2007	185 [56]	RedLINE 40
CA	Hospital	Gardena	HRA	2007	360 [110]	RedLINE 240
CA	Warehouse	Manteca	BUR	2007	482 [147]	RedLINE 240
CA	Warehouse	Manteca	BUR	2007	482 [147]	RedLINE 240
CA	Warehouse	Manteca	BUR	2007	482 [147]	RedLINE 240
CA	Museum	San Francisco	HRA	2007	228 [69]	RedLINE 20
CA	Museum	San Francisco	BUR	2007	230 [70]	RedLINE 240
CA	Warehouse	Manteca	BUR	2008	722 [220]	RedLINE 240
CA	Apartment	San Francisco	ER	2008	559 [170]	RedLINE 240
CA	Condominium	San Francisco	ER	2008	342 [104]	RedLINE 20
CA	University	Palo Alto	ER	2009	501 [153]	RedLINE 240
CA	Hospital	Temecula	LAM	2009	380 [116]	RedLINE 20
CA	Office	Anaheim	ER	2010	782 [238]	RedLINE 240
CA	Hospital	Los Angeles	ER	2010	45 [14]	RedLINE 100
CA	University	Santa Clara	HRA	2010	295 [90]	RedLINE 40G
CA	Office	Glendale	SAM	2011	1203 [366]	FlamLINE 20
CA	Pool	Los Angeles	ER	2011	180 [55]	RedLINE 100
CA	Plaza	Menlo	HRA	2011	130 [40]	RedLINE 20
CA	Hospital	San Leandro	SAM	2011	113 [34]	FlamLINE 240
CA	Condominium	Walnut	LAM	2011	400 [122]	RedLINE 40
CA	Condominium	Los Angeles	ER	2012	190 [58]	RedLINE 100
CA	Apartment	Novato	ER	2012	147 [45]	RedLINE 100
CA	Office	Palo Alto	ER	2012	165 [50]	RedLINE 40
CA	University	Palo Alto	ER	2012	181 [55]	RedLINE 100
CA	Apartment	Redwood City	ER	2012	326 [99]	RedLINE 100
CA	Condominium	San Jose	HRA	2012	390 [119]	RedLINE 240
CA	Hospital	Oakland	SAM	2013	250 [76]	FlamLINE 100
CA	Apartment	San Jose	HRA	2013	665 [203]	RedLINE 100
CO	Apartment	Denver	HRA	2001	33 [10]	RedLINE 20
CO	Condominium	Denver	HRA	2007	205 [62]	RedLINE 100
CO	Condominium	Denver	HRA	2007	205 [63]	RedLINE 100
CO	Office	Telluride	BUR	2007	46 [14]	RedLINE 40
CO	Residence	Telluride	SAM	2007	46 [14]	RedLINE 20
CO	Condominium	Denver	BUR	2010	115 [35]	RedLINE 40
CO	Plaza	Denver	HRA	2010	60 [18]	RedLINE 100

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
CO	School	Golden	ER	2010	33 [10]	RedLINE 40G
CO	Hotel	Steamboat	HRA	2010	50 [15]	RedLINE 40
CO	Office	Colorado Springs	HRA	2011	284 [87]	RedLINE 100
CO	Office	Denver	ER	2012	26 [8]	RedLINE 100
CO	Station	Denver	ER	2012	235 [72]	RedLINE 40
<b>CT</b>	Office	Derby	SBS	2007	150 [46]	FlamLINE 40
CT	Office	New Haven	HRA	2007	273 [83]	RedLINE 40
CT	Plaza	New Haven	HRA	2007	265 [81]	RedLINE 40
CT	School	Greenwich	HRA	2008	150 [46]	RedLINE 40
CT	Hotel	Hanover	BUR	2008	20 [6]	RedLINE 40
CT	Bank	Stamford	HRA	2008	420 [128]	RedLINE 240
CT	College	North Haven	HRA	2009	120 [37]	RedLINE 40
CT	Bank	Stamford	HRA	2009	138 [42]	RedLINE 240
CT	Library	Storr	HRA	2010	201 [61]	RedLINE 20
CT	Hospital	Stamford	SAM	2013	40 [12]	FlamLINE 40
CT	Tunnel	Stamford	ER	2013	40 [12]	FlamLINE 40
<b>DC</b>	Condominium	Washington	HRA	2000	203 [62]	RedLINE 20
DC	Condominium	Washington	HRA	2001	500 [152]	RedLINE 40
DC	Condominium	Washington	HRA	2001	172 [52]	RedLINE 40
DC	Office	Washington	HRA	2001	284 [87]	RedLINE 40
DC	Convention Center	Washington	HRA	2002	3840 [1171]	RedLINE 240
DC	University	Mt. Vernon	HRA	2003	681 [208]	RedLINE 40
DC	Condominium	Washington	HRA	2003	95 [29]	RedLINE 20
DC	Court	Washington	SAM	2003	10 [3]	RedLINE 40
DC	Hotel	Washington	HRA	2003	649 [198]	RedLINE 20
DC	Hotel	Washington	HRA	2003	425 [130]	RedLINE 40
DC	Office	Washington	BUR	2003	400 [122]	RedLINE 40
DC	Office	Washington	ER	2003	130 [40]	FlamLINE 20
DC	Tunnel	Washington	SAM	2003	130 [40]	FlamLINE 20
DC	University	Washington	HRA	2003	860 [262]	RedLINE 40
DC	Condominium	Washington	HRA	2004	300 [100]	RedLINE 20
DC	Condominium	Washington	HRA	2004	300 [100]	RedLINE 40
DC	Hotel;	Washington	HRA	2004	200 [61]	RedLINE 40
DC	Office	Washington	HRA	2004	900 [275]	RedLINE 40
DC	Office	Washington	HRA	2004	900 [275]	RedLINE 20 G
DC	Office	Washington	HRA	2004	200 [61]	RedLINE 40
DC	Office	Washington	HRA	2004	380 [116]	RedLINE 40 G
DC	Office	Washington	SBS	2004	950 [290]	RedLINE 20
DC	Office	Washington	HRA	2004	500 [152]	RedLINE 40
DC	Condominium	Washington	ER	2005	966 [294]	RedLINE 40
DC	Office	Washington	HRA	2005	300 [91]	RedLINE 20
DC	Office	Washington	HRA	2005	204 [62]	RedLINE 40
DC	Condominium	Washington	HRA	2006	118 [36]	RedLINE 40
DC	Office	Washington	HRA	2006	231 [70]	RedLINE 40
DC	School	Washington	HRA	2006	204 [62]	RedLINE 40
DC	Condominium	Washington	HRA	2007	440 [134]	RedLINE 40
DC	Condominium	Washington	HRA	2007	80 [24]	RedLINE 100
DC	Museum	Washington	ER	2007	907 [277]	RedLINE 240
DC	Office	Washington	ER	2007	1146 [349]	RedLINE 240
DC	Office	Washington	ER	2007	128 [39]	RedLINE 240
DC	Subway Station	Washington	ER	2008	122 [37]	RedLINE 100
DC	Hotel	Washington	HRA	2009	166 [51]	RedLINE 40
DC	Plaza	Washington	HRA	2009	240 [73]	RedLINE 40
DC	Office	Washington	CAA	2012	176 [54]	RedLINE 100
DC	Office	Washington	HRA	2013	46 [14]	RedLINE 40

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
FL	Condominium	Palm Beach	HRA	1999	360 [110]	RedLINE 20
FL	Condominium	St. Petersburg	SBS	2000	151 [46]	RedLINE 20
FL	Hotel	Estero	SAM	2001	103 [31]	FlamLINE 40
FL	Plaza	Tampa	BUR	2001	40 [12]	RedLINE 20
FL	School	Hernando	BUR	2002	100 [30]	RedLINE 20
FL	Condominium	Sarasota	BUR	2002	118 [36]	RedLINE 20
FL	Club	Boca Raton	HRA	2003	135 [41]	RedLINE 20
FL	Office	Miami	BUR	2003	175 [53]	RedLINE 20
FL	Apartment	Pompano Beach	HRA	2003	132 [40]	RedLINE 20
FL	Condominium	Pompano Beach	HRA	2003	132 [40]	RedLINE 20
FL	Mall	Tampa	BUR	2003	114 [35]	RedLINE 20
FL	Office	W. Palm Beach	BUR	2003	85 [26]	RedLINE 20
FL	Office	Winterhaven	BUR	2003	102 [31]	RedLINE 40
FL	Condominium	Ft. Lauderdale	HRA	2004	90 [27]	RedLINE 20
FL	Condominium	Ft. Lauderdale	HRA	2004	275 [84]	RedLINE 20
FL	Condominium	Hollywood	HRA	2004	134 [41]	RedLINE 20
FL	Mall	Inverness	SBS	2004	190 [58]	FlamLINE 20
FL	Condominium	Adventura	HRA	2005	395 [120]	RedLINE 20
FL	Condominium	Miami	HRA	2005	591 [180]	RedLINE 20
FL	School	Orlando	HRA	2005	260 [79]	FlamLINE 40
FL	Condominium	Miami	HRA	2006	458 [140]	RedLINE 20
FL	Mall	Pensacola	SBS	2006	400 [122]	FlamLINE 40
FL	Condominium	W. Palm Beach	HRA	2006	400 [122]	RedLINE 20
FL	Office	W. Palm Beach	BUR	2006	280 [85]	RedLINE 40
FL	School	Cypress Band	BUR	2007	150 [46]	RedLINE 40
FL	School	Ft. Lauderdale	BUR	2007	120 [37]	RedLINE 40
FL	Post Office	Gainesville	SBS	2007	850 [259]	FlamLINE 40
FL	Post Office	Gainesville	SBS	2007	850 [259]	FlamLINE 20
FL	Warehouse	Jacksonville	SBS	2007	55 [17]	FlamLINE 40
FL	Condominium	Miami	HRA	2007	656 [200]	RedLINE 40
FL	Condominium	Miami	HRA	2007	166 [51]	RedLINE 20
FL	Condominium	Miami	HRA	2007	649 [198]	RedLINE 20
FL	Hotel	Miami	HRA	2007	213 [65]	RedLINE 40
FL	Residence	Miami	HRA	2007	308 [94]	RedLINE 20
FL	School	Miami	BUR	2007	82 [25]	RedLINE 40
FL	Amusement	Orlando	BUR	2007	175 [53]	RedLINE 40
FL	School	St. Lucie	BUR	2007	110 [34]	RedLINE 40
FL	Condominium	Tampa	HRA	2007	203 [62]	RedLINE 20
FL	Condominium	Tampa	HRA	2007	203 [62]	RedLINE 20
FL	Office	Vero Beach	BUR	2007	120 [37]	FlamLINE 20
FL	Condominium	W. Palm Bch.	HRA	2007	80 [24]	RedLINE 20
FL	Condominium	Ft. Lauderdale	HRA	2008	98 [30]	RedLINE 40
FL	Post Office	Jacksonville	SBS	2008	232 [71]	FlamLINE 40
FL	Warehouse	Jacksonville	SBS	2008	100 [30]	FlamLINE 20
FL	Condominium	Singer Island	HRA	2009	262 [80]	RedLINE 20
FL	Store	Orlando	SBS	2010	285 [87]	FlamLINE 40
FL	Tunnel	Tampa	LAM	2010	202 [62]	FlamLINE 40
FL	Condominium	Naples	HRA	2011	1201 [366]	RedLINE 40
FL	Condominium	Ft. Lauderdale	HRA	2012	231 [70]	RedLINE 40
FL	Tunnel	Miami	SAM	2012	554 [169]	FlamLINE 100
FL	Warehouse	Miami	SBS	2012	544 [166]	FlamLINE 100
FL	Condominium	Miami	HRA	2013	346 [105]	RedLINE 40
FL	Tunnel	Tunnel	LAM	2013	342 [104]	FlamLINE 100
GA	Warehouse	McDonough	BUR	1999	466 [142]	RedLINE 240
GA	Factory	Covington	BUR	2001	42 [13]	RedLINE 20
GA	Convention Center	Atlanta	HRA	2002	977 [298]	RedLINE 240
GA	Factory	Stone Mountain	BUR	2002	190 [58]	RedLINE 20
GA	Station	Brookhaven	SBS	2004	81 [25]	FlamLINE 20
GA	Warehouse	Dawson	SBS	2005	561 [171]	FlamLINE 100
GA	Office	Atlanta	HRA	2006	47 [14]	RedLINE 20

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
GA	Hospital	Egelston	HRA	2006	900 [274]	RedLINE 20
GA	Hotel	Atlanta	ER	2007	160 [49]	RedLINE 20
GA	Pool	Atlanta	ER	2007	160 [49]	RedLINE 40
GA	Mall	Augusta	HRA	2007	468 [143]	RedLINE 40
GA	Mall	Augusta	BUR	2007	465 [142]	RedLINE 20
GA	Utility	Peachtree City	BUR	2007	68 [21]	RedLINE 40
GA	School	Savannah	BUR	2007	100 [30]	RedLINE 20
GA	Hospital	Atlanta	ER	2009	20 [6]	RedLINE 40
GA	University	Atlanta	HRA	2010	16 [5]	RedLINE 40
GA	Warehouse	McDonough	BUR	2010	380 [116]	RedLINE 240
GA	Factory	Savannah	BUR	2011	24 [7]	RedLINE 20
GA	Office	Savannah	SBS	2011	200 [61]	FlamLINE 40
GA	Office	Atlanta	HRA	2012	14 [4]	RedLINE 40
GA	Warehouse	McDonough	BUR	2012	544 [166]	RedLINE 240
GA	Hotel	Atlanta	ER	2007	160 [49]	RedLINE 20
HI	Office	Honolulu	HRA	2007	126 [38]	RedLINE 40
H	Plaza	Honolulu	ER	2007	126 [38]	RedLINE 20
H	Hotel	Ka'Olina	ER	2007	21 [6]	RedLINE 100
H	Residence	Ko'Olina	SAM	2007	15 [5]	RedLINE 20
H	Hospital	Honolulu	ER	2008	100 [30]	RedLINE 100
H	Library	Honolulu	LAM	2008	160 [49]	RedLINE 40
H	Hotel	Honolulu	SBS	2009	39 [12]	FlamLINE 20
H	Mall	Kapahulu	LAM	2010	150 [46]	RedLINE 20
H	University	Honolulu	LAM	2012	380 [116]	RedLINE 40
IA	Warehouse	Ottumwa	BUR	1998	650 [198]	RedLINE 240
IA	Warehouse	Mt. Pleasant	BUR	2004	462 [141]	RedLINE 240
IA	Warehouse	Des Moines	BUR	2005	1065 [325]	RedLINE 240
IA	Warehouse	Des Moines	BUR	2005	235 [72]	RedLINE 240
IA	Warehouse	Des Moines	BUR	2005	1628 [496]	RedLINE 240
IA	Warehouse	Ottumwa	BUR	2006	556 [169]	RedLINE 240
IA	Warehouse	Ottumwa	BUR	2009	180 [55]	RedLINE 240
IA	Warehouse	Denison	BUR	2010	220 [67]	RedLINE 240
IA	Utility	Cedar Rapids	BUR	2011	108 [33]	RedLINE 40
IA	Warehouse	Denison	BUR	2011	470 [143]	RedLINE 240
IA	Warehouse	Iowa City	BUR	2011	657 [200]	RedLINE 240
IA	Warehouse	Denison	BUR	2012	104 [32]	RedLINE 240
IA	Warehouse	Iowa City	BUR	2012	330 [101]	RedLINE 240
IL	Warehouse	Geneva	BUR	1998	870 [265]	RedLINE 240
IL	Plaza	Chicago	HRA	2003	295 [90]	RedLINE 40
IL	Office	Chicago	HRA	2004	295 [90]	RedLINE 40
IL	Warehouse	Chicago	CAA	2005	355 [108]	RedLINE 40
IL	Warehouse	Geneva	BUR	2005	373 [114]	RedLINE 240
IL	Condominium	Chicago	HRA	2006	214 [65]	RedLINE 20
IL	Museum	Chicago	HRA	2009	60 [18]	RedLINE 240
IL	Factory	Mt. Vernon	BUR	2011	75 [23]	RedLINE 20
IL	Office	Springfield	HRA	2011	44 [13]	RedLINE 40
IL	School	Aurora	BUR	2012	215 [65]	RedLINE 40
IL	School	Aurora	CAA	2012	54 [16]	RedLINE 40
IL	School	Cicero	CAA	2012	207 [63]	RedLINE 20
IN	Office	Terra Haute	BUR	2007	51 [16]	RedLINE 40
N	Warehouse	Terra Haute	SBS	2007	50 [15]	FlamLINE 20
N	Office	Grand Prairie	APP	2008	705 [215]	RedLINE 40
N	Office	New Carlisle	SBS	2008	22 [7]	FlamLINE 20
N	Office	Indianapolis	BUR	2009	165 [50]	RedLINE 40
N	Plaza	Indianapolis	HRA	2009	106 [32]	RedLINE 40
N	Factory	Indianapolis	HRA	2010	16 [5]	RedLINE 40
N	Office	Indianapolis	HRA	2010	4 [1]	RedLINE 40

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## USA continued...

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<b>N</b>	Mall	Carmel	ER	2011	44 [13]	RedLINE 20
<b>N</b>	Hospital	Fort Wayne	HRA	2011	35 [11]	RedLINE 40 G
<b>N</b>	Stadium	Indianapolis	ER	2011	26 [8]	RedLINE 40
<b>KS</b>	Warehouse	Edwardsville	BUR	1999	918 [280]	RedLINE 240
KS	Warehouse	Edwardsville	BUR	2001	162 [49]	RedLINE 240
KS	Church	Topeka	BUR	2002	240 [73]	RedLINE 40
KS	Library	Topeka	CTP	2002	50 [15]	RedLINE 40
KS	Warehouse	Topeka	BUR	2002	490 [149]	RedLINE 40
KS	Warehouse	Wichita	SBS	2003	140 [43]	RedLINE 240
KS	Warehouse	Dodge City	BUR	2005	331 [101]	RedLINE 240
KS	Warehouse	Dodge City	BUR	2006	280 [85]	RedLINE 240
KS	Office	Kansas City	BUR	2007	38 [12]	RedLINE 20
KS	Office	Kansas City	BUR	2007	38 [12]	RedLINE 20
KS	Office	Wichita	BUR	2007	21 [6]	RedLINE 20
KS	Office	Wichita	BUR	2007	20 [6]	RedLINE 40
KS	Plaza	Wichita	BUR	2007	21 [6]	RedLINE 20
KS	School	Wichita	BUR	2007	20 [6]	RedLINE 20
KS	Hospital	Kansas City	HRA	2010	2454 [747]	RedLINE 40
KS	Warehouse	Dodge City	BUR	2010	110 [34]	RedLINE 240
KS	School	Goddard	BUR	2010	258 [79]	RedLINE 40
KS	School	Kansas City	BUR	2010	63 [19]	RedLINE 40
KS	Hospital	Mission	BUR	2010	172 [52]	RedLINE 40
KS	Museum	Kansas City	SBS	2011	670 [204]	FlamLINE 40
KS	School	Ottawa	CTP	2011	60 [18]	RedLINE 40
KS	Hospital	Shawnee	CAA	2011	90 [27]	RedLINE 40
KS	School	Stirling	BUR	2011	180 [55]	RedLINE 20
KS	School	Kansas City	BUR	2012	470 [143]	RedLINE 20
KS	University	Overland Park	CAA	2012	39 [12]	RedLINE 40
<b>KY</b>	Warehouse	Louisville	BUR	1998	1399 [427]	RedLINE 240
KY	Warehouse	Forrest	SBS	2005	312 [95]	RedLINE 240
KY	Factory	Louisville	BUR	2009	454 [138]	RedLINE 40
KY	Factory	Louisville	BUR	2010	452 [138]	RedLINE 40
KY	Warehouse	Louisville	BUR	2011	304 [93]	RedLINE 240
<b>LA</b>	Silos	Destrahan	HRA	2001	24 [7]	RedLINE 24
LA	Mall	Lafayette	BUR	2002	230 [70]	RedLINE 20
LA	Mall	Lafayette	BUR	2004	271 [83]	RedLINE 40
LA	Factory	Barksdale	BUR	2007	34 [10]	RedLINE 40
LA	Factory	Barksdale	BUR	2007	34 [10]	RedLINE 40
LA	Office	Baton Rouge	BUR	2007	151 [46]	RedLINE 40
LA	University	Natchitoches	BUR	2008	62 [19]	RedLINE 240
LA	Hospital	Alexandria	HRA	2009	175 [53]	RedLINE 40
LA	Office	Lake Charles	HRA	2009	200 [61]	RedLINE 100
LA	Hotel	New Orleans	HRA	2009	30 [9]	RedLINE 40
LA	Bank	Shreveport	HRA	2010	102 [31]	RedLINE 20
<b>MA</b>	Mall	Boston	HRA	2003	272 [83]	RedLINE 40
MA	Bank	Newton	ER	2003	26 [8]	RedLINE 20
MA	Hotel	Boston	ER	2004	26 [8]	RedLINE 06
MA	Plaza	Boston	HRA	2006	545 [166]	RedLINE 40
MA	Factory	Amherst	BUR	2007	50 [15]	RedLINE 40
MA	Plaza	Amherst	HRA	2007	151 [46]	RedLINE 40
MA	Convention Center	Boston	HRA	2007	128 [39]	RedLINE 100
MA	Convention Center	Boston	HRA	2007	130 [40]	RedLINE 100
MA	Plaza	Boston	HRA	2007	547 [167]	RedLINE 40
MA	Plaza	Boston	HRA	2008	168 [51]	RedLINE 40
MA	Office	Manchaca	BUR	2010	176 [54]	RedLINE 40
MA	Plaza	Boston	HRA	2011	50 [15]	RedLINE 40

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
MA	Tunnel	Boston	SAM	2012	186 [57]	FlamLINE 40
MA	Library	Williamston	CAA	2012	24 [7]	RedLINE 40
MA	Bridge	Andover	LAM	2013	35 [11]	RedLINE 40
MA	Tunnel	Boston	SAM	2013	200 [61]	FlamLINE 40
MA	Tunnel	Boston	ER	2013	20 [6]	FlamLINE 100
MA	School	Stetson Hill	HRA	2013	21 [6]	RedLINE 40
MD	Hospital	Baltimore	HRA	1999	102 [31]	RedLINE 40
MD	School	McDonough	BUR	2001	475 [145]	RedLINE 20
MD	TV Studios	Silver Spring	HRA	2002	381 [116]	RedLINE 40
MD	Condominium	Baltimore	HRA	2003	306 [93]	RedLINE 40
MD	Tunnel	Baltimore	SAM	2003	103 [31]	FlamLINE 40
MD	Plaza	Chevy Chase	ER	2003	115 [35]	RedLINE 20
MD	Office	Baltimore	ER	2004	425 [130]	FlamLINE 40
MD	Office	Bethesda	HRA	2005	180 [55]	RedLINE 20
MD	Condominium	Baltimore	HRA	2006	274 [84]	RedLINE 40
MD	Plaza	Rockville	HRA	2006	231 [70]	RedLINE 40
MD	Condominium	Silver Spring	HRA	2006	108 [33]	RedLINE 40
MD	College	Baltimore	BUR	2007	260 [79]	RedLINE 40
MD	Hotel	Baltimore	HRA	2007	65 [20]	RedLINE 40
MD	University	Baltimore	HRA	2007	260 [79]	RedLINE 40
MD	Condominium	Chevy	HRA	2007	440 [134]	RedLINE 40
MD	Office	Rockville	HRA	2007	200 [61]	RedLINE 40
MD	Hospital	Baltimore	HRA	2008	167 [51]	RedLINE 20
MD	Club	Bethesda	HRA	2008	205 [62]	RedLINE 40
MD	Hotel	Gaithersburg	APP	2008	350 [107]	RedLINE 40
MD	Market	Bethesda	HRA	2009	298 [91]	RedLINE 40
MD	Condominium	Georgetown	APP	2009	127 [39]	RedLINE 40
MD	Quay	Ocean City	HRA	2010	300 [91]	RedLINE 40
MD	Office	Baltimore	CAA	2011	272 [83]	RedLINE 40
MD	Tunnel	Baltimore	LAM	2011	367 [112]	RedLINE 40G
MD	Apartment	Rockville	HRA	2011	132 [40]	RedLINE 40
MD	Office	Rockville	HRA	2012	234 [71]	RedLINE 40
<b>MI</b>	College	Battlecreek	BUR	1998	222 [68]	RedLINE 20
M	Factory	Niles	CAA	1998	Detailing	RedLINE 20
M	School	Battlecreek	BUR	1999	20 [6]	RedLINE 20
M	Hospital	Vicksburg	BUR	2000	53 [16]	RedLINE 20
M	Office	Ann Arbor	SAM	2001	92 [28]	FlamLINE 240
M	School	Bloomfield	BUR	2001	15 [5]	RedLINE 40
M	School	Comstock	BUR	2001	202 [62]	RedLINE 20
M	University	Lansing	BUR	2001	191 [58]	RedLINE 40
M	Factory	Otsego	BUR	2001	38 [12]	RedLINE 20
M	School	Utica	BUR	2001	277 [84]	RedLINE 40
M	Court	Westland	BUR	2001	125 [38]	RedLINE 40
M	Office	Baldwin	HRA	2002	365 [111]	RedLINE 20
M	School	Kalamazoo	BUR	2002	15 [5]	RedLINE 20
M	Office	Livonia	BUR	2002	88 [27]	RedLINE 40
M	School	Utica	BUR	2002	220 [67]	RedLINE 40
M	Office	Kalamazoo	BUR	2003	38 [12]	RedLINE 20
M	School	Nazareth	BUR	2003	51 [16]	RedLINE 40
M	School	Battlecreek	BUR	2004	30 [9]	RedLINE 40
M	Factory	Detroit	BUR	2004	180 [55]	RedLINE 20
M	School	Kalamazoo	BUR	2004	79 [24]	RedLINE 40
M	Factory	Saline	BUR	2004	120 [37]	RedLINE 40
M	Office	Chelsea	BUR	2005	385 [117]	RedLINE 40
M	Warehouse	Livonia	BUR	2006	1095 [334]	RedLINE 40
M	Factory	Detroit	BUR	2007	50 [15]	RedLINE 100
M	School	Grosse Ile	BUR	2007	44 [13]	RedLINE 40
M	Office	Grosse Ile	BUR	2007	44 [13]	RedLINE 40
M	School	Kalamazoo	BUR	2008	30 [9]	RedLINE 20

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
<b>MN</b>	Office	Lincoln	HRA	2006	220 [67]	RedLINE 40
MN	Mall	Edina	BUR	2008	219 [67]	RedLINE 40
MN	University	Minneapolis	HRA	2011	172 [52]	RedLINE 40
MN	Condominium	Richfield	HRA	2011	183 [56]	RedLINE 40
MN	Garage	St. Paul	HRA	2011	418 [127]	RedLINE 40
<b>MO</b>	Factory	St. Joseph	BUR/CAA	1999	954 [291]	RedLINE 20
MO	Office	Kansas City	BUR	2001	15 [5]	Special Detail
MO	Plaza	St. Louis	BUR	2001	76 [23]	FlamLINE 40
MO	Office	Northlands	BUR	2002	45 [14]	RedLINE 40
MO	University	St. Louis	HRA	2007	200 [61]	RedLINE 40
MO	University	St. Louis	BUR	2007	200 [61]	RedLINE 20
MO	School	Branson	SBS	2008	628 [191]	FlamLINE 20
MO	Theater	Maryville	HRA	2008	68 [21]	RedLINE 40
MO	Office	St. Louis	LAM	2011	3575 [1089]	RedLINE 40
MO	School	St. Joseph	SBS	2012	22 [7]	FlamLINE 40
MO	Office	St. Louis	BUR	2012	32 [10]	RedLINE 20
<b>MS</b>	Office	Meridian	BUR	2004	153 [47]	RedLINE 20
<b>NC</b>	Warehouse	Randelman	BUR	1999	925 [283]	RedLINE 20
NC	Factory	Redford	BUR	2001	230 [70]	RedLINE 20
NC	School	Fuquay Varina	SBS	2002	370 [113]	RedLINE 40
NC	School	Raleigh	BUR	2002	148 [45]	FlamLINE 40
NC	School	Wake	BUR	2002	31 [9]	RedLINE 40
NC	School	Wake	BUR	2002	370 [113]	RedLINE 40
NC	Warehouse	Statesville	BUR	2003	404 [123]	RedLINE 240
NC	Warehouse	Statesville	BUR	2003	404 [123]	RedLINE 240
NC	Warehouse	Charlotte	BUR	2004	385 [117]	RedLINE 40
NC	Condominium	Charlotte	BUR	2005	290 [88]	RedLINE 20
NC	Warehouse	Charlotte	CTP	2005	262 [80]	RedLINE 40
NC	Office	Chapel Hill	SBS	2006	1279 [390]	FlamLINE 20
NC	School	Charlotte	BUR	2006	200 [61]	RedLINE 40
NC	Hospital	Pitt	HRA	2006	600 [183]	RedLINE 20
NC	School	Raleigh	BUR	2006	50 [15]	RedLINE 40
NC	Warehouse	Raleigh	SBS	2006	446 [136]	FlamLINE 240
NC	School	Rutherford	BUR	2006	263 [80]	RedLINE 40
NC	Office	Charlotte	SBS	2007	550 [168]	FlamLINE 20
NC	School	Charlotte	SBS	2007	550 [168]	FlamLINE 20
NC	School	Greenville	BUR	2007	78 [24]	RedLINE 40
NC	School	Hamlet	SBS	2007	880 [268]	FlamLINE 20
NC	Office	Peachtree	BUR	2007	68 [21]	RedLINE 40
NC	School	Richmond	SBS	2007	880 [268]	FlamLINE 20
NC	Bank	Charlotte	ER	2008	149 [45]	RedLINE 100
NC	Plaza	Fayetteville	HRA	2008	288 [88]	RedLINE 100
NC	Office	Beaufort	SBS	2009	190 [58]	FlamLINE 20
NC	Office	Raleigh	HRA/ER	2009	429 [131]	RedLINE 240
NC	Library	Winston-Salem	BUR	2009	200 [61]	RedLINE 40
NC	Bank	Charlotte	ER	2010	548 [167]	RedLINE 240
NC	University	Greenville	APP	2010	705 [215]	RedLINE 40
NC	Office	Raleigh	SBS	2010	426 [130]	FlamLINE 20
NC	Office	Raleigh	HRA	2010	375 [114]	RedLINE 20
NC	School	Wakefield	SBS	2010	950 [289]	FlamLINE 40
NC	Hospital	Raleigh	ER	2011	169 [51]	RedLINE 100
NC	School	Cary	CAA	2012	396 [121]	RedLINE 40
NC	Office	Charlotte	CAA	2012	1225 [373]	RedLINE 40
NC	Hospital	Goldsboro	CAA	2012	170 [52]	RedLINE 40
NC	University	Greenville	SBS	2012	266 [81]	FlamLINE 40
NC	Office	Greensboro	SBS	2013	165 [50]	FlamLINE 20
NC	Utility	Kings	SBS	2013	1800 [548]	FlamLINE 40
NC	Mall	Raleigh	BUR	2013	380 [116]	RedLINE 20

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
<b>ND</b>	School	Mandan	BUR	2003	125 [38]	RedLINE 40
<b>NE</b>	Warehouse	Omaha	BUR	1998	282 [86]	RedLINE 240
<b>NE</b>	Warehouse	Omaha	BUR	2001	100 [33]	RedLINE 240
<b>NE</b>	Office	Omaha	BUR	2009	72 [22]	RedLINE 40
<b>NE</b>	Warehouse	Grand Island	BUR	2010	498 [152]	RedLINE 240
<b>NE</b>	Warehouse	Lincoln	BUR	2010	223 [68]	RedLINE 240
<b>NE</b>	Warehouse	Omaha	BUR	2010	152 [46]	RedLINE 240
<b>NE</b>	Warehouse	Omaha	BUR	2010	558 [170]	RedLINE 240
<b>NE</b>	Warehouse	Grand Island	BUR	2012	641 [195]	RedLINE 240
<b>NJ</b>	Court	Trenton	HRA	2003	350 [107]	RedLINE 40
<b>NJ</b>	Office	Jersey City	SBS	2008	245 [75]	FlamLINE 20
<b>NJ</b>	Office	Jersey City	BUR	2008	120 [37]	RedLINE 100
<b>NJ</b>	Mall	Bloomfield	LAM	2010	460 [140]	RedLINE 20
<b>NJ</b>	Garage	East Hanover	HRA	2011	492 [150]	RedLINE 20
<b>NJ</b>	Condominium	Edgewater	BUR	2011	209 [64]	RedLINE 40
<b>NJ</b>	Plaza	Trenton	HRA	2012	134 [41]	RedLINE 40
<b>NM</b>	School	Albuquerque	BUR	2007	978 [298]	RedLINE 40
<b>NV</b>	Condominium	Las Vegas	ER/HRA	2000	862 [263]	RedLINE 40
<b>NV</b>	Library	Reno	SBS	2000	21 [6]	RedLINE 20
<b>NV</b>	Condominium	Las Vegas	HRA	2001	1148 [350]	RedLINE 40
<b>NV</b>	Condominium	Las Vegas	HRA	2002	1148 [350]	RedLINE 40
<b>NV</b>	Condominium	Las Vegas	HRA	2004	1125 [343]	RedLINE 40
<b>NV</b>	Condominium	Las Vegas	HRA	2004	862 [263]	RedLINE 40
<b>NV</b>	Condominium	Las Vegas	HRA	2004	1012 [308]	RedLINE 40
<b>NV</b>	Condominium	Las Vegas	HRA	2005	1029 [314]	RedLINE 40
<b>NV</b>	Condominium	Las Vegas	ER	2010	75 [23]	FlamLINE 100
<b>NV</b>	Condominium	Las Vegas	ER	2010	30 [9]	FlamLINE 100
<b>NY</b>	Warehouse	Buffalo	SBS	2001	980 [299]	FlamLINE 40
<b>NY</b>	School	Manhattan	BUR	2001	140 [43]	RedLINE 20
<b>NY</b>	Office	New York	HRA	2001	80 [24]	RedLINE 40
<b>NY</b>	Prison	Rikers	BUR	2001	60 [18]	RedLINE 40
<b>NY</b>	School	Rochelle	BUR	2002	175 [53]	RedLINE 40
<b>NY</b>	School	Rochelle	HRA	2002	175 [53]	RedLINE 40
<b>NY</b>	Warehouse	Bay Shore	BUR	2003	204 [62]	RedLINE 20
<b>NY</b>	University	New York	BUR	2003	23 [7]	RedLINE 40
<b>NY</b>	Church	Bay Shore	BUR	2004	20 [6]	RedLINE 20
<b>NY</b>	Church	Bay Shore	BUR	2004	20 [6]	RedLINE 40
<b>NY</b>	Factory	Ft. Edwards	BUR	2004	467 [142]	RedLINE 40
<b>NY</b>	Warehouse	Ft. Edwards	BUR	2004	467 [141]	RedLINE 40
<b>NY</b>	Office	Massapequa	CAA	2004	641 [195]	RedLINE 20
<b>NY</b>	Utility	Massapequa	CAA	2004	641 [195]	RedLINE 20
<b>NY</b>	Factory	Orangeburg	BUR	2004	274 [84]	RedLINE 40
<b>NY</b>	Office	New York	HRA	2005	800 [244]	RedLINE 40
<b>NY</b>	School	New York	CAA	2006	327 [100]	RedLINE 40
<b>NY</b>	Waterworks	Brooklyn	APP	2007	695 [212]	RedLINE 40
<b>NY</b>	Waterworks	Hunt's Point	SAM	2007	695 [212]	RedLINE 40
<b>NY</b>	Plaza	Manhattan	LAM	2007	1149 [350]	RedLINE 40
<b>NY</b>	Factory	New York	HRA	2007	100 [30]	RedLINE 20
<b>NY</b>	Hotel	New York	ER	2007	200 [61]	RedLINE 40
<b>NY</b>	Plaza	New York	HRA	2007	1149 [350]	RedLINE 40
<b>NY</b>	Plaza	New York	HRA	2007	330 [101]	RedLINE 40
<b>NY</b>	Plaza	New York	LAM	2007	130 [40]	RedLINE 20
<b>NY</b>	School	New York	BUR	2007	50 [15]	RedLINE 40
<b>NY</b>	Condominium	New York City	LAM	2007	130 [40]	RedLINE 20 G
<b>NY</b>	Hotel	New York City	ER	2007	261 [80]	RedLINE 40

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NY	Office	New York City	HRA	2007	330 [101]	RedLINE 40
NY	College	West Point	HRA	2007	70 [21]	RedLINE 240
NY	Arena	Hempstead	APP	2008	527 [161]	RedLINE 40
NY	Bridge	New York City	LAM	2008	825 [251]	RedLINE 40
NY	Apartment	West Point	HRA	2008	100 [30]	RedLINE 40
NY	Plaza	New York City	LAM	2009	454.5 [138]	RedLINE 40
NY	Waterworks	Bronx	HRA	2010	1624 [495]	RedLINE 100
NY	Convention Center	New York City	LAM	2010	9950 [3031]	RedLINE 40 G
NY	Memorial	New York City	CAA	2010	725 [221]	RedLINE 100
NY	Office	Rochester	HRA	2010	931 [284]	RedLINE 40
NY	University	Binghamton	HRA	2011	284 [87]	RedLINE 20
NY	Condominium	Brooklyn	LAM	2011	110 [34]	RedLINE 40
NY	School	New York City	BUR	2012	185 [56]	RedLINE 100
NY	Library	Rochester	HRA	2012	118 [36]	RedLINE 20
NY	Office	Rochester	HRA	2012	380 [116]	RedLINE 40
<b>OH</b>	Warehouse	Streetsboro	BUR	2000	120 [37]	RedLINE 240
OH	School	Bedford	CTP	2001	72 [22]	RedLINE 40
OH	School	Bedford	CTP	2001	552 [168]	RedLINE 40
OH	Plaza	Beechwood	BUR	2001	40 [12]	FlamLINE 20
OH	Station	Canton	BUR	2001	100 [30]	RedLINE 20
OH	Station	Canton	BUR	2001	85 [26]	RedLINE 240
OH	School	Cleveland	CTP	2001	832 [254]	RedLINE 40
OH	School	Cleveland	CTP	2001	884 [270]	RedLINE 40
OH	School	Euclid	CTP	2001	93 [28]	RedLINE 40
OH	Warehouse	Jonesboro	BUR	2001	1267 [386]	RedLINE 240
OH	Library	Parma	CTP	2001	200 [61]	RedLINE 40
OH	Utility	Parma	BUR	2001	2620 [799]	RedLINE 20
OH	School	Solon	CTP	2001	98 [30]	RedLINE 40
OH	Warehouse	Streetsboro	CTP	2001	370 [113]	RedLINE 240
OH	University	Toledo	BUR	2001	102 [31]	RedLINE 40
OH	Library	Alliance	BUR	2002	64 [20]	RedLINE 40
OH	Utility	Baldwin	BUR	2002	365 [111]	RedLINE 20
OH	School	Delaware	BUR	2002	83 [25]	RedLINE 40
OH	School	Toledo	BUR	2003	102 [31]	RedLINE 40
OH	Mall	Cleveland	BUR	2004	1012 [310]	RedLINE 240
OH	Office	Cleveland	BUR	2004	38 [12]	RedLINE 20
OH	Office	Cleveland	BUR	2004	56 [17]	FlamLINE 40
OH	Warehouse	Franklin	HRA	2004	1150 [351]	RedLINE 40
OH	Office	Lorain	BUR	2004	26 [8]	RedLINE 40
OH	School	Cleveland	BUR	2005	1012 [308]	RedLINE 240
OH	Warehouse	Youngstown	CTP	2005	1310 [399]	RedLINE 40
OH	Office	Cleveland	BUR	2006	755 [230]	RedLINE 20
OH	Waterworks	Cleveland	BUR	2006	740 [226]	RedLINE 20
OH	Warehouse	Sidney	BUR	2006	250 [76]	RedLINE 20
OH	Factory	Cleveland	BUR	2007	186 [57]	RedLINE 20
OH	Factory	Cleveland	BUR	2007	44 [13]	RedLINE 20
OH	Plaza	Cleveland	HRA	2007	226 [69]	RedLINE 20
OH	Plaza	Cleveland	HRA	2007	226 [69]	RedLINE 20
OH	Waterworks	Cleveland	BUR	2007	740 [225]	RedLINE 20
OH	Plaza	Delaware	HRA	2007	400 [122]	RedLINE 40
OH	Warehouse	Delaware	BUR	2007	400 [122]	RedLINE 40
OH	Warehouse	Delaware	BUR	2007	400 [122]	RedLINE 40
OH	School	Maple	BUR	2007	57 [17]	RedLINE 20
OH	Office	Columbus	CTP	2008	395 [120]	RedLINE 40
OH	Condominium	Columbus	HRA	2010	176 [54]	RedLINE 40
OH	Hospital	Cleveland	BUR	2011	243 [74]	RedLINE 40
OH	Office	Columbus	HRA	2011	208 [63]	RedLINE 40
OH	Hospital	Cleveland	HRA	2012	625 [190]	RedLINE 100
OH	Hospital	Cleveland	HRA/ER	2013	308 [94]	RedLINE 100

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
<b>OK</b>	Office	Mustang	BUR	2001	142 [43]	RedLINE 20
OK	Office	Oklahoma City	HRA	2011	127 [39]	RedLINE 40
OK	University	Oklahoma City	SBS	2011	105 [32]	FlamLINE 100
OK	Hospital	Norman	CAA	2012	55 [17]	RedLINE 40
<b>OR</b>	Office	Beaverton	BUR	2009	60 [18]	RedLINE 40
OR	School	Forest Grove	BUR	2012	254 [80]	RedLINE 100
OR	University	Portland	ER	2013	308 [94]	RedLINE 40
<b>PA</b>	Mall	Exton	BUR	1999	364 [111]	RedLINE 20
PA	Office	Harrisburg	HRA	2001	1034 [315]	RedLINE 40
PA	Warehouse	Lancaster	BUR	2001	424 [129]	RedLINE 20
PA	College	Bryn Mawr	BUR	2002	50 [15]	RedLINE 40
PA	Tunnel	Philadelphia	SBS	2002	25 [8]	FlamLINE 20
PA	Mall	Scranton	BUR	2002	408 [124]	RedLINE 20
PA	Office	Scranton	BUR	2002	140 [43]	RedLINE 20
PA	Plaza	Scranton	BUR	2002	408 [124]	RedLINE 20
PA	Office	Malvern	BUR	2003	56 [17]	RedLINE 20
PA	Warehouse	Ft. Indianatown	CTP	2004	555 [169]	RedLINE 20
PA	Warehouse	Ft. Indianatown	BUR	2004	555 [169]	RedLINE 20
PA	Warehouse	Lancaster	CAA/SAM	2004	40 [12]	FlamLINE 40
PA	Warehouse	Orangeburg	BUR	2004	274 [84]	RedLINE 40
PA	University	Pittsburgh	BUR	2004	200 [61]	RedLINE 20
PA	Hospital	York	HRA/ER	2004	328 [100]	RedLINE 240
PA	Hospital	York	HRA	2004	149 [45]	RedLINE 40
PA	Warehouse	Binghamton	BUR	2005	347 [106]	RedLINE 20
PA	Office	Freeport	BUR	2006	319 [97]	RedLINE 40
PA	School	Philadelphia	SAM	2006	250 [76]	RedLINE 40
PA	Mall	Pittsburgh	SBS	2006	517 [158]	RedLINE 20
PA	School	Pittsburgh	BUR	2006	195 [59]	RedLINE 40
PA	Plaza	Lawrence	HRA	2007	750 [228]	RedLINE 40
PA	Plaza	Lawrence	HRA	2007	750 [229]	RedLINE 40
PA	School	New Castle	BUR	2007	6 [2]	RedLINE 20
PA	Bank	Pittsburgh	HRA	2007	121 [37]	RedLINE 40
PA	Bank	Pittsburgh	SBS	2007	120 [37]	FlamLINE 40
PA	Warehouse	Pittsburgh	SAM	2007	430 [131]	RedLINE 20
PA	Museum	Philadelphia	HRA	2008	132 [40]	RedLINE 40
PA	Factory	Pittsburgh	BUR	2008	831 [253]	RedLINE 20
PA	School	Bensalem	CTP	2010	40 [12]	RedLINE 40
PA	Bridge	Pittsburgh	ER	2011	56 [17]	RedLINE 40 G
PA	Hospital	Harrisburg	CAA	2012	169 [51]	RedLINE 40
PA	College	Newton	BUR	2012	66 [20]	RedLINE 20
PA	Plaza	Pittsburgh	HRA	2012	144 [44]	RedLINE 40
PA	Plaza	Pittsburgh	HRA	2012	111 [34]	RedLINE 100
PA	Stadium	University Park	ER	2012	63 [19]	RedLINE 240
<b>PR</b>	Warehouse	Rio Padres	ER	1999	148 [45]	RedLINE 40
PR	Factory	San Juan	SBS	2006	1300 [396]	FlamLINE 100
<b>SC</b>	School	Seneca	BUR	2000	111 [39]	RedLINE 20
SC	Warehouse	Gaffney	BUR	2001	768 [234]	RedLINE 240
SC	School	Savannah	SBS	2002	70 [21]	RedLINE 40
SC	School	Myrtle Beach	BUR	2003	77 [23]	RedLINE 20
SC	School	Florence	BUR	2004	28 [9]	RedLINE 40
SC	Warehouse	Greenville	BUR	2005	180 [55]	RedLINE 240
SC	Office	Columbia	ER	2007	691 [210]	RedLINE 40
SC	School	Columbia	BUR	2007	61 [19]	RedLINE 40
SC	School	Columbia	BUR	2007	100 [30]	RedLINE 40
SC	School	Columbia	BUR	2007	100 [30]	RedLINE 40
SC	School	Columbia	BUR	2009	100 [30]	RedLINE 40

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
SC	Office	Mt. Pleasant	HRA	2009	281 [86]	RedLINE 40 G
SC	School	Laurens	BUR	2010	266 [81]	RedLINE 20
SC	School	Laurens	BUR	2010	251 [76]	RedLINE 20
SC	School	Columbia	BUR	2011	356 [108]	RedLINE 40
SC	School	Chapin	BUR	2012	623 [190]	RedLINE 100
SC	School	Columbia	BUR	2012	73 [22]	RedLINE 40
SC	School	Fort Mill	SBS	2012	794 [242]	FlamLINE 40
<b>TN</b>	Utility	Chattanooga	BUR	2002	340 [104]	RedLINE 20
TN	Utility	Chattanooga	BUR	2003	84 [26]	RedLINE 40
TN	Utility	Cherokee	BUR	2003	84 [26]	RedLINE 40
TN	Factory	Memphis	BUR	2003	411 [125]	RedLINE 20
TN	Office	Memphis	BUR	2003	411 [125]	RedLINE 20
TN	University	Memphis	BUR	2003	60 [18]	RedLINE 40
TN	Warehouse	Memphis	BUR	2003	125 [38]	RedLINE 20
TN	Hospital	Nashville	BUR	2003	18 [5]	RedLINE 40
TN	Office	Memphis	BUR	2004	250 [76]	RedLINE 40
TN	University	Memphis	BUR	2004	250 [76]	RedLINE 40
TN	University	Memphis	BUR	2004	113 [35]	RedLINE 40
TN	Warehouse	Memphis	SAM	2004	250 [76]	RedLINE 20
TN	Warehouse	Memphis	SAM	2004	250 [76]	RedLINE 20
TN	Warehouse	Memphis	SAM	2004	250 [76]	RedLINE 20
TN	School	Murfreesboro	BUR	2004	230 [70]	RedLINE 20
TN	Warehouse	Shelbyville	SAM	2004	160 [49]	FlamLINE 40
TN	Warehouse	Shelbyville	SPF	2004	350 [107]	RedLINE 20
TN	Office	Memphis	BUR	2005	450 [137]	RedLINE 20
TN	Office	Nashville	BUR	2007	120 [37]	RedLINE 40
TN	School	Nashville	BUR	2007	120 [37]	RedLINE 40
TN	Utility	Jacksonville	SBS	2008	100 [30]	FlamLINE 20
TN	Utility	Watts Bar	BUR	2009	304 [93]	RedLINE 40
TN	Utility	Knoxville	BUR	2010	136 [41]	RedLINE 100
TN	College	Collegedale	BUR	2011	18 [5]	RedLINE 40
TN	Condominium	Nashville	HRA	2012	19 [6]	RedLINE 20
TN	Utility	Spring City	BUR	2012	468 [143]	RedLINE 20
<b>TX</b>	School	Austin	BUR	2000	48 [15]	RedLINE 20
TX	Warehouse	Fort Worth	BUR	2000	740 [226]	RedLINE 240
TX	Bridge	Dallas	BUR	2001	119 [36]	RedLINE 40
TX	Office	Dallas	BUR	2001	87 [27]	RedLINE 40
TX	Warehouse	Dallas	SBS	2001	635 [194]	FlamLINE 20
TX	Warehouse	Fort Worth	BUR	2001	400 [122]	RedLINE 240
TX	Warehouse	Fort Worth	BUR	2001	511 [156]	RedLINE 240
TX	Warehouse	Fort Worth	BUR	2001	373 [114]	RedLINE 240
TX	Warehouse	Fort Worth	BUR	2001	373 [114]	RedLINE 240
TX	Warehouse	Fort Worth	BUR	2001	373 [114]	RedLINE 240
TX	School	Houston	BUR	2001	33 [10]	RedLINE 20
TX	School	Houston	BUR	2001	24 [7]	RedLINE 40
TX	University	Lorena	BUR	2001	42 [13]	RedLINE 20
TX	Church	Plano	BUR	2001	175 [53]	RedLINE 20
TX	School	San Antonio	BUR	2001	60 [18]	RedLINE 40
TX	Stadium	San Antonio	HRA/SAM	2001	448 [137]	FlamLINE 40
TX	School	Galveston	CTP	2002	200 [61]	RedLINE 40
TX	School	Wiley	BUR	2002	270 [82]	FlamLINE 40
TX	Warehouse	Abilene	BUR	2003	170 [52]	RedLINE 20
TX	Prison	Corpus Christi	BUR	2003	262 [80]	RedLINE 20
TX	Factory	San Antonio	BUR	2003	124 [38]	RedLINE 40
TX	University	San Antonio	BUR	2003	50 [15]	RedLINE 20
TX	Warehouse	Fort Worth	BUR	2004	746 [230]	RedLINE 240
TX	Warehouse	Grand Prairie	BUR	2004	517 [158]	RedLINE 40
TX	Church	Houston	BUR	2004	20 [6]	RedLINE 40

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STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
TX	School	Houston	BUR	2004	192 [58]	RedLINE 40
TX	School	Houston	BUR	2004	2008 [612]	RedLINE 40
TX	School	Houston	BUR	2004	1320 [402]	RedLINE 20
TX	Warehouse	Houston	BUR	2004	210 [64]	RedLINE 40
TX	Warehouse	Houston	BUR	2004	210 [64]	RedLINE 40
TX	School	Kingwood	BUR	2004	1320 [402]	RedLINE 20
TX	Office	San Antonio	CTP	2004	Details	RedLINE 40
TX	Warehouse	San Antonio	BUR	2004	124 [38]	FlamLINE 40
TX	Hospital	Waco	BUR	2004	417 [127]	RedLINE 40
TX	Office	Waco	BUR	2004	417 [127]	RedLINE 40
TX	School	Walker	SBS	2004	198 [60]	RedLINE 40
TX	School	Webster	SBS	2004	200 [61]	FlamLINE 20
TX	School	Houston	BUR	2005	821 [250]	RedLINE 40
TX	School	Humble	BUR	2005	173 [53]	RedLINE 40
TX	School	Waco	BUR	2005	227 [69]	RedLINE 20
TX	Office	Austin	HRA	2006	418 [127]	RedLINE 40
TX	School	Austin	BUR	2006	240 [73]	FlamLINE 40
TX	School	McAllen	BUR	2006	2013 [614]	RedLINE 20
TX	Factory	Austin	BUR	2007	390 [119]	RedLINE 40
TX	Office	Austin	BUR	2007	390 [119]	RedLINE 40
TX	Plaza	Austin	HRA	2007	55 [17]	RedLINE 40
TX	Warehouse	Austin	BUR	2007	418 [127]	RedLINE 40
TX	Warehouse	Austin	BUR	2007	390 [119]	RedLINE 40
TX	School	Bellville	BUR	2007	65 [20]	RedLINE 20
TX	School	Benavides	BUR	2007	255 [78]	RedLINE 40
TX	Factory	Bishop	BUR	2007	122 [37]	RedLINE 40
TX	Factory	Bishop	BUR	2007	122 [37]	RedLINE 40
TX	School	Clear Lake	BUR	2007	40 [12]	RedLINE 20
TX	School	Corpus Christi	BUR	2007	313 [95]	RedLINE 40
TX	School	Corpus Christi	BUR	2007	313 [95]	RedLINE 40
TX	Bank	Dallas	BUR	2007	24 [7]	FlamLINE 40
TX	Stadium	Dallas	BUR	2007	200 [61]	RedLINE 20
TX	Office	DeSoto	BUR	2007	30 [9]	RedLINE 40
TX	School	Grangerland	BUR	2007	16 [5]	RedLINE 20
TX	Hotel	Grapevine	BUR	2007	160 [49]	RedLINE 40
TX	Stadium	Harlingen	BUR	2007	200 [61]	RedLINE 40
TX	Condominium	Houston	BUR	2007	28 [9]	RedLINE 40
TX	Factory	Houston	BUR	2007	138 [42]	RedLINE 40
TX	Office	Houston	BUR	2007	138 [42]	RedLINE 40
TX	School	Houston	BUR	2007	277 [84]	RedLINE 40
TX	School	Houston	BUR	2007	272 [83]	RedLINE 20
TX	School	Humble	BUR	2007	111 [34]	RedLINE 20
TX	School	Kingwood	BUR	2007	180 [55]	RedLINE 40
TX	School	Oakridge	BUR	2007	16 [5]	RedLINE 20
TX	School	Polk	BUR	2007	160 [49]	RedLINE 40
TX	Prison	Venus	SBS	2007	1052 [320]	FlamLINE 20
TX	Prison	Venus	SBS	2007	1200 [366]	FlamLINE 20
TX	School	Victoria	BUR	2007	40 [12]	RedLINE 40
TX	School	Alice	BUR	2008	440 [134]	RedLINE 40
TX	Warehouse	Austin	BUR	2008	678 [207]	RedLINE 40
TX	Bank	Dallas	SBS	2008	667 [203]	FlamLINE 40
TX	Plaza	Dallas	HRA	2008	140 [43]	RedLINE 40
TX	Amusement	Grapevine	BUR	2008	160 [49]	RedLINE 40
TX	School	Kingwood	BUR	2008	631 [192]	RedLINE 40
TX	Church	Manchaca	BUR	2008	240 [73]	RedLINE 40
TX	Prison	Venus	SBS	2008	932 [284]	FlamLINE 40
TX	School	Fort worth	SBS	2009	1170 [356]	FlamLINE 40
TX	Factory	Houston	SBS	2009	316 [96]	FlamLINE 40
TX	Plaza	San Antonio	HRA	2009	712 [217]	RedLINE 40
TX	Warehouse	Sunnyvale	BUR	2009	641 [195]	RedLINE 240

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## USA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
TX	School	Tuloso	BUR	2009	227 [69]	RedLINE 40
TX	School	George West	BUR	2010	365 [111]	RedLINE 40
TX	Factory	Houston	BUR	2010	320 [97]	RedLINE 40
TX	School	Kingsville	BUR	2010	395 [120]	RedLINE 40
TX	Office	City of Tomball	BUR	2011	400 [122]	RedLINE 40
TX	School	Corpus Christi	SBS	2011	330 [101]	FlamLINE 20
TX	Warehouse	El Paso	BUR	2011	574 [175]	RedLINE 240
TX	Office	Houston	SBS	2011	232 [71]	FlamLINE 40
TX	School	Houston	BUR	2011	875 [267]	RedLINE 20
TX	Utility	Plano	BUR	2011	400 [122]	RedLINE 40
TX	Museum	Fort Worth	ER	2012	317 [97]	RedLINE 40 G
TX	Club	Houston	SBS	2012	252 [77]	FlamLINE 40
TX	Hospital	Houston	BUR	2012	150 [46]	RedLINE 40
TX	University	Irving	SBS	2012	200 [61]	FlamLINE 40
TX	University	Austin	SBS	2013	44 [13]	FlamLINE 20
TX	Warehouse	Sunnyvale	BUR	2013	270 [82]	RedLINE 240
UT	Warehouse	Tremonton	BUR	2007	500 [152]	RedLINE 240
UT	Plaza	Salt Lake City	HRA/ER	2009	70 [21]	RedLINE 240
UT	Plaza	Salt Lake City	ER	2010	20 [6]	RedLINE 40
UT	Plaza	Salt Lake City	HRA	2010	283 [86]	RedLINE 240
VA	Bank	Richmond	HRA	2001	23 [7]	RedLINE 240
VA	University	Norfolk	CTP	2002	390 [119]	RedLINE 40
VA	Office	Richmond	SAM	2002	76 [23]	FlamLINE 240
VA	Condominium	Alexandria	HRA	2003	200 [61]	RedLINE 40
VA	Office	Alexandria	HRA	2003	200 [61]	RedLINE 40
VA	Plaza	Alexandria	HRA	2003	23 [7]	RedLINE 40
VA	Warehouse	Newport News	BUR	2003	460 [140]	RedLINE 20
VA	School	Norfolk	CTP	2003	390 [119]	RedLINE 40
VA	Warehouse	Culpepper	SBS	2005	2010 [613]	FlamLINE 100
VA	Office	Herndon	HRA	2005	380 [116]	RedLINE 40
VA	Office	Leesburg	HRA	2005	191 [58]	RedLINE 40
VA	Office	Arlington	HRA	2007	213 [65]	RedLINE 20
VA	Plaza	Arlington	HRA	2007	213 [65]	RedLINE 20
VA	Airport	Dulles	HRA	2007	2447 [745]	RedLINE 40
VA	Airport	Dulles	HRA	2007	2800 [854]	RedLINE 40
VA	Office	Henrico	BUR	2007	30 [9]	RedLINE 20
VA	Terminal	Norfolk	BUR	2007	88 [27]	RedLINE 40
VA	School	Alexandria	BUR	2008	148 [45]	RedLINE 40
VA	Garage	Alexandria	HRA	2008	800 [244]	RedLINE 40
VA	Office	Arlington	HRA	2008	589 [179]	RedLINE 100
VA	Utility	Alexandria	HRA	2009	366 [111]	RedLINE 40
VA	Office	Tysons Corners	HRA	2009	507 [154]	RedLINE 40
VA	Office	Washington	APP	2009	173 [53]	RedLINE 100
VA	Office	Alexandria	HRA	2010	513 [156]	RedLINE 40
VA	Plaza	Arlington	HRA	2010	191 [58]	RedLINE 40
VA	Plaza	Crystal City	HRA	2010	167 [51]	RedLINE 20
VA	Office	Alexandria	HRA	2011	277 [84]	RedLINE 100
VA	Court	Arlington	HRA	2011	552 [168]	RedLINE 40
VA	Office	Fort Belvoir	BUR	2011	135 [41]	RedLINE 40
VA	Court	Arlington	HRA	2012	208 [63]	RedLINE 240
VA	Court	Arlington	HRA	2012	324 [99]	RedLINE 20
VA	Utility	Dulles	ER	2012	1119 [341]	RedLINE 40 G
VA	Utility	Chester	SBS	2013	2810 [856]	FlamLINE 100
VA	Utility	Dulles	LAM	2013	70 [21]	RedLINE 40 G
WA	University	Seattle	BUR	2002	43 [13]	RedLINE 20
WA	Mall	Seattle	HRA	2004	215 [66]	RedLINE 40
WA	Station	Seattle	HRA	2004	215 [66]	RedLINE 40
WA	Plaza	Redmond	HRA	2008	2600 [792]	RedLINE 40

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*USA continued...*

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
WA	Office	Seattle	HRA	2008	273 [83]	RedLINE 40
WA	Warehouse	Centralia	BUR	2009	879 [268]	RedLINE 240
WA	University	Lakewood	HRA	2009	37 [11]	RedLINE 100
WA	Mall	Seattle	SBS	2009	118 [36]	FlamLINE 40
WA	Hospital	Tacoma	HRA	2009	592 [180]	RedLINE 40
WA	Hospital	Washington	HRA	2009	35 [11]	RedLINE 40
WA	University	Seattle	CAA	2010	15 [5]	RedLINE 40
WA	Warehouse	Seattle	HRA	2010	174 [53]	RedLINE 100
WA	University	Pullman	HRA	2011	13 [4]	RedLINE 40
WA	University	Seattle	SBS	2011	191 [58]	FlamLINE 40
WA	Utility	Seattle	ER	2011	161 [49]	RedLINE 40 G
WA	School	Edmonds	CAA	2012	40 [12]	RedLINE 40
WA	Hospital	La Crosse	BUR	2012	200 [61]	RedLINE 40
WA	Condominium	Seattle	CAA	2012	216 [66]	RedLINE 20
WA	Office	Seattle	SBS	2013	14 [4]	RedLINE 240
<b>WI</b>						
WI	Factory	Verona	BUR	2008	196 [60]	RedLINE 40
WI	Office	Verona	HRA	2013	107 [33]	RedLINE 240
<b>WV</b>						
WV	Hospital	Weirton	BUR	2002	70 [21]	RedLINE 40
<b>WY</b>						
WY	Club	Cheyenne	HRA	2012	162 [49]	RedLINE 40
WY	Utility	Green River	ER	2012	118 [36]	RedLINE 20

**CANADA**

AB	Plaza	Calgary	HRA	2006	249 [76]	RedLINE 20
AB	Warehouse	Calgary	BUR	2008	365 [111]	RedLINE 240
AB	Hospital	Calgary	HRA	2009	300 [91]	RedLINE 40
AB	Office	Red Deer	SBS	2009	133 [41]	FlamLINE 20
AB	Hospital	Calgary	HRA	2010	333 [102]	RedLINE 40
AB	Hospital	Calgary	HRA	2010	137 [42]	RedLINE 40
AB	Office	Calgary	SBS	2010	179 [55]	FlamLINE 40
AB	Plaza	Calgary	HRA	2010	316 [96]	RedLINE 100
AB	Hospital	Calgary	SBS	2011	73 [22]	FlamLINE 100
AB	Hospital	Calgary	SBS	2011	186 [57]	FlamLINE 40
AB	Plaza	Calgary	HRA	2011	195 [59]	RedLINE 40 G
AB	Hospital	Lethbridge	BUR	2011	177 [54]	RedLINE 40 G
AB	Hospital	Calgary	HRA	2012	200 [61]	RedLINE 40
AB	University	Calgary	HRA	2012	113 [34]	RedLINE 40
AB	Airport	Fort McMurray	SBS	2012	116 [35]	FlamLINE 20
AB	Office	Calgary	SBS	2013	218 [66]	FlamLINE 100
<b>BC</b>						
BC	Garage	Vancouver	SBS	2002	1114 [340]	FlamLINE 40
BC	Court	Vancouver	SBS	2005	200 [61]	FlamLINE 40
BC	Plaza	Vancouver	SBS	2005	65 [20]	FlamLINE 40
BC	Court	Vancouver	SBS	2006	120 [37]	FlamLINE 40
BC	Court	Vancouver	SBS	2006	50 [15]	FlamLINE 40
BC	Court	Vancouver	SBS	2006	160 [49]	FlamLINE 40
BC	Condominium	Victoria	SBS	2007	46 [14]	FlamLINE 20
BC	Convention Center	Vancouver	HRA	2008	514 [157]	RedLINE 240
BC	Convention Center	Vancouver	APP	2008	514 [157]	RedLINE 240
BC	Office	Vancouver	SBS	2008	407 [124]	FlamLINE 40
BC	Office	Burnaby	SBS	2009	167 [51]	FlamLINE 40
BC	Plaza	Burnaby	HRA	2009	170 [52]	RedLINE 40
BC	Club	Vancouver	SBS	2009	33 [10]	FlamLINE 20
BC	Condominium	Vancouver	HRA	2009	87 [27]	RedLINE 40
BC	Condominium	Vancouver	BUR	2009	175 [53]	RedLINE 40
BC	Office	Vancouver	SBS	2009	144 [44]	FlamLINE 20
BC	Office	Vancouver	HRA	2009	155 [47]	RedLINE 40

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## CANADA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
BC	Plaza	Vancouver	HRA	2009	167 [51]	RedLINE 40
BC	University	Kamloops	SBS	2010	33 [10]	FlamLINE 20
BC	Office	Vancouver	SBS	2010	159 [48]	FlamLINE 20
BC	Plaza	Vancouver	SBS	2010	398 [121]	FlamLINE 40
BC	Hospital	Vancouver	ER/SBS	2011	15 [5]	FlamLINE 40
BC	Mall	Vancouver	SBS	2011	27 [8]	FlamLINE 40
BC	Museum	Vancouver	SBS	2011	193 [59]	FlamLINE 240
BC	Plaza	Vancouver	SBS	2011	280 [85]	FlamLINE 40
BC	Plaza	Vancouver	HRA	2011	40 [12]	RedLINE 40 G
BC	Mall	Victoria	ER	2011	14 [4]	RedLINE 40 G
BC	Court	Burnaby	HRA	2012	124 [38]	RedLINE 20
BC	Utility	Hudson Hope	SBS	2012	440 [134]	FlamLINE 40
BC	Condominium	Richmond	ER/SBS	2012	204 [62]	RedLINE 100
BC	Mall	Surrey	SBS	2012	367 [112]	FlamLINE 40
BC	Condominium	Vancouver	BUR	2012	286 [87]	RedLINE 40
BC	Condominium	Vancouver	SBS	2012	180 [55]	FlamLINE 40
BC	Court	Vancouver	HRA	2012	160 [49]	RedLINE 40
BC	Condominium	Vancouver	SBS	2013	110 [34]	FlamLINE 20
BC	Seaport	Vancouver	SBS	2013	40 [12]	FlamLINE 40
BC	Condominium	Victoria	SBS	2013	104 [32]	FlamLINE 40
<b>MB</b>	Bridge	Winnipeg	APP	2003	742 [226]	FlamLINE 20
MB	Airport	Winnipeg	SBS	2010	48 [15]	FlamLINE 100
<b>NB</b>	School	Sackville	SBS	2011	58 [18]	FlamLINE 20
<b>NL</b>	School	Carbonear	SBS	2013	67 [20]	FlamLINE 40
<b>NS</b>	Office	Dartmouth	BUR	2002	165 [50]	RedLINE 20
NS	Condominium	Halifax	HRA	2006	134 [41]	RedLINE 20
NS	University	Bible Hill	SBS	2007	60 [18]	FlamLINE 20
NS	College	Halifax	BUR	2007	57 [17]	FlamLINE 20
NS	College	Halifax	HRA	2007	119 [36]	FlamLINE 20
NS	Condominium	Halifax	HRA	2007	137 [42]	RedLINE 20
NS	Condominium	Halifax	HRA	2007	137 [42]	RedLINE 20
NS	School	Halifax	TPO	2007	207 [63]	RedLINE 20
NS	School	Halifax	HRA	2007	207 [63]	RedLINE 20
NS	School	Stellarton	BUR	2007	238 [73]	RedLINE 20
NS	School	Halifax	BUR	2009	50 [15]	RedLINE 20
NS	Office	CFB Georgetown	BUR	2010	106 [32]	RedLINE 20
NS	School	Dartmouth	BUR	2010	91 [28]	RedLINE 40
NS	Office	Halifax	SBS	2010	137 [42]	FlamLINE 40
NS	School	Halifax	SBS	2010	43 [13]	FlamLINE 40
NS	School	Halifax	ER	2011	160 [49]	RedLINE 40
NS	Office	Truro	SBS	2012	42 [13]	FlamLINE 40
<b>ON</b>	Bank	Mississauga	BUR(PMR)	1996	210 [64]	RedLINE 40
ON	College	Scarborough	HRA	1997	39 [12]	RedLINE 40
ON	Hotel	Toronto	HRA	1997	428 [130]	RedLINE 40
ON	Office	Scarborough	SBS	1998	241 [73]	RedLINE 40
ON	Factory	Brampton	BUR	1999	138 [42]	RedLINE 240
ON	Apartment	Cambridge	SBS	1999	14 [5]	RedLINE 20
ON	Office	Guelph	BUR	1999	380 [116]	RedLINE 20
ON	Apartment	Mississauga	SBS	1999	35 [11]	RedLINE 40
ON	Office	North York	BUR	1999	231 [70]	RedLINE 20
ON	Plaza	North York	HRA	1999	410 [125]	RedLINE 20
ON	College	Toronto	SPF	2000	23 [7]	RedLINE 20
ON	Utility	Toronto	SBS	2000	126 [38]	RedLINE 40
ON	School	Langstaff	BUR	2001	133 [41]	RedLINE 40
ON	Apartment	Milton	HRA	2001	44 [13]	RedLINE 40

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## CANADA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
ON	Mall	Ottawa	BUR	2001	260 [79]	RedLINE 20
ON	Mall	Ottawa	BUR	2001	260 [79]	RedLINE 20
ON	Airport	Toronto	BUR	2001	40 [12]	RedLINE 240
ON	School	Toronto	SBS	2001	64 [20]	FlamLINE 20
ON	Utility	Wesleyville	SBS	2001	66 [20]	FlamLINE 20
ON	Factory	Windsor	BUR	2001	856 [261]	RedLINE 40
ON	Office	Hamilton	SBS	2002	240 [73]	FlamLINE 20
ON	Apartment	Kanata	HRA	2002	680 [207]	RedLINE 40
ON	School	Markham	BUR	2002	98 [30]	RedLINE 40
ON	School	Richmond Hill	BUR	2002	307 [94]	RedLINE 20
ON	Hospital	Toronto	SAM	2002	17 [5]	RedLINE 40
ON	Tunnel	Toronto	ER	2002	80 [24]	RedLINE 240
ON	College	London	BUR	2003	200 [61]	RedLINE 20
ON	Museum	Ottawa	HRA/SBS	2003	1050 [320]	RedLINE 40
ON	University	Peterborough	BUR	2003	10 [3]	RedLINE 20
ON	School	Toronto	BUR	2003	214 [65]	RedLINE 20
ON	Tunnel	Toronto	SAM	2003	125 [38]	FlamLINE 20
ON	School	Brooklin	BUR	2004	150 [46]	RedLINE 40
ON	Condominium	Guelph	SBS	2004	267 [81]	FlamLINE 40
ON	Tunnel	Mississauga	HRA	2004	103 [31]	RedLINE 20
ON	School	North York	BUR	2004	233 [71]	RedLINE 20
ON	Museum	Ottawa	SBS	2004	234 [71]	FlamLINE 100
ON	Residence	Ottawa	HRA	2004	150 [46]	RedLINE 20
ON	College	Scarborough	SBS	2004	84 [26]	FlamLINE 40
ON	Mall	Toronto	APP	2004	96 [29]	RedLINE 40
ON	Mall	Toronto	HRA	2004	24 [7]	RedLINE 40
ON	School	Toronto	BUR	2004	82 [25]	RedLINE 20
ON	School	Whitby	BUR	2004	450 [137]	RedLINE 20
ON	Mall	Windsor	BUR	2004	80 [24]	RedLINE 40
ON	College	York	BUR	2004	240 [73]	RedLINE 20
ON	Condominium	Yorkville	HRA	2004	50 [16]	RedLINE 40
ON	Warehouse	Brampton	BUR	2005	620 [189]	RedLINE 240
ON	School	Cambridge	BUR	2005	30 [9]	RedLINE 20
ON	Residence	Ottawa	BUR	2005	165 [50]	RedLINE 20
ON	School	Ottawa	BUR	2005	125 [38]	RedLINE 20
ON	Factory	Toronto	BUR	2005	118 [36]	RedLINE 40
ON	Factory	Toronto	BUR	2005	60 [18]	RedLINE 20
ON	School	Toronto	BUR	2005	20 [6]	RedLINE 20
ON	School	Toronto	BUR	2005	84 [26]	RedLINE 20
ON	School	Toronto	BUR	2005	264 [80]	RedLINE 40
ON	School	Toronto	BUR	2005	160 [49]	RedLINE 20
ON	Store	Toronto	BUR	2005	27 [8]	RedLINE 20
ON	Store	Woodstock	BUR	2005	109 [33]	RedLINE 20
ON	School	Barrie	BUR	2006	122 [37]	RedLINE 40
ON	Warehouse	Brampton	BUR	2006	180 [55]	RedLINE 240
ON	Condominium	Toronto	BUR	2006	41 [13]	RedLINE 20
ON	Hotel	Toronto	SBS	2006	25 [8]	FlamLINE 40
ON	School	Toronto	BUR	2006	8 [2]	FlamLINE 40
ON	School	Toronto	BUR	2006	74 [23]	RedLINE 40
ON	Warehouse	Brampton	BUR	2007	195 [59]	RedLINE 240
ON	College	Chatham	BUR	2007	14 [4]	RedLINE 40
ON	Plaza	Ottawa	HRA	2007	200 [61]	RedLINE 40
ON	Factory	Richmond Hill	BUR	2007	122 [37]	RedLINE 40
ON	College	Toronto	BUR	2007	14 [4]	RedLINE 40
ON	Factory	Toronto	BUR	2007	122 [37]	RedLINE 20
ON	Plaza	Toronto	HRA	2007	200 [61]	RedLINE 20
ON	School	Toronto	HRA	2007	200 [61]	RedLINE 40
ON	Tunnel	Toronto	ER	2007	312 [95]	RedLINE 20
ON	Tunnel	Toronto	LAM	2007	316 [96]	RedLINE 20
ON	Warehouse	Toronto	BUR	2007	195 [59]	RedLINE 240

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## CANADA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
ON	Office	Bluewater	BUR	2008	205 [63]	RedLINE 20
ON	Condominium	Kingston	SBS	2008	239 [73]	FlamLINE 240
ON	College	Markham	BUR	2008	63 [19]	RedLINE 20
ON	Condominium	Morrison	HRA	2008	86 [26]	RedLINE 20
ON	Hotel	Ottawa	HRA	2008	49 [15]	RedLINE 20
ON	Office	Petawawa	SBS	2008	109 [33]	FlamLINE 100
ON	Condominium	Toronto	HRA	2008	53 [16]	RedLINE 40
ON	School	Toronto	BUR	2008	100 [30]	RedLINE 40
ON	School	Toronto	BUR	2008	233 [71]	RedLINE 20
ON	School	Vaughan	BUR	2008	100 [30]	RedLINE 20
ON	Hospital	Ajax	SBS	2009	1017 [310]	FlamLINE 40
ON	School	Kitchener	SBS	2009	30 [9]	FlamLINE 20
ON	School	Orillia	BUR	2009	284 [87]	RedLINE 20
ON	condominium	Ottawa	BUR	2009	216 [66]	RedLINE 20
ON	Hospital	Toronto	SBS	2009	18 [5]	FlamLINE 240
ON	Office	Toronto	SBS	2009	10 [3]	FlamLINE 40
ON	College	Hamilton	SBS	2010	93 [28]	FlamLINE 40
ON	Office	Ottawa	SBS	2010	49 [15]	FlamLINE 40
ON	School	Pickering	SBS	2010	178 [54]	FlamLINE 40
ON	Factory	Sault Saint Marie	Tie-in	2010	66 [20]	RedLINE 20
ON	Condominium	Toronto	HRA	2010	72 [22]	RedLINE 20
ON	Hospital	Toronto	SBS	2010	16 [5]	FlamLINE 100
ON	School	Toronto	SBS	2010	96 [29]	FlamLINE 40
ON	School	Toronto	BUR	2010	56 [17]	RedLINE 20
ON	Station	Toronto	BUR	2010	13 [4]	RedLINE 100
ON	Station	Toronto	SBS	2010	102 [31]	FlamLINE 100
ON	School	Hamilton	BUR	2011	75 [23]	RedLINE 20
ON	Condominium	Rexdale	ER	2011	95 [29]	RedLINE 40
ON	Plaza	Toronto	SBS	2011	40 [12]	FlamLINE 40
ON	Station	Toronto	SBS	2011	296 [90]	FlamLINE 20
ON	University	Toronto	ER	2011	41 [13]	RedLINE 40
ON	School	Bolton	BUR	2012	77 [23]	RedLINE 40
ON	Hospital	Guelph	BUR	2012	74 [23]	RedLINE 100
ON	Hospital	Hamilton	BUR	2012	131 [40]	RedLINE 20
ON	Hospital	Hamilton	SBS	2012	63 [19]	FlamLINE 40
ON	Hospital	Hamilton	SBS	2012	47 [14]	FlamLINE 40
ON	Condominium	Kitchener	HRA	2012	77 [23]	RedLINE 20
ON	Bank	Mississauga	SBS	2012	1646 [502]	FlamLINE 40
ON	School	Mississauga	BUR	2012	76 [23]	RedLINE 20
ON	Garage	Niagara Falls	HRA	2012	202 [62]	RedLINE 20
ON	Tunnel	Ottawa	SBS	2012	14 [4]	FlamLINE 40
ON	Bridge	Toronto	ER	2012	45 [14]	RedLINE 240
ON	Bridge	Toronto	ER	2012	61 [19]	RedLINE 240
ON	Condominium	Toronto	HRA	2012	100 [30]	RedLINE 20
ON	Mall	Toronto	SBS	2012	1224 [373]	FlamLINE 40
ON	Mall	Toronto	SBS	2012	94 [29]	FlamLINE 40
ON	Racetrack	Toronto	ER	2012	106 [32]	RedLINE 40
ON	School	Toronto	BUR	2012	81 [25]	RedLINE 20
ON	University	Toronto	ER	2012	22 [7]	RedLINE 40
ON	Station	Vaughan	BUR	2012	123 [38]	RedLINE 20
ON	Racetrack	Toronto	ER	2013	312 [95]	RedLINE 40
ON	University	Toronto	ER	2013	5 [2]	RedLINE 40
QC	Apartment	Montréal	HRA	2003	113 [34]	RedLINE 20
QC	University	Montréal	HRA	2003	230 [70]	RedLINE 40
QC	Utility	Montréal	HRA	2003	237 [72]	RedLINE 40
QC	Apartment	Montréal	HRA	2004	315 [96]	RedLINE 20
QC	Bank	Montréal	HRA	2004	127 [39]	RedLINE 240
QC	Office	Montréal	HRA	2004	294 [90]	RedLINE 40
QC	Station	Montréal	HRA	2004	54 [16]	RedLINE 20

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## CANADA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
QC	Station	Montréal	HRA	2004	54 [16]	RedLINE 20
QC	Station	Montréal	HRA	2004	93 [28]	RedLINE 20
QC	University	Montréal	HRA	2004	131 [40]	RedLINE 100
QC	University	Montréal	HRA	2004	56 [17]	RedLINE 40
QC	Utility	Montréal	HRA	2004	113 [34]	RedLINE 40
QC	Condominium	LaSalle	HRA	2005	238 [73]	RedLINE 20
QC	Office	Montréal	HRA	2005	23 [7]	RedLINE 20
QC	Office	Montréal	HRA	2005	91 [28]	RedLINE 20
QC	Station	Montréal	HRA	2005	82 [25]	RedLINE 20
QC	Station	Montréal	HRA	2005	40 [12]	RedLINE 20
QC	Subway Station	Montréal	HRA	2005	68 [21]	RedLINE 20
QC	University	Montréal	HRA	2005	128 [39]	RedLINE 20
QC	Hotel	Ville de Québec	HRA	2005	111 [34]	RedLINE 20
QC	Office	Ville de Québec	HRA	2005	105 [32]	RedLINE 20
QC	Office	Ville de Québec	HRA	2005	21 [6]	RedLINE 20
QC	Office	Ville de Québec	HRA	2005	317 [97]	RedLINE 40
QC	University	Montréal	SBS	2006	55 [17]	FlamLINE 40
QC	Hospital	Saint-Hyacinthe	HRA	2006	26 [8]	RedLINE 40
QC	Condominium	Montréal	HRA	2007	68 [21]	RedLINE 40
QC	University	Laval	HRA	2008	2 [1]	RedLINE 100
QC	Hospital	Montréal	HRA	2008	272 [83]	RedLINE 20
QC	Hospital	Montréal	HRA	2008	50 [15]	RedLINE 20
QC	Hospital	Montréal	HRA	2008	51 [16]	RedLINE 20
QC	Office	Montréal	SBS	2008	54 [16]	FlamLINE 40
QC	Plaza	Montréal	HRA	2008	65 [20]	RedLINE 40
QC	Subway Station	Montréal	HRA	2008	60 [18]	RedLINE 20
QC	Residence	Laval	HRA	2009	184 [56]	RedLINE 20
QC	Condominium	Montréal	SBS	2009	44 [13]	FlamLINE 40
QC	Convention Center	Montréal	HRA	2009	50 [15]	RedLINE 40
QC	Office	Montréal	HRA	2009	20 [6]	RedLINE 40
QC	Office	Montréal	HRA	2009	164 [50]	RedLINE 40
QC	School	Montréal	SBS	2009	84 [26]	FlamLINE 20
QC	Office	Ville de Québec	SBS	2009	61 [19]	FlamLINE 40
QC	Bridge	Kahnawake	HRA	2010	40 [12]	RedLINE 40
QC	Office	Laval	HRA	2010	44 [13]	RedLINE 20
QC	Office	Laval	HRA	2010	44 [13]	RedLINE 20
QC	Office	Laval	ER	2010	7 [2]	RedLINE 240
QC	Casino	Montréal	HRA	2010	434 [132]	RedLINE 40
QC	Casino	Montréal	HRA	2010	485 [148]	RedLINE 20
QC	Museum	Montréal	HRA	2010	75 [23]	RedLINE 40
QC	University	Montréal	HRA	2010	579 [177]	RedLINE 20
QC	University	Montréal	HRA	2010	27 [8]	RedLINE 40
QC	Office	Ville de Québec	HRA	2010	24 [7]	RedLINE 20
QC	Garage	Gatineau	HRA	2011	102 [31]	RedLINE 40
QC	Hospital	Montréal	HRA	2011	98 [30]	RedLINE 20
QC	Hospital	Montréal	HRA	2011	28 [9]	RedLINE 20
QC	Office	Montréal	HRA	2011	50 [15]	RedLINE 40
QC	Office	Montréal	HRA	2011	219 [67]	RedLINE 40
QC	Office	Montréal	HRA	2011	59 [18]	RedLINE 40
QC	University	Montréal	HRA	2011	82 [25]	RedLINE 40
QC	University	Montréal	HRA	2011	79 [24]	RedLINE 40
QC	Office	Ville de Québec	SBS	2011	25 [8]	FlamLINE 20
QC	Utility	Beauharnois	SBS	2012	7 [2]	FlamLINE 40
QC	Office	Brossard	SBS	2012	583 [178]	FlamLINE 20
QC	Office	Laval	HRA	2012	228 [70]	RedLINE 20
QC	Condominium	Montréal	ER	2012	62 [19]	RedLINE 20
QC	Hospital	Montréal	SBS	2012	1211 [369]	FlamLINE 20
QC	Hospital	Montréal	HRA	2012	28 [9]	RedLINE 20
QC	Hospital	Montréal	HRA	2012	38 [12]	RedLINE 20
QC	Hospital	Montréal	SBS	2012	54 [16]	FlamLINE 20

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## CANADA continued...

STATE/ PROVINCE	PROJECT NAME & BUILDING TYPE	CITY	MEMBRANE INSTALLED	YEAR INSTALLED	FOOTAGE ft. [m]	SITURA JOINT TYPE
QC	Office	Montréal	SBS	2012	130 [40]	FlamLINE 20
QC	Office	Montréal	SBS	2012	244 [74]	FlamLINE 20
QC	Office	Montréal	HRA	2012	115 [35]	RedLINE 20
QC	Office	Montréal	SBS	2012	61 [19]	FlamLINE 20
QC	School	Montréal	SBS	2012	13 [4]	FlamLINE 40
QC	Tunnel	Montréal	HRA	2012	1 [0]	RedLINE 20
QC	Residence	Ville de Québec	SBS	2012	315 [96]	FlamLINE 40
QC	Hospital	Montréal	SBS	2013	470 [143]	FlamLINE 20
QC	Stadium	Montréal	HRA	2013	185 [56]	RedLINE 20
QC	Station	Montréal	HRA	2013	15 [5]	RedLINE 40
QC	University	Montréal	SBS	2013	566 [173]	FlamLINE 100
QC	University	Montréal	SBS	2013	102 [31]	FlamLINE 240
QC	Utility	Montréal	HRA	2013	1738 [530]	RedLINE 240

**INTERNATIONAL**

Austria	University	Vienna	BUR	1997	1082[330]	RedLINE 20
Austria	Bank	Vienna	BUR	1997	1181[360]	RedLINE 40
Austria	City Centre	Vienna	BUR	1995	1804[550]	RedLINE 20
Austria	Park and Ride	Vienna	BUR	1995	525 [160]	RedLINE 40
Austria	Airport Centre	Salzburg	BUR	1997	820[250]	RedLINE 20/40
Germany	Mall	Meiningen	BUR	1995	1253 [382]	RedLINE 20
Germany	Power Station	Peitz	ER	1994	1023 [312]	RedLINE 40
Germany	City Hall	Berlin	BUR	1998	827 [252]	RedLINE 20 G
Germany	Köln Arena	Köln	BUR	1997	1319 [402]	RedLINE 20/40
Germany	Tunnel	Dresden	BUR	1998	2076 [633]	RedLINE 20
England	Airport	Stansted	ER/BUR	1989	2296 [700]	RedLINE 240
England	Store	Manchester	SBS	1996	705 [215]	RedLINE 40
England	Sainbury	Epsom	BUR	1998	203 [62]	RedLINE 20
England	School	Long Lane	BUR	1998	85 [26]	RedLINE 20
Russia	Bank	Moscow	BUR	1996	984 [300]	RedLINE 40 G
Switzerland	Tunnel	Nuenberg	BUR	1986	771 [235]	RedLINE 20
Switzerland	Mall	Sursee	BUR	1987	345 [105]	RedLINE 20
Switzerland	Tunnel	St. Gallen	SBS	1994	4100[1250]	RedLINE 240
Switzerland	High School	Zürich	SBS	1995	197 [60]	RedLINE 20
Switzerland	Tunnel	Zürich	HRA	1994	1148 [350]	RedLINE 20/06
Switzerland	Bridge Isolation	Birsfelden	BUR	1996	361[110]	RedLINE 40 G
Switzerland	Highway Bridge	Bern	SBS	1993	525 [160]	RedLINE 40
Switzerland	Parking Garage	Zürich	BUR	1997	361 [110]	RedLINE 20
Switzerland	Hotel	Engelberg	BUR	1979	108 [33]	RedLINE 20
Switzerland	Diary	Zürich	BUR	1984	345 [105]	RedLINE 20
United Arab Emirates	Tower Complex	Dubai	SBS	2002	8000 [2450]	FlamLINE 40

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SITURA INC. constantly strives to improve and expand its customer service. Though this technical manual represents current information at time of printing on SITURA products, regular bulletins are published to keep the registered Technical Manual holders updated and informed on the latest developments in expansion joint material technology and SITURA expansion joint application techniques. Bulletins and the latest articles on SITURA joints can be accessed on SITURA's web site **[www.situra.com](http://www.situra.com)**.

## SITURA EXPANSION JOINT SAMPLES

Enclosed at the back of this manual are SITURA expansion joint samples, due to limitations in space a selection of samples is enclosed, if there is a particular SITURA expansion joint sample that you would like please call SITURA at **1-888-4-SITURA** (1-888-474-8872) or e-mail SITURA at [situra@situra.com](mailto:situra@situra.com).

