



A SIKA COMPANY

# INSTALL DATA EMSEAL SJS-FR

**IMPORTANT!** Do not install this material until all members of your crew have read and understand these instructions and all related MSDS sheets. If any of the crew do not understand any part of these instructions call EMSEAL: 1-800-526-8365 or 508-836-0280

This product can only fulfill its design function if it has been correctly selected and correctly installed. This means that joint width (after allowance for concrete shrinkage), total joint movement and expected loads must have been considered and accounted for. These installation instructions are generic and may need adapting to suit specific project requirements and unique conditions. Consult EMSEAL if necessary.

The SJS-FR is a silicone bellows/coverplate system that is anchored to the joint faces of structural expansion joint gaps between flat, level, adjacent slabs. Installation will bring the top surface of the SJS-FR proud of the finished deck level by the thickness of the coverplate or slightly recessed where this installation option has been specified, selected, and properly executed. Please note that, in appearance, the SJS-FR1 and SJS-FR2 Systems are identical. They do vary in the amount of fire-retardant-impregnated foam in the build. This difference is monitored by UL as part of their ongoing certification. Both SJS-FR1 (1-hour fire-rated) and SJS-FR2 (2-hour fire-rated) are installed using the same instructions found in this installation sheet.

**Design/System/Construction/Assembly Usage Disclaimer** This material has been tested to UL/ULC 2079 and is manufactured under UL's Follow-Up Service. The material is being supplied as a fire-rated component of a wall or floor assembly. It has been tested to UL 2079 in assemblies as depicted in EMSEAL's various listings in the UL Online Certifications Directory. Use of this material in assembly configurations other than depicted in the named UL listings will not encumber or lower the resistance of the deck or wall assembly but is done so at the designers' discretion and responsibility for designing substrates as part of a fire rated assembly that meet applicable standards for the project. Similarly, the published information in the UL Listings cannot always address every construction nuance encountered in the field. Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified products or materials. Authorities Having Jurisdiction should be consulted before construction to ensure that specific adjacent substrates and assemblies are detailed and constructed to meet local fire-rating requirements.

## Installation Options

The SJS-FR System from EMSEAL can be installed in several ways as selected by the designer or owner:

- 1) Surface mounted on top of concrete deck (no recess, no blackout).
- 2) Surface mounted on top of EMSEAL's Emcrete elastomeric nosing material in blockouts on each side of the joint.
- 3) Recessed on top of EMSEAL's Emcrete elastomeric nosing material in blockouts on each side of the joint.

These installation instructions will discuss the installation of the SJS-FR System assuming that all concrete prep and blackout work including the placement of the Emcrete elastomeric nosing has already been done.

Sections at the end of these instructions provide tips on concrete preparation, spall repair using Emcrete elastomeric nosing, leveling of the deck surfaces etc.

It is important that you and all members of your crew read and understand this entire installation manual before proceeding with installation.

## Identification of sizing difference (NOTE A)

Use this illustrative guide for all SJS-FR-based products.

SJS-FR is available in standard sizes from 2" (50mm) up to 10" (250mm).

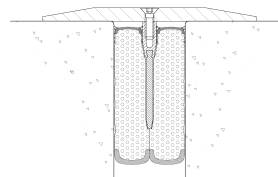
Smaller widths from 2" (50 mm) up to 3.5" (90 mm) can be seen in **SJS-FR Illustration A**.

Larger widths of 4" (50mm) up to 10" (250mm) can be seen in **SJS-FR Illustration B**.

Exact widths of 4" (50mm) ONLY can be either variation.

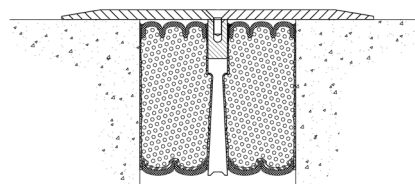
**IMPORTANT: The smaller size (A) does not have a locking pin. Also the final coverplate torque requirements differ with size (Steps 26 and 27)**

**SJS-FR Illustration A**



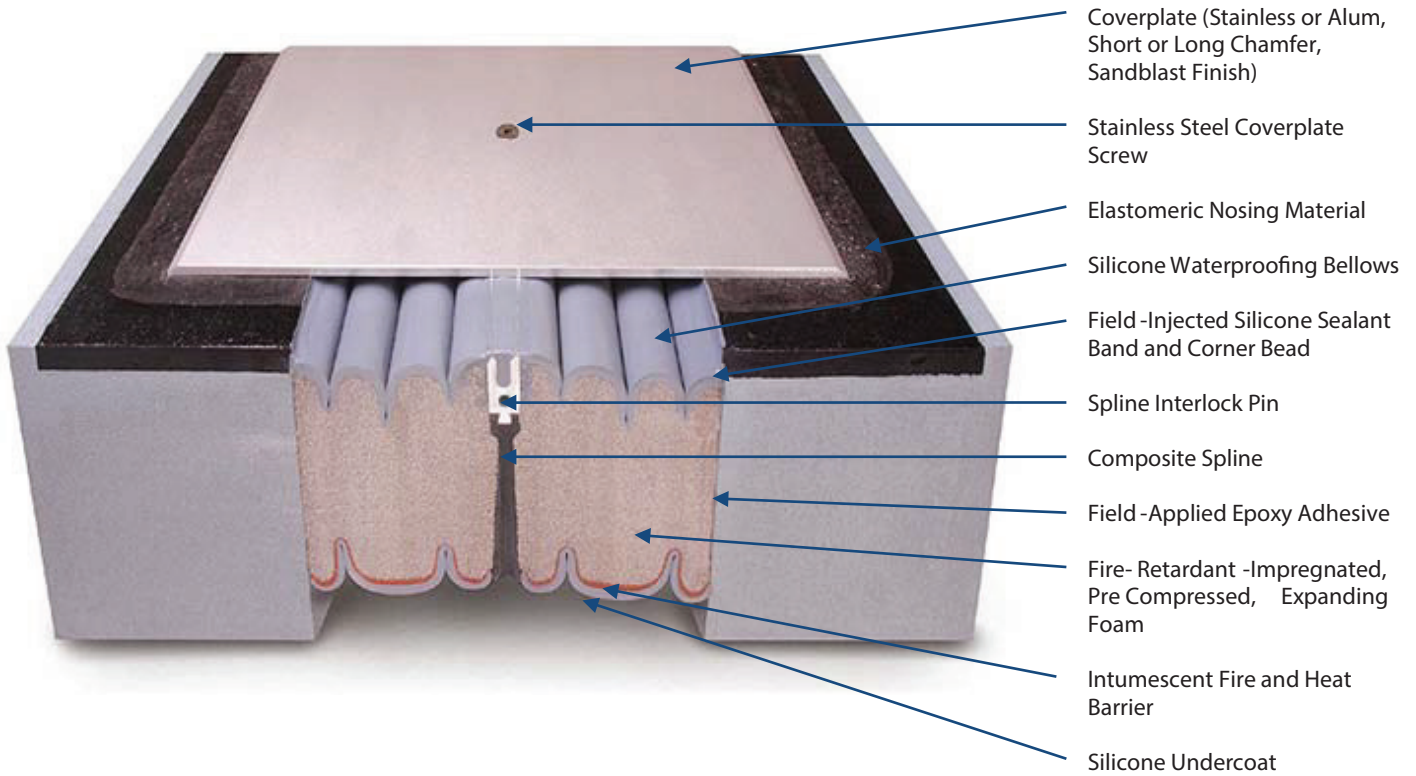
Width: 2" (50mm) to 3.5" (90mm)

**SJS-FR Illustration B**



Width: 4" (100mm) and wider

## SJS-FR System Components



SJS-FR System as supplied — precompressed, shrink-wrapped, with spline pins and installation hanger bars.



SJS-FR System installed with Emcrete elastomeric nosing material in blockouts on each side of joint gap.

**IMPORTANT: Spline locking pin is not present on shallow depth smaller width SJS-FR - NOTE A page 1 Illustration A.**

## Equipment List For Installation of SJS-FR-Seismic Joint System from EMSEAL

In addition to normal tools of the trade and safety equipment as required by the installing contractors' internal safety program and in compliance with local, state and federal safety requirements, the following material and equipment must be on-site before the EMSEAL Technician arrives or before installation can begin:

### For Preparing Concrete and Grinding Concrete & Nosing Material

- 4-inch angle grinder(s)
- Diamond cup blade(s) for concrete
- Abrasive blade(s) for metal
- "ZEK" wheel pads or 20-grit sanding disks for abrading EMSEAL elastomeric nosing material

### For Forming Nosing Material and/or for Spall Repair

- 2-inch Styrofoam extruded polystyrene cut into 6-inch wide strips. (Total quantity 2-times the joint length)
- 2-inch Duct tape (Total quantity 3-times the joint length) for wrapping the Styrofoam to aid release from nosing material
- "Cherry paper" building felt to mask joint edges (Total quantity 2-times the joint length)

### For Cutting and Drilling Aluminum

- "Sawz-all" (reciprocating saw)
- Metal cutting blades for Sawz-all
- Cutting-oil ("3-in-1" or equal)
- Drill – sizes 3/8-inch Drill (for drilling new coverplate holes if needed)
- Countersink bits
- Small hand-held metal (fine-toothed) file (for removing metal burrs after cutting)

### For Installing and Tooling Liquid Joining Silicone and Sealant Bands from Sausages

- Sausage caulk guns to hold 20-oz silicone sausages
- Sausage-gun nozzles (cones)
- Caulk knives
- Utility knives

### For Gunning and Spreading Liquid Intumescent Joining Material from Caulk Tubes

- Sausage caulk guns to hold 20-oz intumescent sausages
- Sausage-gun nozzles (cones)
- Caulk knives

### For Mixing and Spreading Epoxy Adhesive

- Heavy duty electric, plug-in, low-speed, high-torque drill for mixing thick epoxy
- New clean paddles, "jiffy mixers", for use in electric drill
- Minimum 6 each – 1 1/2-inch wide by min. 8-inch long margin trowels
- Clean or unused plaster/paint pails to mix epoxy, hold cleaning solvents, etc.

### For Removing & Installing, Screws in Hanger Bars and Coverplate

- Hi-Torque, electric Drill-Driver(s) – to remove and reinstall stainless steel screws. Drill-Drivers instead of drills are required to help prevent over-tightening the screws
- Minimum 6 ea – 5/32 or 7/32-inch hex bit socket drill drivers (3/8-inch drive) See NOTE A Page 1 to identify SJS-FR

- 3/8-inch socket adapters (for use in drills)
- Heavy hammer (3-pound) to tap end of spline to set spline pins at opposite end of stick
- Long-handled 3/8-inch socket wrench (for final hand tightening of screws)

### Other Miscellaneous Tools and Materials

- Levels, 2-foot, 4-foot, and torpedo-level
- 100-foot tape measure
- 1 box of lumber crayons (to mark high spots for grinding)
- Combination square
- Chalk box with chalk
- Flat bar and small pry bar
- Pail of cleaning solvent (acetone or equal) (depending on the size of the job, less solvent may be adequate)
- Box of clean, dry, lint-free, 100% cotton cloth (not paper) rags
- Shop Vac
- Extension cords
- Generator or reliable electrical source
- High-pressure blowers to clear debris

## Coverplate Inspection and Storage

### ▲ IMPORTANT ▲

**Customer is responsible for inspection and proper storage of material upon arrival.**

**Coverplate metals, when in contact with moisture while in their packaging, may discolor--ensure shipments are kept dry.**

## Storage and Handling

**NOTE** – The precompressed foam in the SJS-FR System will expand faster when hot and slower when cold.

**On hot days Above 60°F (15°C)** – Keep the material in its cardboard shipping cartons, out of direct sunlight (preferably on an intermediate, shaded deck.)

If no shade is available on a really hot day, keep the material inside an air-conditioned job van, or open the lids of the shipping cartons and lay bags of ice over the material. This will give you more working time.

**On cold days Below 41°F (5°C)** – If it is sunny out, open the cartons and set the material in the sun. Or, keep the material in a heated job-van until immediately prior to use.

### 1. Use grinders to remove all bumps and protrusions of concrete from joint faces. Concrete:

- Remove loose particles and weak concrete to ensure sound concrete substrate. Spalls, chipped edges and uneven surfaces must be repaired using suitable patching material and proper patching geometry





and techniques. Joint faces must be parallel. Joints must have unobstructed depth greater than or equal to the full depth of the largest material supplied plus 1/2-inch (6mm).

- Remove all contaminants by sandblasting or grinding to ensure a thoroughly clean and sound substrate for the full sealant depth. **NOTE** – DO NOT use a wire wheel — this will polish the substrate and cause bond-failure.
- Dry all wet surfaces. **NOTE** – If a flame is used to dry substrates this will leave carbon on the substrate and cause bond-failure. Grind and clean the surfaces to remove carbon.
- Wipe joint faces with solvent-dampened, lint-free rags to remove all concrete dust and contaminants.

#### Metal:

- Sandblast or grind to rough, white metal and solvent-wipe immediately prior to applying SJS-FR epoxy.

**IMPORTANT:** Ensure that no oxidation (rusting) occurs before the epoxy is applied.

Other Substrates: Contact EMSEAL.

### 2. Prep and repair any spalls at the joint edge and at the back edges of the blockout with appropriate repair material and repair geometry.

**NOTE** – Repair of spalls is best done using EMSEAL's Emcrete elastomeric nosing material. This material is flowable, self-leveling, and fast curing. If your project is to use the installation option that involves installing a nosing material as a low-friction, sound reducing, support for the cover plate of the SJS-FR, then spalls can be repaired in a single step along with filling the blockout — see "Tips for working with Nosing Material" section, page 7.



### 3. Ensure deck heights are the same across joint-gap and that there are no obstructions to the free movement of the cover plate.

**NOTE** – Place coverplate sections across the joint opening. Remember that the joint will close during summer heating. This means that when closed, the cover plate must be free to slide on both sides of the centerline of the joint opening. Any cured lumps, lips, overpours of concrete, will prevent free movement. Grind these off using diamond cup grinders.



### 4. Using wire brushes, blowers, and solvent wiping, remove all dust and debris from joint faces.

**NOTE** – This step is critical to ensure that the epoxy adhesive bonds properly to the joint faces. Any dust or debris left on the substrates could cause a bond failure.



### 5. Ensure deck is even and flat along its length on both sides of the joint.

Cover plates are supplied in standard 5-foot lengths. In order to be fully supported and to prevent rocking, the deck or nosing surface must be level across the joint for the full length of each plate.

This is achieved by laying out the cover plates over the joint opening along the entire length of the joint. Then by putting pressure on one edge of a plate, push down on the opposite side. If the plate rocks, identify where the high spot(s) are under the plate. Lift the plate and mark these spots using a lumber crayon. Use a grinder and 'ZEC' wheel or 20-grit sanding disk to remove the high spot(s). Place the cover plate back over the location and repeat the process until the plate lies flat and no rocking can be produced.

**NOTE** – This leveling process is easily achieved when the Emcrete elastomeric nosing is used. If installed directly onto concrete, this process will require you to grind the concrete using diamond cup grinders.

### 6. Mix one kit of epoxy adhesive and apply a thin coat (no more than 1/16-inch thick) to both joint faces to a depth of 4-inches (100mm) — be sure to extend epoxy between parapet or split column faces of transitions to upturns.

#### Mixing Epoxy:

- EMSEAL epoxy adhesive may be used in the 41°F (5°C) to 95°F (35°C) temperature range.
- Using a trowel, transfer the entire contents of Part B (hardener) into the contents of Part A (base).
- Mix the material thoroughly with a drill and mixing paddle. Scrape the walls and bottom of the container to ensure uniform and complete mixing.
- Always mix component B (hardener) into component A (base).
- Ensure that a uniform gray color with no black or white streaks is obtained.

**IMPORTANT:** DO NOT thin the epoxy.

Ensure that the mixed epoxy adhesive is applied to the substrate before the pot life has expired (10 – 30 minutes depending on the ambient temperature).

**WARNING** – Epoxy will harden more quickly when left in the pot — get it onto the joint face as soon as possible.



**IMPORTANT:** The epoxy must still be uncured when installing the SJS-FR into the joint-opening.

If the epoxy cures before installing the SJS-FR then reapply new epoxy. If work is interrupted for more than 2 hours after initial cure then grind the old epoxy and apply new wet epoxy.

**NOTE** – If preferred, you may use a bulk gun to draw up and apply epoxy to the joint faces and to the side of the foam before spreading it with the margin trowels.

**IMPORTANT:** While one or more workers are applying epoxy to the joint faces, others must prepare the SJS-FR assemblies.

**7. Prepare a “starter piece” of SJS-FR, to suit the transition or termination detail suitable to the joint as agreed in discussion with EMSEAL and EMSEAL field technician.**

**NOTE** – Starter pieces and end pieces are custom configured based on the needs of the particular installation. Usually they have an end where the center spline stops short and the last six to eight inches is foam only. This allows you to trim, notch and bend, or miter the foam to suit termination requirements.

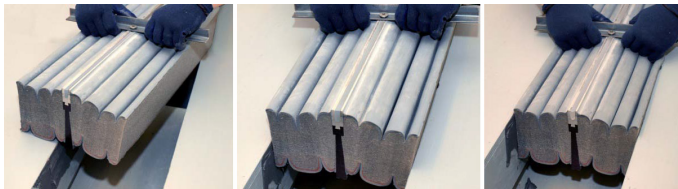
**8. Open SJS-FR System “starter piece” by cutting shrink-wrap by running a utility knife along the hardboard sides. (DO NOT cut along silicone bellows surfaces).**

Remove and discard shrink-wrap and hardboard.

**IMPORTANT:** Work quickly and deliberately after cutting the shrink-wrap to avoid material expanding beyond a usable size.



**9. Allow foam to expand to the width (or just slightly greater) of the joint opening so that when lowered it fits snugly into the wet epoxy on the joint faces and does not sag below the lip of the blockout**



**10. Rotate joint hanger bars to hold the joint assembly in place**



**11. Clean the silicone bellows and faces using clean, lint-free, cotton rags and water to remove the slight white manufacturing powder on the silicone surfaces.**



**12. Using a sausage caulk gun, nozzle, and the silicone sausages supplied, apply a thick (1/8-inch) bead of liquid silicone**

to the face of the silicone bellows and onto the foam along and 1/2-inch (12mm) below the silicone bellows. Do this for both the top and bottom silicone bellows.



**13. Using a large (20 ounce) bulk caulk gun and the intumescent caulk sausage provided, gun intumescent caulk on the foam face of the end of the material.**

Gun enough intumescent material so that when it is spread out with a caulk knife it will provide a 1/8” (3mm) thick coating over the entire foam and spline surface.



**14. Using a caulk knife, spread the intumescent across the foam and spline face to an even 1/8-inch (3mm) coating.**



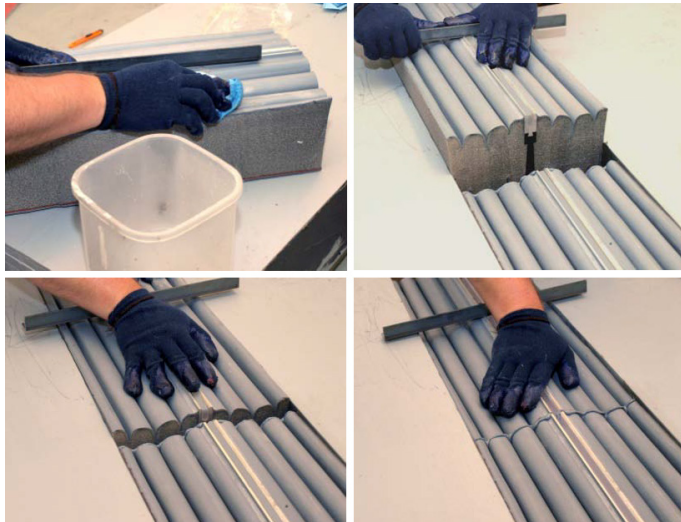


**15. Unpack and wipe next material assembly, and lower it into the joint against the wet epoxy on the joint faces, sliding it up to align with the already installed piece.**

Make sure the end of the joining pin lines up with the hole in the spline of the previously installed spline. Push the lengths together so that the spline pin pushes all the way into the hole of the previous length.

Ensure the splines of each length are snugged up tightly against each other.

**NOTE** – Some of the silicone tooled to the face should squeeze out between the bellows faces.



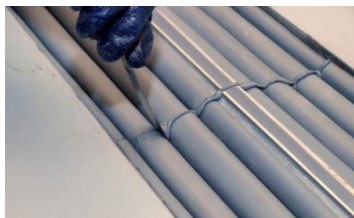
**16. If the spline pin\* did not seat all the way in step 15, use a 3-pound hammer to tap the aluminum part of the end of the spline away from the joint to ensure that the spline-pin is driven all the way into the previously installed length. (\*Smaller widths do NOT have a joining pin. See NOTE A page 1)**

**Note** – liquid silicone should squeeze up out of the joint.



**17. Using a caulk knife, tool the joining silicone into and across the bellows.**

If necessary, use the caulk gun to apply additional silicone to the joint between the two lengths and tool excess from the surface and between the wrinkles of the bellows.



**18. Repeat process until all lengths of joint assembly have been installed.**



**19. Using lint-free cotton rags and solvent clean the silicone bellows next to the joint faces to receive the silicone sealant bands and corner beads.**



**20. Using the same procedure as with the “starter piece”, cut the “closing piece” to length by trimming the foam-only end. Address the transition or termination at the end of the joint as agreed in consultation with EMSEAL.**

**21. Using your sausage gun and the silicone sausages provided, inject silicone sealant bands between the foam, silicone bellows, and joint faces. Inject a deep (minimum 3/4-inch (20mm)) band of liquid silicone.**

**NOTE** – Rotate hanger bars as you go so you can install a continuous corner band of silicone.

*IMPORTANT: On installations of long runs of material, have one worker drop back after the installation of the first 2–3 lengths to follow along and carry out step 17, 19, and 21.*

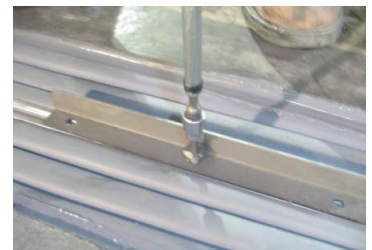


**22. Using a caulk knife, tool the silicone into a corner bead between the top of the silicone bellows and the joint face.**

*IMPORTANT: Do not let silicone get between the folds of the bellows.*



**23. Starting at one end of the joint, remove the first one or two hangers to make room to install the first section of coverplate.**



**24. Lay out cover plates next to the joint to identify starting and finishing plates.**

**NOTE** – Coverplates are shorter than the foam/spline assembly so that they can be laid across the joints of the foam/spline assembly. DO NOT line up the coverplate ends over a foam/spline assembly join. Lay out all of the coverplates beside the joint to ensure that plate joints do not line up with foam/spline joints.

**25. Place the first section of coverplate over the joint assembly and line up the screw holes over the channel in the spline.**



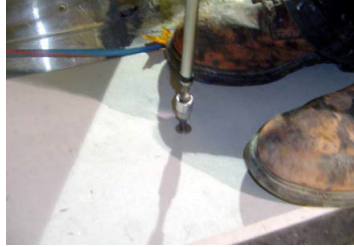
**26. Using a drill-driver and hex bit socket, drive the coverplate screws into the spline channel until tight.**

**Smaller SJS-FR (Illustration A) uses a 5/32" socket.**

**Larger SJS-FR (Illustration B) uses a 7/32" socket.**

**(See NOTE A page 1)**

CAUTION: Driving the cover plate screws requires a lot of torque. Be sure to have a firm grip on a supporting handle on the drill driver. Be sure to brace the drill as needed to prevent it from spinning and causing injury.



**27. Manually tighten coverplate screws to final torque**

It is critical that the top of the spline be pulled up tight to the underside of the coverplates.

To achieve this, you must use a torque wrench and tighten each screw:

**--Smaller-width SJS-FR**

**(NOTE A pg1 - Illustration A)** using a 1/4" diameter screw and a 5/32" hex bit socket, torque to 156 in-lbs (13 ft-lbs; 17Nm).

**--Larger-width SJS-FR (NOTE A pg1 - Illustration B)** using a 3/8" diameter screw and a 7/32" hex bit socket, torque to 240 in-lbs (20 ft-lbs; 27Nm).



**28. Remove next joint hanger(s) as needed and, leaving a 2-mm spacing between coverplates (approx thickness of a US quarter coin), install coverplate sections until installation is complete with the installation of the final finishing cover plate.**



### TIPS for working with Emcrete Nosing Material

- 1) Completely wrap Styrofoam form strips with duct tape to make removal easier
- 2) Place a Styrofoam form against each joint face and insert Styrofoam wedges between forms
- 3) Prime blockouts and spalls with EMSEAL's Emprime Primer
- 4) Mix nosing material in accordance with on-site instructions from an EMSEAL field technician.



Pour nosing material into blockouts to level with bottom of concrete chamfer or to within 3/8-inch from deck surface. Use nosing material to ensure blockouts are level from one side of the joint to the other. Use nosing material in this step to ensure blockouts are level along their length.

Blockouts can be filled flush to the deck or recessed by the thickness of the cover plate supplied.

### TIPS for transitioning SJS-FR to COLORSEAL or WFR2 in parapets, split columns, and wall joints

- 1) Follow the on-site instructions of an EMSEAL field technician for the proper execution of all transitions and terminations.
- 2) Insert this foam-only end between the faces of the parapet walls or split columns into the wet epoxy being sure to push it in to the depth of the vertical foam to join it from the vertical plane.

### Site Fabricate Transitions and/or Connect Factory-Fabricated Transitions

If the system contains special pieces or transitions such as tees or right angles, these must be site-measured, cut and fabricated (or connected if factory-fabricated) at this stage to complete the system.

**NOTE** – If starting at a transition (Upturn, Flat 90° etc) join the first full length to the already installed transition piece.