



DSM SYSTEM

Watertight Joint System for Decks and Below-Grade Walls



DSM SYSTEM sample shown here is displayed in substrate mock-up

Product Description

The **DSM SYSTEM** builds on a track record of over 30 years of sealing horizontal plane and below-grade joints with impregnated foam sealants.

The system is comprised of precompressed, silicone-and-impregnated-foam hybrid installed into field-applied epoxy adhesive on the joint faces with the silicone bellows locked to the joint faces with a silicone sealant band (see Figure 1).

The DSM SYSTEM features an innovation in sealant technology in the form of an acrylic adhesive infused into the cellular foam base material. This new chemistry incorporates a hydrophobic microsphere component never before available in a sealant formulation.

The material 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 predecessors did 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 on top decks as well as intermediate decks.

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

Uses

- Ideal for new construction and retrofit of old or failed joint systems in concrete or in embedded metal angles where demolition and removal of the metal angles is not feasible or affordable.
- Ideal for lasting replacement of tee-to-tee caulk joints in precast parking decks and stadiums or where pedestrian or vehicular traffic is expected.
 - Decks
 - Runways
 - Stadiums
 - Mall bridge connectors
 - Parking decks
 - Airport aprons
 - Arenas
 - Below-grade walls
 - Roadways
 - Sidewalks
 - Ice-floors
 - Tunnel walls
 - Stair towers
 - Perimeter joints

Figure 1: DSM SYSTEM in Typical Installation — New or Retrofit

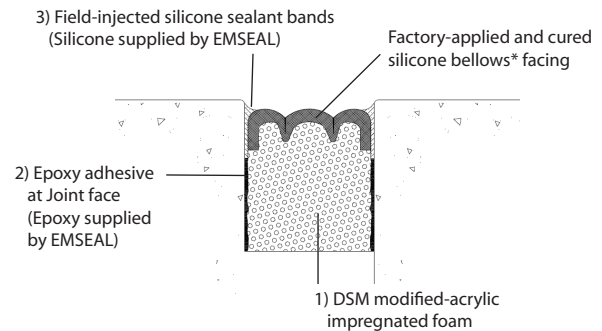
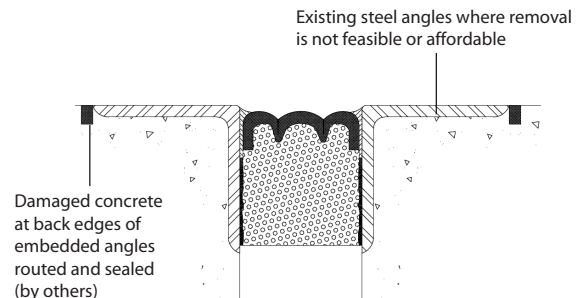


Figure 2: DSM SYSTEM in Existing Steel Angles — Retrofit



Features

Watertight – The tensionless silicone bellows are installed just below the deck surface. This ensures watertightness is achieved at the deck surface.

Non-Invasive Anchoring – There are no hard metal-to-concrete connections with the DSM SYSTEM. This includes embedded pins, anchors, screws, bolts or tracks, trays or rails. The system is locked to the joint faces by means of the 1) backpressure of the foam; 2) the epoxy adhesive, and 3) 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 deck to wall, at curbs, sidewalks, parapets, tees, and crosses are available from EMSEAL.

Movement Capability – +50% and -50% (Total 100%) of nominal material size (see "Performance").

Aesthetics & Versatility – Standard color is gray (other colors available), uniform bellows appearance, 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 +50%, -50% (100% total) of nominal material size.
- Substrates must be parallel, plumb and capable of resisting approx. 2.5 psi backpressure from the foam.
- Standard sizes from 1/2" (12mm) to 4" (100mm).
For joint openings 4-inches (100mm) and larger, where an integral coverplate is preferred, consider SJS SYSTEM.
- Fuel Resistance – Silicone sealant is not degraded by contact with fuel. Some swelling of the material will normally occur, but it will return to its original shape upon evaporation of the fuel.

Composition

- DSM is produced by coating an impregnated cellular foam with highway-grade silicone.
- 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. 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 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 foam
- Apply a thin layer of epoxy to both sides of the joint face.
- Remove shrink-wrap packaging and hardboard. Allow partial expansion until snug when inserted into epoxied joint faces.
- Insert material into joint until bellows is flush with (below-grade or deck-to-wall) or recessed by 1/4" (6mm) in traffic applications.
- 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.

CAD & Guide Specs

Guide specifications and CAD details are available online at emseal.com or by email.

Warranty

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

Availability & Price

DSM 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.

Property	Value	Test Method
Base material	Cellular, high density, polyurethane foam	N/A
Impregnation	Proprietary, modified, water-based, acrylic 22.3 PSI min (153 kPa) 2.3 PSI MIN (153 kPa)	N/A
Tensile strength	157% min	ASTM D3574 E
Elongation — ultimate		ASTM D3574 E
Temperature service range		ASTM C711
High	185°F (85°C)	
Low	-40°F (-40°C)	
UV Resistance	No Changes – 2000 hours	ASTM G155-00A
(Accelerated Weatherometer) 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. -50% of nominal size and when simultaneously heated to 180°F (85°C) for 3 hours	
Compression set	Material recovers to +50% of nominal size within 24 hours of compression to -50% and simultaneous heating to 180°F (85°C) for 3 hours	

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)

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.

Nominal Material Size (Joint Size at Mean T°F)	Depth of Seal	Min. Joint (closes to)	Max. Joint (opens to)
1/2" (12mm)	1 3/4" (45mm)	1/4" (6mm)	3/4" (20mm)
3/4" (20mm)	1 3/4" (45mm)	3/8" (9mm)	1-1/8" (28mm)
1" (25mm)	2" (50mm)	1/2" (12mm)	1-1/2" (40mm)
1-1/4" (30mm)	2" (50mm)	5/8" (16mm)	1-7/8" (48mm)
1-1/2" (40mm)	2 1/2" (65mm)	3/4" (20mm)	2-1/4" (55mm)
1-3/4" (45mm)	2 1/2" (65mm)	7/8" (22mm)	2-5/8" (68mm)
2" (50mm)	2 1/2" (65mm)	1" (25mm)	3" (75mm)
2-1/4" (55mm)	2 1/2" (65mm)	1-1/8" (28mm)	3-3/8" (87mm)
2-1/2" (65mm)	2-3/4" (70mm)	1-1/4" (30mm)	3-3/4" (95mm)
2-3/4" (70mm)	3-1/4" (80mm)	1-3/8" (35mm)	4-1/8" (105mm)
3" (75mm)	3-1/4" (80mm)	1-1/2" (40mm)	4-1/2" (115mm)
3-1/4" (85mm)	3-1/2" (90mm)	1-5/8" (42mm)	4-7/8" (120mm)
3-1/2" (90mm)	3-1/2" (90mm)	1-3/4" (45mm)	5-1/4" (135mm)
3-3/4" (95mm)	4" (100mm)	1-7/8" (48mm)	5-5/8" (145mm)
4" (100mm)	4" (100mm)	2" (50mm)	6" (150mm)

- For joint openings 4-inches (100mm) and larger, where an integral coverplate is preferred, consider SJS SYSTEM.
- For sizes not shown consult EMSEAL.
- Select nominal material size to correspond to joint-gap size at mean temperature.
- Material supplied in shrink-wrapped sticks of 6.56 ft. (2M).