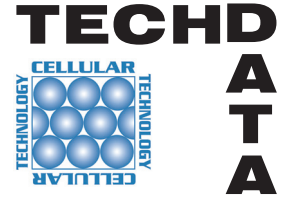




# DSF SYSTEM

NSF-Compliant Watertight Joint System



## Product Description

Featuring a silicone-bellows sealing surface and backed by an integral, pressure-resisting impregnated foam backing, the DSF System provides a lasting solution to joint sealing applications where constant exposure to non-corrosive liquids is expected. It also provides a seal which will not pose a contamination risk to liquids or solids which may be ingested.

The silicone bellows are compliant to NSF/ANSI Standard 61 for contact with potable drinking water. They are also in compliance with FDA Regulation CFR 177.2600 for indirect contact with food.

The system is comprised of (see Figure 1) 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.

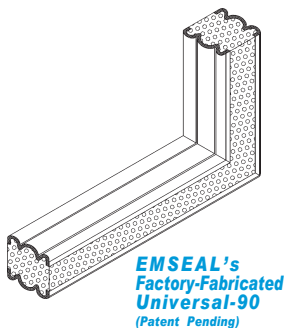
The DSF system features EMSEAL's patent-pending microsphere-modified acrylic adhesive infused into the cellular foam base material.

For submerged applications this product has been tested in a hydrostatic-head pressure simulator to continuously resist water pressure of various levels without product deflection or leaking. Consult EMSEAL for the status and for application head pressure which will coincide with your situation.

## Features

**Watertight** — DSF System is installed with the tensionless silicone bellows facing the liquid ensuring that watertightness is achieved.

**Non-Invasive Anchoring** — there are no hard metal-to-substrate connections with the DSF 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. The DSF System is manufactured in straight-run sticks which are joined in the field with EMSEAL's exclusive "Universal-90's" which are factory-fabricated single-piece 90-degree units. In addition to guaranteeing watertightness, EMSEAL's "Universal-90's" allow for much

faster and more secure installation by eliminating field cutting at angles. And because they are coated on both sides they can easily be installed at inside and outside corners as needed. (See Figure 3)

**Double-Sided Straight-Run Option** — The DSF System is also available with double-sided protection manufactured with the liquid-resistant bellows on both sides of straight lengths for use in applications where contact with water from two sides is possible. (See Figure 2)

## Uses

Manufactured to resist and not contaminate conditions found when expansion systems contact water and other clean liquids. Some examples are:

- Municipal Water Tanks
- Potable Water Containers
- Food Preparation Areas
- Spill Guards
- Proximity to Cleanable, Wipeable, Nonporous Surfaces
- Restaurants
- Cafeterias
- Food Storage
- Clean Water Applications

Figure 1: DSF SYSTEM in Typical Installation (Single-sided)

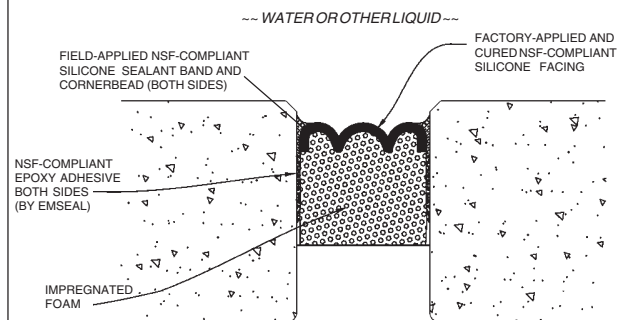
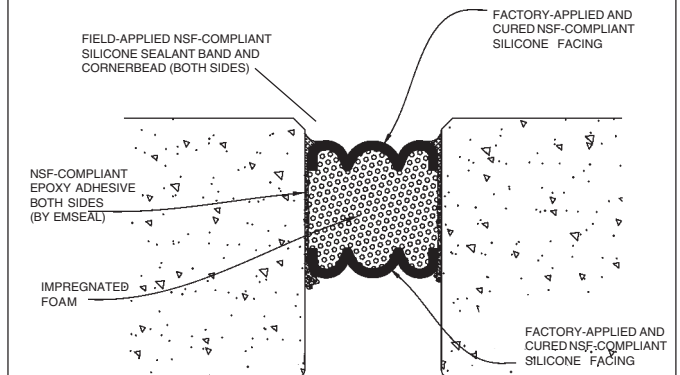
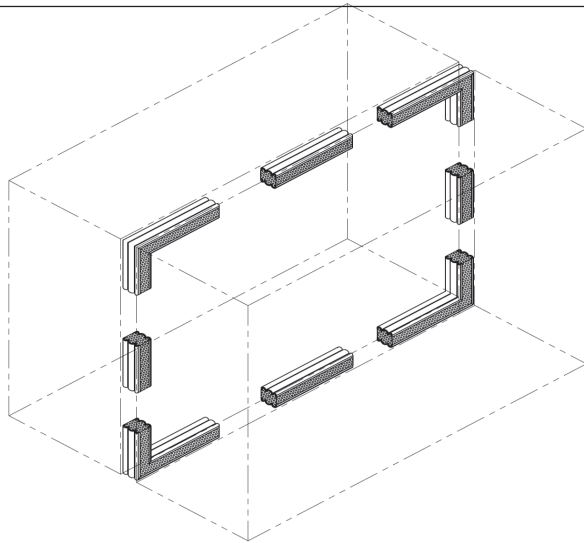


Figure 2: DSF SYSTEM in Installation Where Exposure from Both Sides is Possible (Double-sided)





**Figure 3: EMSEAL's patent-pending, warranted-watertight, factory-fabricated Universal-90's at inside and outside corners ensures continuity of seal while eliminating field execution of direction changes. Shown here with straight-run sticks (applied and yet-to-be-applied) for one total system.**

**Movement Capability** +25% and -25% (50% total) of nominal material size. (See "Performance")

**Versatility** — The standard DSF System color is off-white. Uniform bellows appearance, water resistance, and ability to handle variations in joint size through size-switching are among other system features.

**Performance**

Capable of movements of +25%, -25% (50% total) of nominal material size.

The DSF System will maintain its watertight capabilities and shape under a constant submerged depth of various headwater pressures. Consult EMSEAL with your requirements.

Standard sizes from 1/2" (12mm) to 2" (50mm). Other sizes up to 4" (100mm) available subject to review of application. Consult EMSEAL.

Substrates must be solid, parallel, plumb and capable of resisting approximately 2.5 psi backpressure from the foam.

**Composition**

- The DSF System is produced by coating an impregnated cellular foam with a non-corrosive liquid silicone sealant compliant to NSF/ANSI 61 Standard as well as FDA regulation CFR 177.2600.
- The external silicone facing is factory applied to the foam at a width greater than the maximum offered extension and is cured before final compression.
- The 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 head pressure and reasonable transient point loads.
- The DSF System is supplied in 6.56 LF (2m) shrink-wrapped lengths (sticks). "Universal-90" factory-fabricated corners with a standard length of 6-inches (one leg) and 12-inches (other leg) are also available. DSF 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.

**Table 1: Typical Physical Properties of DSF Impregnated Foam**

Property	Value	Test Method
<b>Base Material</b>	Cellular, high density, polyurethane foam	N/A
<b>Impregnation</b>	Proprietary, modified, water-based, acrylic	N/A
<b>Temp. Service Range</b> High Low	185°F (85°C) -40°F (-40°C)	ASTMC711
<b>UV Resistance*</b>	No Changes--2000 hours	ASTMG155-00A
<b>Resistance to Aging*</b>	No Changes--2000 hours	ASTMG155-00A
<b>Bleeding:</b> -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 185°F (85°C) for 3 hours	
<b>Compression Set</b>	Material recovers to +25% of nominal size within 24 hours after compression to -25% and simultaneous heating to 180°F (85°C) for 3 hours	

(\*Accelerated Weatherometer)

**Table 2: Typical Physical Properties of Silicone Coating**

Property	Value	Test Method
<b>Specific Gravity, 77°F (25°C)</b>	1.33	ASTMD70
<b>Peel Strength</b>	25%	
<b>Hardness (Shore A)</b>	35	ASTM D 2240
<b>Tack-Free</b>	30 minutes	
<b>Elongation</b>	350 %	ASTMD412
<b>Tensile Strength</b>	275 psi	ASTMD412

## Installation

**IMPORTANT:** The following instructions are a summary. Refer to "DSF Install Data" and job-specific instructions of an EMSEAL technician for complete procedures. FOR PROFESSIONAL USE ONLY. KEEP OUT OF REACH OF CHILDREN.

- Store indoors at room temperature. Expansion is quicker when warm, slower when cold. Substrate temperature must range between 40°F (5°C) and 110°F (43°C). Shelf Life: One year in original unopened packaging stored at temperatures not to exceed 80°F (26°C).
- **Precautions:** Wear chemical-resistant gloves and/or barrier hand cream when handling liquid sealant or epoxy. Remove promptly from skin with a commercial hand cleaner before eating or smoking. Avoid inhaling vapors.
- **Sequencing:** Install factory-fabricated transition and/or termination pieces first. Connect straight run material to in-place terminations and transitions. Cut closing pieces 3/8-inch (10mm) longer than the opening to be joined. Compress material longitudinally to fit.
- Ensure nominal material size matches joint size.
- Mix epoxy and trowel a thin layer onto the joint faces to at least the depth of the DSF foam.
- Remove shrink-wrap packaging and hardboard.
- Wipe silicone facing using clean lint-free rag made damp with water.
- Insert material into joint to determined depth below the substrate surface.
- Inject a band of liquid silicone between mating bellows' faces.
- Join lengths by pushing silicone-coated ends firmly together.
- Before the epoxy or the silicone cures, force the tip of the bulk-gun cone between the foam and the substrate and inject a silicone sealant band. Tool the overflow sealant into a corner bead between the top of the silicone bellows and the substrate.
- Tool the silicone between joined lengths so that the bellows are not restrained by excess silicone. Tooling should be completed within 15 minutes of application.

### Table 3: DSF System Sizing

(Based on DSF+5 designed to maintain watertight capabilities and shape under a constant submerged depth (hydrostatic pressure) of up to 5-feet. Contact EMSEAL for other depth situations.)

Nominal* Material Size at Mean T°	Depth of Seal
1/2 in (12 mm)	1 1/2 in (40 mm)
5/8 in (16 mm)	1 1/2 in (40 mm)
3/4 in (20 mm)	1 1/2 in (40 mm)
1 in (25 mm)	2 in (50 mm)
1 1/4 in (30 mm)	2 in (50 mm)
1 1/2 in (40 mm)	2 3/8 in (58 mm)
1 3/4 in (45 mm)	2 3/8 in (58 mm)
2 in (50 mm)	2 1/2 in (65 mm)

\*Corresponds to joint size at mean temperature.

**NOTE:** It is critical that any exposed foam ends or any other foam exposed during installation be field coated with the liquid silicone sealant supplied.

- **Clean Up:** Remove epoxy and silicone sealant from equipment before it cures using MEK\*, Toluene\*, or Xylene\*. These solvents are not effective after the epoxy or silicone has cured. Cured material may be removed by cutting it away with sharp tools, sandpapering or softening with chlorinated solvents\*.  
\*(Solvents mentioned or referred to are toxic and flammable. Observe solvent manufacturer's precautions and refer to Material Safety Data Sheets as well as local and federal requirements for same handling and use).

**IMPORTANT:** Allow liquid sealant to attain a complete cure before filling area with liquid (7 days minimum).

- **Maintenance:** If the silicone bellows or sealant bands are damaged but remain intact, cut out the damaged area and recaulk. No primer is required. If the bond has been affected or the foam backing of the DSF is compromised, remove the damaged area, clean and prepare the substrates in accordance with instructions and reinstall new material.

## Warranty

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

## CAD Details and Specs

Guide specifications and CAD details are available online at [emseal.com](http://emseal.com) or by email. Contact EMSEAL.

## Availability and Price

DSF is available for shipment internationally. Prices are available from local representatives and/or directly from the manufacturer. The product range is continually being updated, and accordingly EMSEAL® reserves the right to modify or withdraw any product without prior notice.