BEJS SYSTEM

Watertight Joint System for Road Bridges

TECH DATA

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

Product Description

The **BEJS SYSTEM**, Bridge Expansion Joint System, builds on a track record of over 30 years of sealing horizontal plane joints with pre-compressed foam sealants.

The system is comprised of a precompressed, silicone-and-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 Fig. 1).

The BEJS SYSTEM features an innovation in sealant technology in the form of a microsphere-modified, 100% acrylic impregnation infused into the cellular foam base material.

The material is odorless, clean handling, UV stable, non-staining, and features low temperature flexibility not previously available in asphalt, wax, or isobutylene-based predecessors or competitors.

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 bridge decks, wing walls, abutments, jersey barriers, precast panels, etc.

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

Uses

- Watertight, traffic durable, joint-face-adhered, precompressed, **primary seal** for retrofit and new expansion joints in road bridges, wing walls, abutments, jersey barriers, longitudinal joints, precast panels, etc.
- Ideal for new construction and retrofit bridge preservation of old or failed joint systems in concrete or rebuilt joint edges. Use in embedded metal angles where demolition or removal of the metal angles is not feasible and where existing joint opening is suited to the movement capability of BEJS.
- Ideal for lasting replacement of failed caulk joints.

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 BEJS 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 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. "Universal 90s*" Kickout Terminations" and "Custom Transitions" are factory fabricated transition pieces from EMSEAL that can be installed at inside corners and outside corners as needed and are warranted by EMSEAL to be watertight through the entire movement capability of the product. Alternatively, details for field-fabricated transitions from deck to wall, at curbs, sidewalks, parapets, tees, and crosses are available from EMSEAL.

*US Patent: 9,200,437

Movement Capability

+50% and -50% (Total 100%) of nominal material size.

Aesthetics & Versatility

Standard color is black. Uniform bellows appearance, fuel resistance, and an enhanced ability to handle variations in joint size are among other system features.

Performance

- 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). Other sizes available subject to review of application: consult EMSEAL.
- Fuel Resistance: Silicone sealant is not degraded by contact with fuel. Some swelling of the silicone material will normally occur, but it will return to its original shape upon evaporation of the fuel.

Composition

- BEJS 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

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Fig.1: BEJS SYSTEM in Typical Installation — New or Retrofit

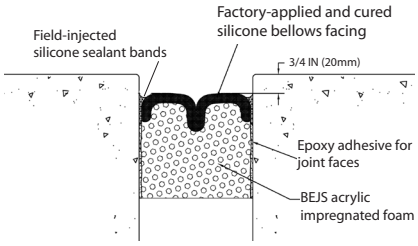


Fig.2: BEJS-ON-A-REEL for Joints 1/2" (12mm) – 1 1/4" (30mm)

Note: Material sizes less than 1 1/4" (30mm) are supplied on 12-LF long reels with a smooth, convex single bellows as shown.

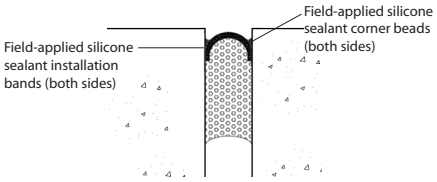


Fig.3: BEJS SYSTEM in Existing Steel Angles – Retrofit

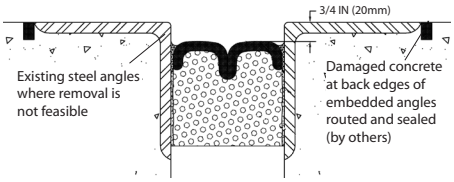


Fig.4: BEJS SYSTEM in Existing Strip-Seal Retrofit

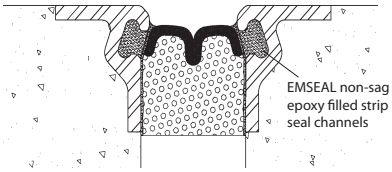
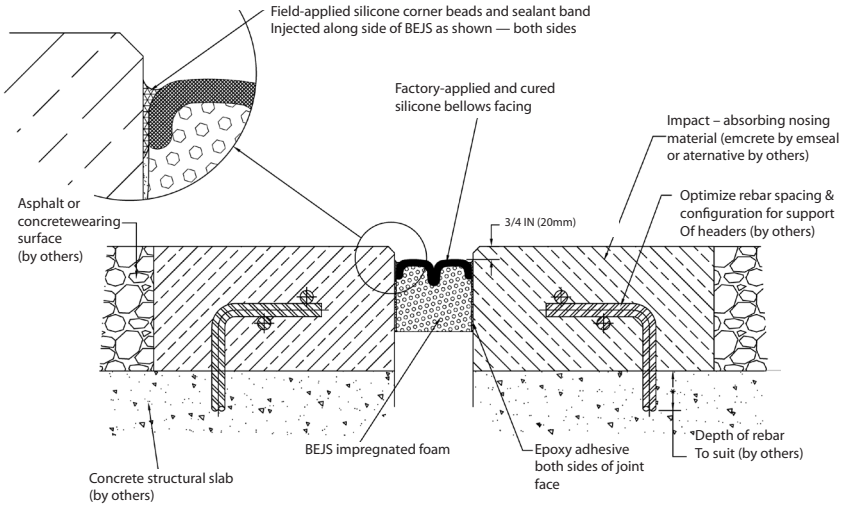


Fig.5: BEJS SYSTEM in New or Rebuilt Joint Edges with Nosing Material



Composition, *continued*

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.
- BEJS SYSTEM 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 "BEJS 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.
- Properly prepare substrates.
- 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 BEJS foam
- Apply a thin layer of epoxy to both sides of the joint face.
- Remove shrink-wrap packaging, hardboard. If necessary, heat using torch to expand material to a snug fit in the joint.
- Insert material into joint with a 3/4" (20mm) recess. For reels recess 1/2" (12mm).
- 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 Details & Guide Specs

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

Warranty

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

Availability & Price

BEJS SYSTEM 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.

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Table 1: Typical Physical Properties of BEJS Foam

Property	Value	Test Method
Base Material	Cellular, high density, polyurethane foam	N/A
Impregnation	Proprietary, modified, water-based, acrylic	N/A
Temperature Service range High Low	 185°F (85°C) -40°F (-40°C)	ASTM C711
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	

Table 2: Typical Physical Properties of Silicone Coating

Property	Value
Color	Black
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 Silcone Coating After Exposure to Fluids

Percent Volume Swell - Visual

Fluid	Silicone Joint Sealant	
JP-4	5 – 20%	
Skydrol B	None	
50/50 Glycol/H2O	None	
Hydraulic Fluid	None	After drying, all samples passed +100/-50% movement testing.

Table 4: BEJS 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)
The following sizes are supplied in on 12-LF (3.65 M) reels. See BEJS-ON-A-REEL information sheet.			
1/2″ (12mm)	1 3/4″ (45mm)	1/4″ (6mm)	3/4″ (20mm)
3/4″ (20mm)	1-3/4″ (45mm)	3/8″ (10mm)	1-1/8″ (28mm)
1″ (25mm)	1 3/4″ (45mm)	1/2″ (12mm)	1-1/2″ (40mm)
1-1/4″ (30mm)	1 3/4″ (45mm)	5/8″ (15mm)	1-7/8″ (47mm)
The following sizes are supplied in shrink-wrapped sticks of 6.56 ft.(2M):			
1-1/2″ (40mm)	1 3/4″ (45mm)	3/4″ (20mm)	2-1/4″ (55mm)
1-3/4″ (45mm)	1 3/4″ (45mm)	7/8″ (22mm)	2-5/8″ (68mm)
2″ (50mm)	2″ (50mm)	1″ (25mm)	3″ (75mm)
2-1/4″ (55mm)	2-1/4″ (55mm)	1-1/8″ (28mm)	3-3/8″ (60mm)
2-1/2″ (65mm)	2-3/8″ (60mm)	1-1/4″ (30mm)	3-3/4″ (95mm)
2-3/4″ (70mm)	2-3/4″ (70mm)	1-3/8″ (35mm)	4-1/8″ (105mm)
3″ (75mm)	2-3/4″ (70mm)	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)	3-1/2″ (90mm)	1-7/8″ (47mm)	5-5/8″ (140mm)
4″ (100mm)	3-1/2″ (90mm)	2″ (50mm)	6″ (150mm)

For joint sizes larger than 4-inches consult EMSEAL

Select nominal material size to correspond to joint-gap size at mean temperature.

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