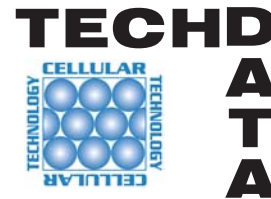




DSM-DS SYSTEM

Dual-Sided Below Grade Expansion Joint System



Product Description

The DSM-DS SYSTEM is a dual-sided expansion joint designed for primary use in sealing below-grade applications where installation is limited to the negative side with some moisture protection needed on the positive side. It can also be used in above-grade applications where positive-side installation is attainable demanding a watertight seal, but the negative side calls for a vapor or moisture barrier.

The system is comprised of:

- 1) Precompressed, silicone-and-impregnated-foam hybrid installed into
- 2) field-applied epoxy adhesive on the joint faces; with the dual-faced silicone bellows locked to the joint faces with
- 3) a silicone sealant band on the watertight side (see Figure 1).

The DSM-DS SYSTEM features sealing performance significantly greater than any acrylic impregnated predecessor. In addition, it is **odorless, clean handling, UV stable, non-staining, and features low temperature flexibility** not previously available in asphalt, wax, or isobutylene-based predecessors.

The result is extension of the usability of the product to applications where asphalt and wax-based products do not work well under conditions of thermal shock (rapid opening and closing of joints during large temperature swings). These applications include joint-face adhered installations in below grade applications such as walls and floors and tunnel ceilings.

Suitability is further extended to joint applications in colder geographical regions to which asphalt and wax-based predecessors have not previously been recommended.

Features

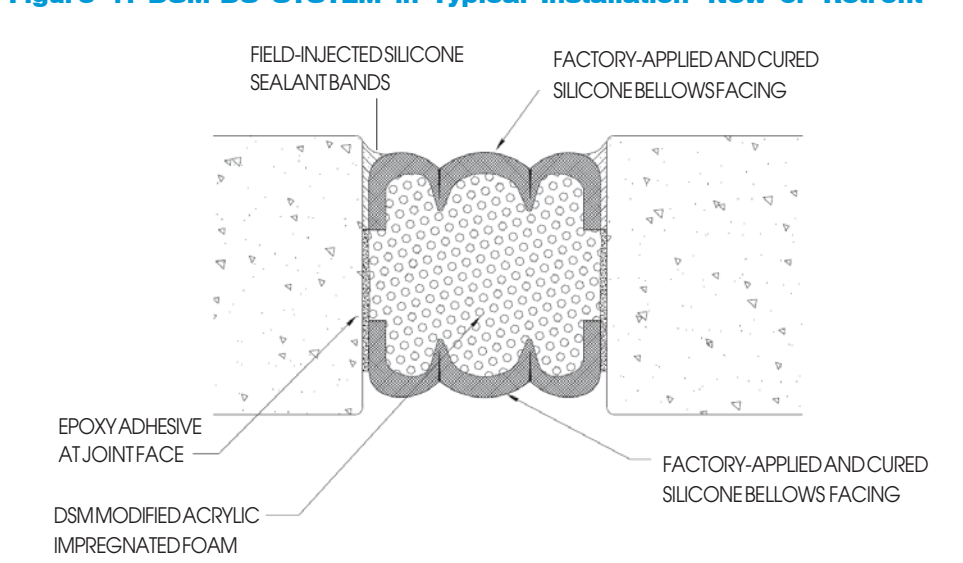
Watertight—the tensionless silicone bellows are installed slightly recessed from the top/outer surface of the substrate. The addition of a final silicone band between the substrate and the bellows ensures watertightness to that particular face.

Non-Invasive Anchoring—there are no hard metal-to-concrete connections with the DSM-DS SYSTEM. This includes embedded pins, anchors, screws, bolts or tracks, trays or rails. The system is

Uses

- Below grade walls
- Slab on grade / foundation floors
- Tunnel walls, ceilings and floors
- Planter walls to seal inside planter and outer wall
- Wastewater digester lids to seal out weather and contain methane for harvesting
- As containment for injected polyurethane grouts

Figure 1: DSM-DS SYSTEM in Typical Installation--New or Retrofit



locked to the joint faces by means of the backpressure of the foam; the epoxy adhesive, and the injected silicone sealant band at the joint face to foam and silicone bellows interface.

Continuity of Seal—as in all EMSEAL expansion joint systems, continuity of seal through changes in plane and direction is an essential performance differentiator. Details for watertight, field-fabricated transitions from walls, floors, tees, (etc.) are available from EMSEAL.

Movement Capability

+30% and -25% (Total 55%) of nominal material size (see "Performance").

Aesthetics & Versatility—Standard color is gray (other colors available), uniform bellows appearance, double sealing, fuel resistance, and an enhanced ability to handle variations in joint size are among other system features.

Performance

- Capable, as a dual seal, of movements of +30%, -25% (55% total) of nominal material size. DSM-DS will remain watertight on the sealed negative side up through movements of +50% of nominal material size with the silicone bellows providing the waterproofing
- Substrates must be parallel, plumb and capable of resisting approx. 2.5 psi backpressure from the foam.
- Standard sizes from 1/2" (12mm) to 12" (300mm)*. Other sizes available subject to review of application: consult EMSEAL.

*Floor joints greater than 4-inches (100mm) which are subject to traffic require a coverplate system.

Composition

- DSM-DS is produced by coating an impregnated cellular foam with high-grade silicone on opposing faces.
- The silicone external facing is factory applied to the foam at a width greater than maximum joint extension and is cured before final compression.
- Silicone application and curing takes place in a factory-controlled environment. In contrast to field applied liquid sealant and backer rod installations, no movement takes place during curing that can cause deformation or stresses in the material.
- When compressed, a bellows is created in the coating on both exposed faces. As joint movement occurs the bellows simply folds and unfolds free of tension on the bondline, and virtually free of tensile stresses in the silicone material.
- The foam provides a resilient backing to the silicone coating, making the system capable of resisting reasonable transient point loads (see Performance).
- DSM-DS SYSTEM is supplied in 6.56 LF (2m) shrink-wrapped lengths (sticks). It is precompressed to less than the joint size for easy insertion. After

removal from the shrink-wrap and hard board restraining packaging, it expands gradually.

Installation

IMPORTANT: The following instructions are a summary. Refer to "DSM SYSTEM Install Data" and job-specific instructions of an EMSEAL technician for complete procedures.

- Store indoors at room temperature. Expansion is quicker when warm, slower when cold.
- Ensure material nominal size matches joint size.
- Mix epoxy and trowel a thin layer onto the joint faces to at least the depth of the DSM-DS foam.
- Apply a thin layer of epoxy to both sides of the joint face.
- Remove shrink-wrap packaging, hardboard. Heat using torch to expand material to a snug fit in the joint.
- Insert material into joint with at least a 1/4" (6mm) recess.
- Join lengths by pushing silicone coated ends firmly together.
- Wipe silicone facing using clean, lint-free rag made damp with solvent.

- Before the epoxy cures, force the tip of the sealant tube between the foam and the substrate and inject a silicone sealant band. Tool overflow sealant into a cove bead between the top of the silicone bellows and the substrate. Tool silicone between joined lengths so that bellows is not restrained by excess silicone. *Note: Application of silicone sealant bands ensures warranted watertightness at the sealed face. Restriction of installation access may preclude the ability to seal both faces.*

Warranty

Standard or project-specific warranties are available from EMSEAL on request.

CAD Details & Guide Specs

Guide specifications and CAD details are available at www.emseal.com.

Availability & Price

DSM-DS SYSTEM is available for shipment internationally. Prices are available from local representatives and/or directly from the manufacturer. EMSEAL® reserves the right to modify or withdraw any product without prior notice.

Table 1: Typical Physical Properties of DSM-DS Foam

Property	Value	Test Method
BASE MATERIAL Impregnation	CELLULAR, HIGH DENSITY, POLYURETHANE FOAM Proprietary, modified, water-based, acrylic	N/A N/A
TENSILE STRENGTH Elongation - ultimate	22.3 PSI MIN (153 kPa) 157% min	ASTMD3574 E ASTM D3574 E
TEMPERATURE SERVICE RANGE	185°F (85°C) -40°F (-40°C)	ASTM C711
HIGH	185°F (85°C)	
LOW	-40°F (-40°C)	
UV RESISTANCE (Accelerated Weatherometer)	No CHANGES--2000 HOURS	ASTM G155-00A
RESISTANCE TO AGING	No CHANGES--2000 HOURS	ASTM G155-00A
Bleeding: -40°F to 180°F (-40°C to 85°C)	No bleeding when compressed to minimum of claimed movement i.e. -25% of nominal size and when simultaneously heated to 180°F (85°C) FOR 3 HOURS	
COMPRESSION SET	MATERIAL RECOVERS TO +30% OF NOMINAL SIZE WITHIN 24 HOURS OF COMPRESSION TO -25% AND SIMULTANEOUS HEATING TO 180°F (85°C) FOR 3 HOURS	

Table 2: Typical Physical Properties of Silicone Coating

Property	Value
COLOR	DARK GRAY
Percent Solids (minimum)	96
SPECIFIC GRAVITY	1.26 - 1.34
Following tests conducted on Sealant Cured after 21 days at 25°C (77°F) and 50% RH:	
ELONGATION PERCENT MINIMUM	1400
Joint Modulus at 50 percent Elongation, psi (kPa) maximum	7(48)
JOINT MODULUS AT 100 PERCENT ELONGATION, PSI (KPA) MAXIMUM	8(55)
Joint Modulus at 150 percent Elongation, psi (kPa) maximum	9(62)
ADHESION TO CONCRETE, MINIMUM PERCENT ELONGATION	+600
Adhesion to Asphalt, minimum percent Elongation	+600
JOINT MOVEMENT CAPABILITY, +100/-50 PERCENT, 10 CYCLES	No FAILURE
Weatherability	Unaffected by climatic extremes
FLEXIBILITY	CURED SEALANT STAYS RUBBERY FROM -45 TO 149°C (-50 TO 300°F)

Table 3: Approximate Volume Change of Silicone Coating after Exposure to Fluids:

Percent Volume Swell - Visual	
Fluid	Silicone Joint Sealant
JP-4	5-20 PERCENT
Skydrol B	None
50/50 GLYCOL/H2O	NONE
Hydraulic Fluid	None

AFTER DRYING, ALL SAMPLES PASSED +100/-50% MOVEMENT TESTING.

Table 4: DSM-DS SYSTEM Sizing

(see "Performance" for movement capabilities & limitations)

Nominal Material Size (Joint Size at Mean T°F)	Depth of Seal	Min. Joint (closes to)	Max. Joint (opens to)
1/2" (12mm)	1 1/2" (40mm)	3/8" (10mm)	5/8" (16mm)
3/4" (20mm)	1-1/2" (40mm)	9/16" (14mm)	15/16" (24mm)
1" (25mm)	2" (50mm)	3/4" (20mm)	1-1/4" (30mm)
1-1/4" (30mm)	2" (50mm)	7/8" (22mm)	1-5/8" (42mm)
1-1/2" (40mm)	2 1/2" (65mm)	1-1/8" (28mm)	2" (50mm)
1-3/4" (45mm)	2-1/2" (65mm)	1-1/4" (30mm)	2-1/4" (55mm)
2" (50mm)	2-1/2" (65mm)	1-1/2" (40mm)	2-5/8" (67mm)
2-1/4" (55mm)	2-1/2" (65mm)	1-5/8" (42mm)	2-7/8" (73mm)
2-1/2" (65mm)	2-3/4" (70mm)	1-7/8" (47mm)	3-1/4" (85mm)
2-3/4" (70mm)	2-3/4" (70mm)	2" (50mm)	3-1/2" (90mm)
3" (75mm)	2-3/4" (70mm)	2-1/4" (55mm)	3-7/8" (98mm)
3-1/4" (85mm)	3-1/2" (90mm)	2-1/2" (65mm)	4-1/4" (110mm)
3-1/2" (90mm)	3-1/2" (90mm)	2-5/8" (67mm)	4-1/2" (115mm)
3-3/4" (95mm)	3-1/2" (90mm)	2-3/4" (70mm)	4-7/8" (120mm)
4" (100mm)	3-1/2" (90mm)	3" (75mm)	5-1/4" (135mm)
5" (125mm)	5-1/2" (140mm)	3-3/4" (95mm)	6-1/2" (165mm)
6" (150mm)	6" (150mm)	4.5" (115mm)	7-1/8" (180mm)

- Sizes available to 12" (300mm)
- For sizes not shown consult EMSEAL.
- Floor joints greater than 4-inches (100mm) which are subject to traffic require a coverplate system.
- Select nominal material size to correspond to joint-gap size at mean temperature.
- Material supplied in shrink-wrapped sticks of 6.56 ft. (2 M).