

# SARANEX® CX

Installation Guidelines for Saranex® CX Vapor Retarder Film and  
Saranex® CX Vapor Retarder Tape in Mechanical Insulation Systems

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## SECTION 1 – SCOPE

- 1.1 This guideline covers the installation of Johns Manville [Saranex® CX Vapor Retarder Film](#) and Johns Manville [Saranex® CX Vapor Retarder Tape](#) as a vapor retarder on mechanical insulation systems operating with service temperatures below ambient. Guidelines are provided for both factory and field applied Saranex CX Vapor Retarder Film and Saranex CX Vapor Retarder Tape in indoor, outdoor and underground applications.
- 1.2 Product data sheets and other JM literature are referenced throughout this guideline. Visit [www.jm.com](http://www.jm.com) for the latest versions of these documents.
- 1.3 The information contained in this guideline and referenced JM documents are current as of April 2025. This guideline is subject to revision without notice. Contact the Johns Manville Customer Information Group at 1-800-231-1024 or your local JM representative for the most recent version of this guideline or other JM referenced literature.
- 1.4 Due to the variations in service conditions and use, this guideline may not be pertinent for every application. A design or specifying engineer can create specifications tailored to particular applications or owner's needs. Such a design or specification engineering service may be more familiar with local conditions, budgets, environment and desired service life of the system, allowing them to generate a precise specification.
- 1.5 It is the intent of this document to provide guidelines for the installation of Saranex CX Film and Saranex CX Tape supplied by Johns Manville. This guideline may not be suitable and shall not be used for the purpose of installing other manufacturer's vapor retarder products. While supplemental insulation system products may be referenced in this guideline, JM recommends consulting the manufacturers of such products for proper installation and handling.
- 1.6 **This guideline is offered as a guide for the purpose described herein. No warranty of procedures, either expressed or implied is intended. All other express or implied warranties of merchantability or fitness for a particular purpose are disclaimed.**

## SECTION 2 – GENERAL

- 2.1 All mechanical insulation shall be free of foreign substances and free of surface moisture or frost prior to the application of Saranex CX Film.
- 2.2 All Saranex CX Film and Saranex CX Tape shall be delivered to project site in original, unbroken factory packaging labeled with product designation. Shipment of Saranex CX Film and Saranex CX Tape from the manufacturer to the installation location shall be in weather-tight transportation. Saranex CX Film and Saranex CX Tape delivered to the job site shall be stored so as to protect the materials from moisture and weather during storage and installation. Saranex CX Film and Saranex CX Tape shall be

protected from long exposure to sunlight to avoid UV exposure from the sun. After installation, Saranex CX Film and Saranex CX Tape can be left exposed for a maximum of two weeks before being covered with protective jacketing.

## SECTION 3 – MATERIALS OF CONSTRUCTION

### 3.1 Vapor Retarder

#### 3.1.1 Saranex CX Vapor Retarder Film

- 3.1.1.1 Saranex 560 CX Film – 6 mils thick, 0.010 permance, available in rolls 35.5" wide by 250' long.
- 3.1.1.2 Saranex 540 CX Film – 4 mils thick, 0.020 permance, available in rolls 35.5" wide by 375' long.

#### 3.1.2 Saranex CX Vapor Retarder Tape

- 3.1.2.1 Saranex 560 CX Tape – Base film is 6 mils thick, 0.010 permance, available in rolls 150' long by 2" or 3" wide.
- 3.1.2.2 Saranex 520 CX Tape – Base film is 2 mils thick, 0.03 permance, available in rolls 150' long by 1", 2" or 3" wide.

#### 3.1.3 Material Specification for Saranex CX Film and Saranex CX Tape

- 3.1.3.1 Vapor retarder shall be Saranex 540 CX or 560 CX Vapor Retarder Film for service temperatures above 0°F and Saranex 560 CX Film in services at and below 0°F or where a permance of 0.02 perm or better is required. Refer to ASTM standards C755, C921 and ASTM C1136 for information on selection and specification of vapor retarders. Refer to technical data sheets and literature on Saranex CX Film and Saranex CX Tape for additional product information.
- 3.1.3.2 Elbows and fittings shall be wrapped with Saranex 520 CX Vapor Retarder Tape. When the pipe/tank temperature is < 32°F or when a permance of 0.02 perms or lower is required, elbows and fittings should be wrapped with 2 layers of Saranex 520 CX tape. When operating temperature is > 32°F, elbows and fittings shall be wrapped with a single layer of Saranex 520 CX Tape. See Section 4.1.1.4 for how to best achieve the required Saranex CX Tape layers. When the nominal outer insulation diameter is 6" or less, 1" wide Saranex 520 CX tape is recommended. When the nominal outer insulation diameter is greater than 6" up to 18", 2" wide Saranex 520 CX tape is recommended. When the nominal outer insulation diameter is greater than 18", 3" wide Saranex 520 CX tape is recommended.
- 3.1.3.3 When operating temperature is ≤ 32°F or when a permance of 0.02 perms or better is required, butt joints shall be wrapped with either two layers of Saranex 520 CX Vapor Retarder Tape or a single layer of Saranex 560 CX Tape. When operating temperature is > 32°F, butt joints shall be wrapped with a single layer of Saranex 520 CX Tape.

- 3.1.3.4 Vapor retarder shall have a maximum permeance of 0.02 perms for applications at or below 32°F and a maximum permeance of 0.03 perms for applications above 32°F.
- 3.1.3.5 Vapor retarder may be factory or field applied to the outer surface of pipe insulation.
- 3.1.3.6 When outer protective jacketing is used on tanks, vessels and equipment, use Saranex 540 CX or 560 CX Vapor Retarder Film as the vapor retarder.
- 3.1.3.7 When not using outer protective jacketing on tanks, vessels and equipment, use Saranex 560 CX Film as the vapor retarder. See section 3.4.1.1.

## 3.2 Adhesives to be Used With Saranex CX Film

- 3.2.1 The following tapes and adhesives have been found to be compatible with Saranex CX Film. Before using any alternative adhesives or tapes test their compatibility and performance in conjunction with Saranex CX Film. The peel strength of the SSL tape with Saranex CX Vapor Retarder Film is recommended to be above 3 lbs. per inch for 1.5" or greater SSL tape width.
- 3.2.2 **Self-Sealing Lap (SSL) tape.** SSL can be used on longitudinal joints in Saranex CX Film. SSL tape shall be a minimum of 1.5" wide. JM does not recommend the use of mastics as the only means of sealing the longitudinal joint. Recommended SSL tapes for this application are:
  - 3M Venture Tape 3693 FLE
  - 3M Venture Tape 1163MS74
  - 3M Venture Tape 514CW
  - Avery Dennison Fasson SSL either FG (fully gummed) or FLE (finger lift edge)
- 3.2.3 **Adhesives Used to Attach Saranex CX to Trymer® Polyisocyanurate (PIR).** Adhesives are used to attach Saranex CX Vapor Retarder Film to the outer surface of [Trymer® PIR](#) in factory applied vapor retarder applications. The purpose of this adhesive is to secure the vapor retarder to the insulation during shipping, handling and installation. It serves no purpose after system installation so only enough adhesive necessary to accomplish the above is required. Liquid adhesives shall be solvent-based or water-based. Consult adhesive manufacturer for recommended materials and instructions on handling adhesives including required operating temperatures and cure time prior to bonding surfaces to ensure good adhesion. Potential adhesives for this application include:
  - Fosters 85-15 adhesive (solvent-based)
  - Childers CP-124 adhesive (solvent-based)
  - Foster 83-13HM adhesive (hot melt)
  - Foster 85-45 adhesive (aerosol)
  - Foster 85-60 adhesive (water-based)

- 3.2.4 **Adhesives Used to Attach Saranex CX to DuPont™ Styrofoam™ Brand Extruded Polystyrene (XPS).** Adhesives are used to attach the Saranex CX Vapor Retarder Film to the outer surface of XPS insulation in factory applied vapor retarder applications. The purpose of this adhesive is to secure the vapor retarder to the insulation during shipping, handling and installation. It serves no purpose after system installation so only enough adhesive necessary to accomplish the above is required. Solvent-based adhesives are not suitable for XPS since most of the solvents will react with XPS. Consult adhesive manufacturer for recommended materials and instructions on handling adhesives including required operating temperatures and cure time prior to bonding surfaces to ensure good adhesion. See section 4.1.1.1 for additional information. Potential adhesives for use in this application include:
  - Foster 85-45 adhesive (aerosol – must be applied to the Saranex film)
  - Foster 83-13HM adhesive (hot melt)
  - Foster 85-60 adhesive (water-based)
- 3.2.5 **Liquid Adhesives Used to Seal Joints in Saranex CX Vapor Retarder Film.** Adhesives may be used to seal any overlapping joints in Saranex CX Film. Liquid adhesives shall be solvent-based or water-based. Consult adhesive manufacturer for most updated grades and literature for instructions on handling adhesives including required cure time prior to bonding surfaces to insure good adhesion. Solvent-based adhesives are not recommended for use on an insulation system containing XPS but if they are used, great care must be taken to ensure that the solvents do not contact the XPS. Examples of liquid adhesives for this application are:
  - Fosters 85-15 adhesive (solvent-based)
  - Childers CP-124 adhesive (solvent-based)
  - Foster 85-45 adhesive (aerosol)
  - Foster 85-60 adhesive (water-based)

## 3.3 Joint Sealants and Mastics

- 3.3.1 Any type of joint sealants and mastics including solvent-based may be used in contact with Saranex CX Film. Note that solvent-based products can damage DuPont™ Styrofoam™ Brand XPS Pipe Insulation Billet (PIB). Consult your JM representative before placing any solvent-based product in contact with XPS PIB™.
- 3.3.2 Mastics may be used in conjunction with Saranex CX Film but JM does not recommend the use of mastics as the only means of sealing the longitudinal joint in Saranex CX Vapor Retarder Film.

## 3.4 Protective Jacketing Materials

- 3.4.1 **Indoor Jacketing**
  - 3.4.1.1 In applications where no mechanical abuse is expected



and aesthetics are non-critical, Saranex CX Film and Saranex CX Tape may be used without the addition of an outer protective jacket.

- 3.4.1.2 In applications outside of those referred to in 3.4.1.1, jacketing shall usually be [Zeston® Series PVC](#) material. Consult JM Technical Support at 833-293-3393, Option 2 for recommended thickness. Jacketing shall be tough and capable of enduring frequent wash-downs with hot water or cleaning agents. All joints of PVC jacket shall be solvent welded using the [Perma-Weld® Solvent Welding System](#) to prevent moisture infiltration into the insulation system.
- 3.4.1.3 In applications outside of those referred to in 3.4.1.1, preformed PVC covers at the same thickness as on straight pipe sections shall usually be used on all fittings, tees, elbows, valves, caps, etc.
- 3.4.1.4 In some indoor situations where there is an expectation for high levels of physical abuse, such as in a loading dock area, where increased flammability resistance is required, or where the aesthetic appearance requirements dictate it, metal jacketing (either aluminum or stainless steel) shall be used. When metal jacketing is used on the straight sections of pipe, the same metal jacketing shall be used on fittings and elbows.

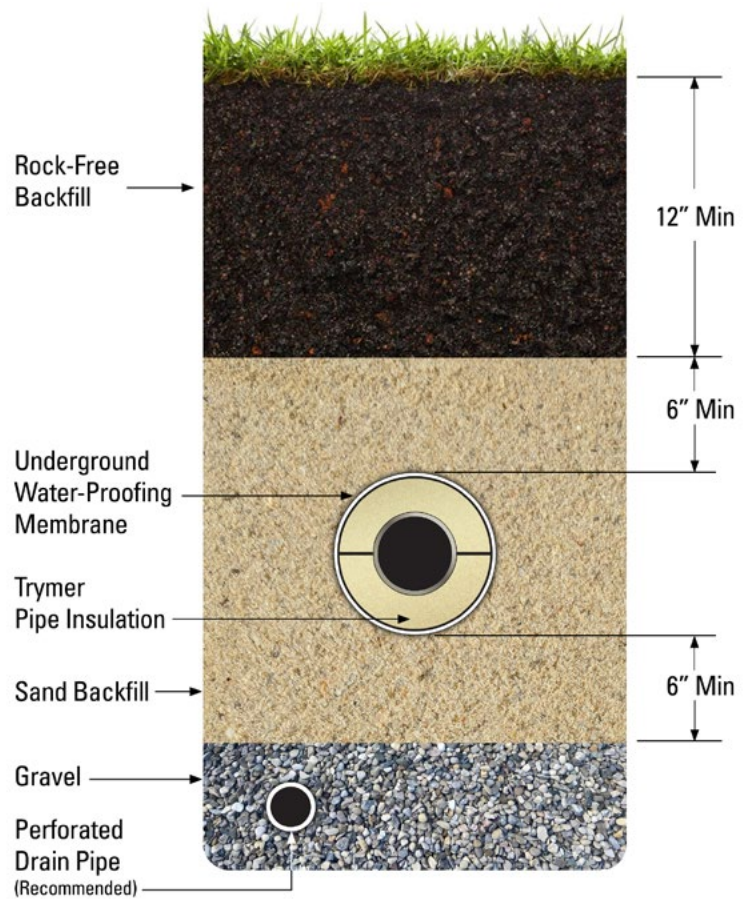
## 3.4.2 Outdoor Jacketing

- 3.4.2.1 Saranex CX Film and Saranex CX Tape shall not be used as the outer jacketing in outdoor applications.
- 3.4.2.2 Jacketing shall be aluminum or stainless steel metal cladding. All metal jacketing shall have a 3-mil thick, three-layer polyfilm moisture barrier (PFMB) factory heat laminated to the interior surface to help prevent corrosion. The use of white painted aluminum jacketing can provide some benefits when the design criterion for the insulation system depends on the outer surface temperature of the jacketing such as condensation control or personal protection. See the [JM Metal Jacketing Installation Guide](#) for more information. Consult JM for appropriate jacketing recommendations.
- 3.4.2.3 Metal jacketing for fittings, tees, valves, caps, etc. shall be sectional, factory contoured, or field-fabricated to fit closely around insulation. Metal jacketing for elbows shall be two-piece pressed elbows where available in the required sizes.
- 3.4.2.4 Banding for metal jacketing shall be 0.015" or 0.020" thick by 0.5" or 0.75" wide stainless steel. The higher thickness and wider banding have greater strength and are typically used on vessels and on larger diameter pipe. However, there are no specific sizes at which banding of different dimensions should be used. The specifier must decide what dimension banding shall be used.

- 3.4.2.5 To ensure vapor retarder continuity, only banding shall be used to secure the metal jacketing. Neither rivets, screws, staples nor any other fastener capable of penetrating the underlying vapor retarder shall be used to secure the metal jacketing.

## 3.4.3 Underground Jacketing

- 3.4.3.1 Underground jacketing shall be Saranex 560 CX Film supplied by Johns Manville. Figure 1 shows the details of trench design. Metal protective jacketing shall not be used underground.



**Figure 1 - Underground Trench Insulation Detail**

# SECTION 4 – APPLICATION

## 4.1 Piping - General

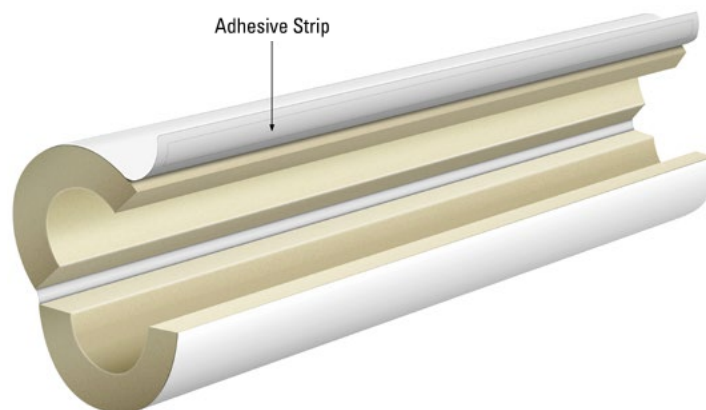
### 4.1.1 Factory Applied Saranex CX Vapor Retarder Film

- 4.1.1.1 Factory application of Saranex CX Film to XPS PIB, Trymer PIR or any other insulation must be performed by a JM Approved Fabricator. All Saranex CX Vapor Retarder Films can be factory applied to the insulation

using hot-melt, liquid or aerosol grade adhesives (see Sections 3.2.3 or 3.2.4). When using hot melt, the temperature of Saranex CX Film at point of adhesive application should be at or below 210°F to prevent the Saranex CX Film from exhibiting any shrinkage. Apply hot-melt adhesive in a thin coating or a spiderweb pattern, avoiding thick globs that may cause an uneven appearance on the outer film surface or cause hot spots that could cause the Saranex CX Film to shrink. Since the Saranex 540 CX Film is thinner, it is more susceptible to shrinkage induced by hot-melt adhesive. Care should be taken to ensure that the hot-melt adhesive is applied in a thin, even coating to avoid a wrinkled surface on the factory applied Saranex 540 CX Film. Per Section 3.2.4, solvent-based adhesives are not suitable for use with XPS insulation.

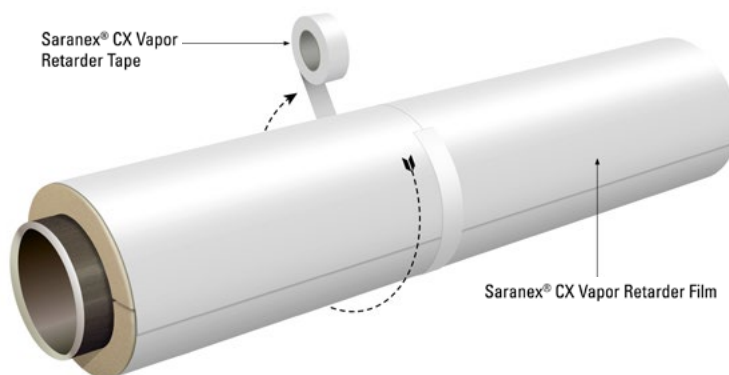
- 4.1.1.2 If joint sealant is being used on the insulation, open the mating insulation pieces with factory applied Saranex CX Film attached and apply the joint sealant as specified in the appropriate JM installation guideline or other insulation manufacturer's literature. JM recommends that when joint sealant is used, it is to be applied across one entire face of the mating surfaces in as thin a layer as possible while still achieving good adhesion. Once the joint sealant is applied, do not allow the mating insulation pieces to close.
- 4.1.1.3 Place the already open mating insulation pieces (where joint sealant has been applied) or open the mating insulation pieces (where joint sealant is not used) and place these onto the pipe or the next lower insulation layer. Align the longitudinal joints to be at about the 3:00 and 9:00 locations on the pipe with the Saranex CX Film lap joint pointing downward to naturally shed water. If this section is to be butted up against previously applied insulation, place the section very near the previously applied section and joint sealant shall be applied to the circumferential/butt joints of either this section or the section to which it will abut. See Section 4.1.1.2 for details on application of joint sealant.
- 4.1.1.4 Bring the two mating pieces together at the longitudinal joints and, if joint sealant is used, press firmly together to seal any joint sealant in the longitudinal joint.
- 4.1.1.5 Slide this section to abut any previously installed section and, if joint sealant is used, press the newly added section firmly against any previously installed section to seal any joint sealant in the circumferential/butt joint.
- 4.1.1.6 Clean the Saranex CX Film longitudinal lap joint surface to which the SSL tape will adhere or both surfaces to which an adhesive will adhere.

- 4.1.1.7 Seal the longitudinal lap joint of the Saranex CX Film using SSL tape (see Section 3.2.2) or liquid adhesive (see Section 3.2.5). Figure 2 shows more detail. If using a liquid adhesive refer to section 4.1.2.6 for installation guidelines.



**Figure 2 - Lap Seal on Saranex CX Vapor Retarder Film**

- 4.1.1.8 Smooth the lap joint with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion and minimize any gaps in the joint.
- 4.1.1.9 Butt joints in Saranex CX Vapor Retarder Film shall be sealed using 3" wide Saranex CX Vapor Retarder Tape. Tape shall be wrapped around the butt joint a minimum of 1¼ circumferences (1¼ wraps). When operating temperature is  $\leq 32^{\circ}\text{F}$  or when a permeance of 0.02 perms or lower is required, butt joints shall be wrapped with either two layers of Saranex 520 CX Vapor Retarder Tape or a single layer of Saranex 560 CX Tape. When operating temperature is  $> 32^{\circ}\text{F}$ , butt joints shall be wrapped with a single layer of Saranex 520 CX Tape. Figure 3 shows the installation details.



**Figure 3 - Factory Applied Saranex CX Vapor Retarder Film and Saranex CX Vapor Retarder Tape**

- 4.1.1.10 Elbows and fittings shall be wrapped with 1", 2" or 3" wide Saranex 520 CX Vapor Retarder Tape. Fittings shall be wrapped to provide a tight covering. Fittings shall be wrapped in a spiral configuration. When the operating temperature is  $\leq 32^{\circ}\text{F}$  or when a permeance of 0.02 perms or lower is specified, Saranex 520 CX Tape shall be spiral wrapped with a 50% overlap to provide a double layer of tape upon completion of wrapping. When operating temperature is  $> 32^{\circ}\text{F}$  or when a permeance of 0.03 perms is acceptable, use minimal overlap during the spiral wrapping of the Saranex 520 CX Tape. If necessary, mold the finished wrap by hand for proper fit of the protective jacket. When the nominal outer insulation diameter is 6" or less, 1" wide Saranex 520 CX tape is recommended. When the nominal outer insulation diameter is greater than 6" up to 18", 2" wide Saranex 520 CX tape is recommended. When the nominal insulation outer diameter is greater than 18", 3" wide Saranex 520 CX tape is recommended.

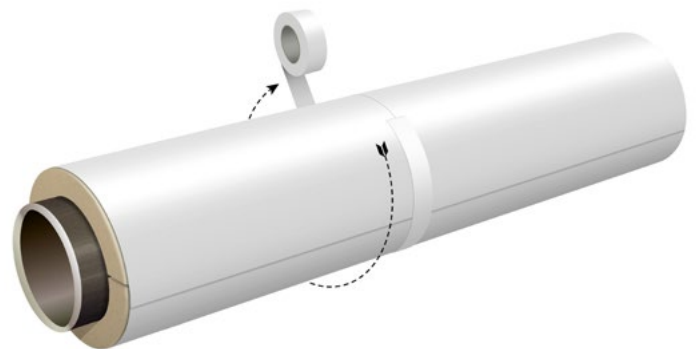


**Figure 4 - Saranex CX Tape with 50% overlap**



**Figure 5 - Saranex CX Tape with minimal overlap**

- 4.1.1.11 Smooth the spiral wrapped tape joint with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion and minimize any gaps in the joint.
- 4.1.1.12 Do not attempt to shrink-wrap Saranex CX Film that is factory applied to pipe insulation sections as this may cause the Saranex Film to separate from the adhesive and/or insulation.
- 4.1.1.13 Mastic/Fabric/Mastic (MFM) vapor retarder can be used at fittings and elbows in conjunction with Saranex CX Film applied on straight sections. See manufacturer for MFM installation instructions. Any MFM system used must meet the permeance requirements of the specification.
- 4.1.1.14 Holes or tears in the vapor retarder are repaired by applying a patch of Saranex CX Vapor Retarder Tape over the hole or tear and then wrapping over the patch and around the pipe with Saranex CX Vapor Retarder Tape a minimum of  $1\frac{1}{4}$  circumferences ( $1\frac{1}{4}$  wraps) to avoid damage to edges of the patch from mechanical wear.
- 4.1.1.15 For application of Saranex CX Vapor Retarder Film over Trymer PIR insulation where a protective jacketing is not used, the taping methods shown in Table 1 of the [JM Installation Guide](#) for Trymer Rigid Polyisocyanurate Insulation in Chilled Water Applications must be followed. For factory installed Saranex CX Vapor Retarder Film with no protective jacketing, this typically requires the application of Saranex 520 CX Tape or  $\frac{3}{4}$ " wide filament tape on 18" centers with 25% circumferential overlap ( $1\frac{1}{4}$  wraps) over the outer surface of the Saranex CX Vapor Retarder Film. Figure 6 shows these details.



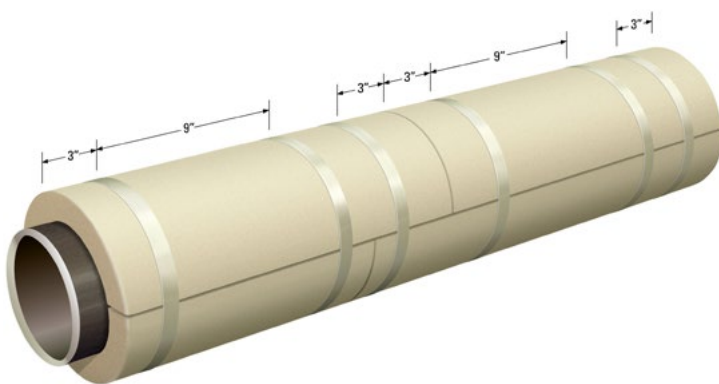
**Figure 6 - Taping Pattern for Chilled Water Applications Using Trymer PIR Insulation**

- 4.1.1.16 Smooth all tape (SSL, Saranex Tape, filament tape, or other) used in all locations with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion, and minimize any gaps between the tape and the substrate.



## 4.1.2 Field Applied Saranex CX Vapor Retarder Film

- 4.1.2.1 While field application of Saranex CX Vapor Retarder Film is acceptable, the preferred method is to use factory applied Saranex CX Vapor Retarder Film. This will usually yield a lower total installed cost due to labor savings, while also maximizing the likelihood of a good system installation by moving some of the vapor retarder installation steps into a controlled indoor factory setting.
- 4.1.2.2 For maximum film flexibility, installation should occur at temperatures above 24°F (-4°C).
- 4.1.2.3 Apply insulation per JM installation guides and/or project specifications.
- 4.1.2.4 Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of Saranex CX Film. Use nylon or glass filament type tape, .75" wide. Figure 7 shows an example of this. Each filament tape wrap shall use a minimum 25% circumferential overlap (1¼ wraps minimum).



**Figure 7 - Taping Pattern**

- 4.1.2.5 Saranex CX Film can be pre-sized and shipped to the job site cut in sheets 35.5" wide by the circumference of the pipe (plus 2" overlap) or cut to this size at the job site from long 35.5" wide rolls.
- 4.1.2.6 If adhesive will not be used to secure the lap joint, properly sized sheets of Saranex CX Vapor Retarder Film shall have SSL tape applied to one edge after cleaning of the area of the Saranex CX Film to which the SSL will be attached. These sheets are then installed around the pipe insulation by placing the edge opposite that with the SSL tape at about the 3:00 or 9:00 position on the insulation and then wrapping the Saranex CX Vapor Retarder Film down under the pipe, up the other side, over the top of the pipe, and finishing near the starting location. Clean the Saranex CX Film longitudinal lap joint surface to which the SSL tape will adhere, remove the SSL release paper, and adhere the SSL to the Saranex CX in the lap joint.

Smooth the lap joint with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion and minimize any gaps in the joint.

- 4.1.2.7 If adhesive rather than SSL tape will be used at the longitudinal joint, the properly sized sheets shall be installed in the same manner as described in 4.1.2.6 except that both adhering surfaces shall be cleaned and then a suitable adhesive (see Section 3.2.5) shall be used to seal the longitudinal joint. Smooth the lap joint with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion and minimize any gaps in the joint.
- 4.1.2.8 Adhesive holding the Saranex CX Vapor Retarder Film to the insulation is not necessary.
- 4.1.2.9 Subsequent pieces of Saranex CX Vapor Retarder Film are applied by either overlapping the previous Saranex CX Vapor Retarder Film section at the circumferential/butt joints or by leaving a gap of ~0.5" between it and the previous Saranex CX Vapor Retarder Film section. Overlapped pieces can have the circumferential/butt joints sealed with adhesive or with suitable Saranex CX Vapor Retarder Tape. Clean all surfaces to which the tape or adhesive will adhere. Circumferential/butt joint gaps shall be sealed with suitable Saranex CX Vapor Retarder Tape. See Section 4.1.1.9 for more information on this.
- 4.1.2.10 Apply Saranex CX Vapor Retarder Tape to fittings and elbows per Section 4.1.1.10.
- 4.1.2.11 Saranex CX Film can be spiral wrapped around a length of pipe insulation in one continuous piece. Clean the adhering surfaces, apply adhesive or Saranex 520 CX Tape at overlapped spiral edge, and smooth this spiral joint with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion and minimize any gaps in the joint. When electing to use adhesives, refer to manufacturer's instructions for application of contact adhesives along this spiral edge to ensure a permanent bond. Apply Saranex CX Vapor Retarder Tape to fittings and elbows per Section 4.1.1.10. This spiral technique is a preferred installation method when wrapping larger diameter pipe where individual pre-sized pieces of Saranex CX Film would be impractical.
- 4.1.2.12 Saranex CX Film can be wrapped in cigarette fashion along the length of roll for insulation systems with an outer circumference of 33.5" or less. The 33.5" circumference limit allows for the 2" overlap seal. Using the length of the roll allows for longer sections of Saranex CX Film to be installed at one time. Use liquid adhesive on the lap seal and smooth this joint with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion and minimize any gaps in the joint. Visually inspect the lap seal for any fish mouthing and use Saranex 520 CX Vapor Retarder Tape along the lap seal to help secure joint. Apply Saranex CX Vapor Retarder Tape to fittings and elbows per Section 4.1.1.10.



- 4.1.2.13 Consult manufacturer's guidelines for proper use of liquid contact adhesives. Recommended cure times must be followed for contact adhesive to properly set prior to joining of the two surfaces.
- 4.1.2.14 Entire field installation of Saranex CX Film may be heat shrunk if a tighter fit around insulation is desired. Saranex CX Tape at fittings/elbows shall not be heat shrunk.
- 4.1.2.15 Holes or tears in the vapor retarder are repaired by applying a patch of Saranex CX Vapor Retarder Tape over the hole or tear and then wrapping over the patch and around the pipe with Saranex CX Vapor Retarder Tape a minimum of 1¼ circumferences (1¼ wraps) to avoid damage to edges of the patch from mechanical wear.
- 4.1.2.16 MFM vapor retarder can be used at fittings and elbows in conjunction with Saranex CX Film applied on straight sections. This technique is used in lieu of the 1", 2" and 3" wide Saranex 520 CX Tape at elbows and fittings. See manufacturer for MFM installation instructions. Any MFM system used must meet the permeance requirements of the specification.

## 4.2 Underground Piping

- 4.2.1 Saranex 560 CX Film shall be used in underground applications. Metal protective jacketing shall not be used underground. Insulation shall be used in conjunction with a vapor retarder.
- 4.2.2 Saranex CX Film shall be factory or field applied using any of the methods described in Sections 4.1.1 or 4.1.2.
- 4.2.3 Saranex CX Film should be applied prior to pipe sections being placed in trench. If pipe is to be installed prior to application of Saranex CX Film, a void space below the pipe large enough to allow the Saranex CX Film to be wrapped under the pipe without being contaminated by dirt will be necessary.
- 4.2.4 Refer to Figure 1 in section 3.4.3 for recommended trench detail in underground applications.
- 4.2.5 Fill around the pipe shall be sand without contaminants that may puncture the vapor retarder.
- 4.2.6 Drain tile in trench bottom is recommended to reduce time the insulation system will be immersed in groundwater.

## 4.3 Tank, Vessel and Equipment

- 4.3.1 Field apply Saranex 540 CX or 560 CX Vapor Retarder Film. See section 3.1.3. Tightly wrap the vessel or equipment insulation circumferentially with the Saranex Film. Overlap the seams by a minimum of 2". Seal the overlapped seams with Saranex 560 CX Vapor Retarder Tape or the solvent adhesives referenced in section 3.2.3. On vertical vessels, apply the Saranex 540 CX or 560 CX Film starting with the bottom course and working upwards. Each course should overlap on top of the one below it thus providing a joint that will naturally shed water. Refer to section 4.1.2 for field application techniques.
- 4.3.2 The vapor retarder on curved head sections shall be mastic/fab/mastic or approved alternate. Any MFM system used must meet the permeance requirements of the specification.
- 4.3.3 Flat head tank sections shall be covered with Saranex CX Film or MFM. When Saranex CX Vapor Retarder Film is used, joints shall be sealed with Saranex 560 CX Vapor Retarder Tape. Tape shall be smoothed at the joints with a flexible rubber squeegee to remove wrinkles, achieve maximum adhesion and minimize any gaps in the joint. Any MFM system used must meet the permeance requirements of the specification.
- 4.3.4 Indoor tanks and equipment shall be covered with Zeston Series PVC jacketing unless conditions allow for exposed Saranex CX Film and Saranex CX Tape. Refer to section 3.4.1.1. Outdoor tanks and equipment shall be covered with aluminum jacketing. Consult manufacturer's recommendations for jacketing thickness. See section 3.4 for additional information.
- 4.3.5 Using a vapor retarding material, caulk around all penetrations in the vapor retarder system such as at openings around flanges, instrument leg openings and support steel.



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