



BEJS

Bridge Expansion Joint System



Information **Guide**

BEJS - Bridge Expansion Joint System

System Durability

How long will it last?

When sized, installed, maintained and inspected properly BEJS could be expected to last 10 to 15 years. In 2014 BEJS received an AASHTO Innovation Award nominated by MoDOT and certified to APEL by NYSDOT, Illinois DOT, Maine DOT.

"This technology's excellent track record should be shared in order to more quickly put it in the hands of states so that they can use it with confidence knowing that other states have found it a successful tool for preserving critical bridge components. BEJS is one of the few technologies that are actually successfully keeping water on the bridge deck and away from the bearing pads and support components. We had such poor results with silicone joints we quit trying to repair leaks." MoDOT

"NYSDOT identified this item after using it to rehabilitate several structural joints. The Material Lab reviewed those sites and found the item to have excellent performance."

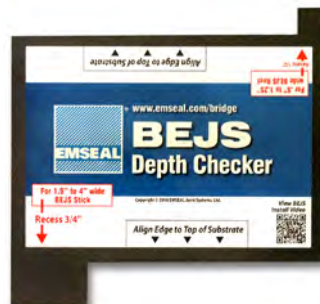
What if the silicone gets punctured or sliced?

We know the enemy of the expansion joint is mechanical damage. The good news is how easy BEJS is to repair. Only the damaged section needs to be removed and reinstalled – not the entire length of the expansion joint like that of a continuous extruded seal such as a compression seal or V-shaped seal.

To prevent damage from occurring in the first place EMSEAL developed the "Depth Checker" tool. This tool gives the installer and the inspector a means to gauge whether the joint



is installed to the proper depth to help ensure better service life.



EMSEAL's Depth Checker tool.



... and what about those joins?

In 2016 NJDOT wrote:

*"New Jersey Department of Transportation has been utilizing Emseal BEJS widespread since 2012 on our structures. To date, NJDOT has not had a single failure of the Emseal BEJS product. With the product applied as per the manufacturer's instructions, **we have not experienced any leakage or failures at the joint splice locations.** It should also be noted that since the first application in 2012, New Jersey has experienced both prolonged record heat as well as record cold."*



Silicone injected to the exposed faces of the silicone bellows also provides a strong bond between the BEJS sticks.

Can BEJS replace liquid sealant and backer rod?

BEJS sizes 6mm to 30mm are produced on 3.65m reels. The reels permit these sizes to be supplied economically and to be used in place of typical liquid sealant and backer rod applications. Typically these include longitudinal joints and easily transitions from decks to parapet walls. Engineers have commented that BEJS-On-A-Reel

"is like caulk and backer rod on steroids!"



BEJS-On-A-Reel

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Performance

How does the BEJS deal with changes when the joint width varies, or there is arris damage?

By working closely with the contractor on site we can determine if one size will work or if additional sizes are required to accommodate these changes. BEJS expands to fill minor surface defects in the joint faces. Communication with the contractor about conditions on site helps to effectively provide a custom solution for your projects.



How do you handle installations during hot weather, yet also ensure that the BEJS won't fail in cold weather?

BEJS is a precompressed joint material and uniquely designed to handle these conditions. Again good communication with the contractor allows us to coordinate how the material should be supplied for the installation. If it will be particularly hot EMSEAL can custom compress BEJS so that it will be easier to install when the joint is at its smallest size. With the ability to compress BEJS to the appropriate width for the conditions it can be installed almost any time of year except during extreme cold conditions. Precompressed joints install faster saving time and money.

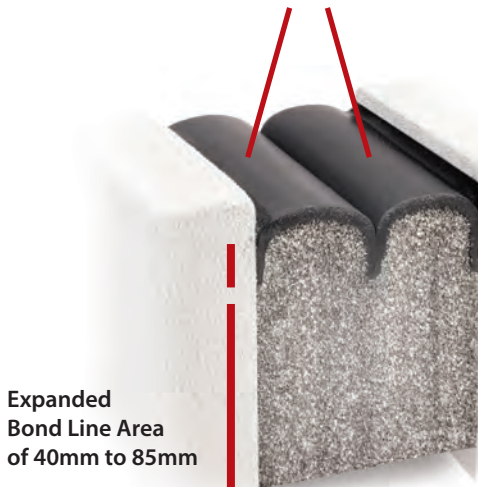
Does debris accumulate on top of BEJS? Could BEJS be pushed out of the joint?

Yes, debris will collect over any expansion joint unless there is a bridge washing or sweeping program in place. Due to the large bond line surfaces on the sides of BEJS, and the backpressure of ≈ 13 to 17 kPa, it pushes out with against the substrate, BEJS has never fallen out of a bridge. Cast in place shoulders or “keepers” in substrates are no longer required. In addition the flat top surface of BEJS prevents material from compressing into a depression or trough.

MoDOT noted in their nomination form to AASHTO:

“The preformed silicone V shape systems are the primary competitor of this system, but they collect more debris and can be more difficult to install in tight joints.”

18mm recess limits grit and debris buildup.
Large bonding surface resists reasonable point loads.



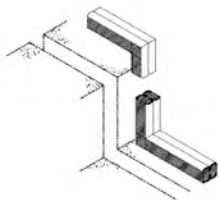
Expanded
Bond Line Area
of 40mm to 85mm

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Features

Expansion joints often leak when they transition to a kerb or parapet wall, how does BEJS handle this?

Continuity of seal through changes in plane make BEJS an essential performance differentiator. EMSEAL is the first company to warrant kerb and parapet wall corner transitions to be watertight with factory fabricated assemblies.



Watertight Transitions with Universal 90's



Main Street over B&A Railroad Beckett, MA



3 years later



5 years later

What if there isn't a kerb or wall and the joint terminates at the end of the deck?

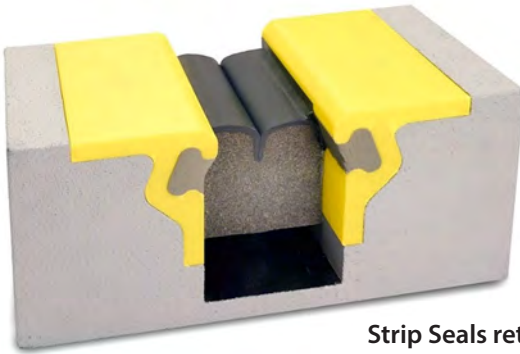
That is a concern and the reason why EMSEAL designed the BEJS Kickout termination which is intended to direct water off the end of the expansion joint and beyond the pier. It functions as a drip edge.



BEJS Kickout

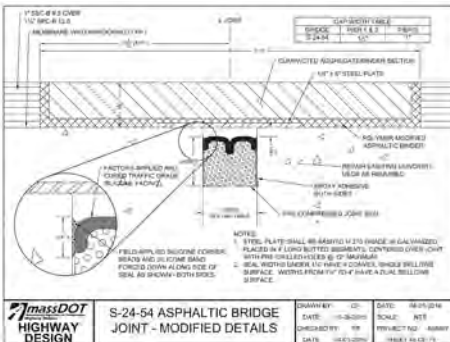
Have you used BEJS in any other applications?

BEJS has successfully been used as a retrofit for failed membranes in strip seals that are no longer manufactured or there is damage to the knuckle area of the rail. We recommend that the knuckle be filled in with our epoxy and the installation proceeds as normal.



Strip Seals retrofit with BEJS

BEJS is used by an increasing number of DOTs as a secondary seal under asphaltic plug joints. BEJS with its factory fabricated transitions ensures watertightness, especially at the kerb and wall under the asphaltic plug joint and acts as belt and suspenders for these applications.



Making Asphaltic Plug Joints Watertight

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Installation

Is BEJS easy to install?

Larger BEJS widths over 30mm are supplied in sticks that measure about 2m. For sizes 6mm - 30mm it comes on 3.65m reels. Because the material is precompressed to fit for the day of install it is one of the easiest systems to install. The BEJS sticks permit easy staging for lane closures without having to deal with large rolls of material. BEJS arrives on site as a system that includes epoxy and silicone sausages for the injected side bands. The BEJS System also includes a 2-part cartridge epoxy option that can be used with a pneumatic gun for increased productivity on site. Furthermore, the silicone sealant can also be used with a pneumatic sausage caulk gun.

MoDOT wrote in their nomination for the AASHTO Innovation Award:

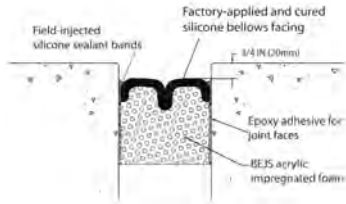
"It fills a maintenance gap for us. Most joints will need one or maybe two of these maintenance type glands in their life cycle before you completely replace the joint and armor. This system is the easiest to install of the options that are currently available in Missouri."



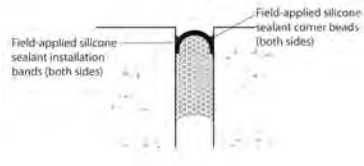
Installation video of BEJS available at www.emseal.com/bejs-installvideo1

Various Installations of BEJS

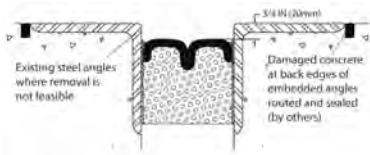
Typical Stick new or retrofit



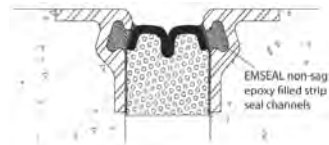
Typical Reel New or Retrofit



Installed in Existing Steel Angles



Installed in Existing Strip-Seal



Emcrete: Rapid setting, self-leveling, impact absorbing elastomeric concrete

If you need to rebuild or repair your substrate -- Emcrete is a flexible, durable, high-impact elastomeric concrete material. Emcrete is comprised of a two-component polyurethane resin mixed with fine aggregate and chopped fiberglass. The combined aggregates impart improved tensile and compressive strength. Emcrete cures rapidly. This means you can usually install BEJS into an optional Emcrete joint header in under an hour. You can return traffic to newly installed Emcrete used either as patch or as an expansion joint header in 2-3 hours.



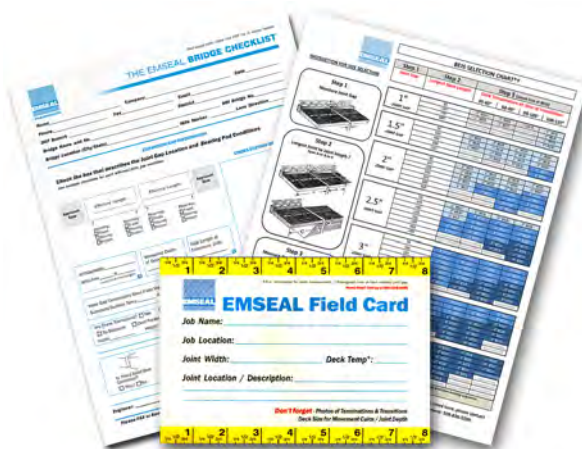
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Sizing

How do I choose the correct size of BEJS?

The correct sizing is a very important part of the BEJS process. We want to ensure that the material will be easy to install in the summer when the joint is closed down, but will have enough foam and silicone to handle the larger joint openings in winter. There are a few helpful tools that EMSEAL provides to assist with this:

1. The **EMSEAL Checklist** that you fill out, send in to NCC (in the UK), and we will advise you on the correct sizes to order.
2. An **EMSEAL Field Measurement Card**. This is a reusable dry erase card that can be filled out on the site, a photo taken, and emailed to EMSEAL for sizing recommendations.
3. An **EMSEAL Sizing Chart** so that you can also go out on the day of the install with a few different sizes of BEJS and determine the best size of BEJS to select based on the bridge deck span lengths, joint openings, plus the current deck and ambient temperatures.



To ensure the right system approach for your project call 01257 266696 or email us at technical@nccinaction.co.uk



BEJS Expansion Joint FAQ's

What are standard available sizes? BEJS is supplied on a 3.65m reel for widths of 12mm to 30mm. For widths of 40mm to 100mm it is supplied as a 2m stick.

What are movement capabilities? +60% and -60% (total 120%) of nominal size.

What temperature is required for installation? 5° C and rising ensures the epoxy and silicone cure properly.

Can I install in wet conditions? This depends...the substrate cannot be "visibly" wet, however a slightly matt damp surface is okay. Wet conditions will jeopardize the ability of the silicone to cure and adhere properly.

What are the lead times? Lead times are dynamic and according to season, size and project requirements.

How long can the material be stored? The foam will become "sleepy" after it has been in high compression for 8-14 months. It will always expand, but may then do so more slowly.

How is the material joined at the seams? A bead of silicone is applied to one end of the material on the silicone surface. The next stick is compressed firmly against it and then pressed down to its finished depth.

How long does the foam take to expand? This is temperature dependent, but in 20° C ambient temperatures the foam will expand in a few minutes. In colder temperatures below 10° C the foam could need several minutes to expand. Production rates can be controlled by opening the packages accordingly.

Can I field fabricate corners? Yes, for outside corners you can make a field fabrication transition that is seamless. For inside corners you can field fabricate them but this takes more time and some skill. A majority of our customers order the factory fabricated inside corner transitions.

Why do you require injected side bands of silicone? Side bands of injected silicone ensure that BEJS is properly locked onto the substrate with no leaks. Substrates aren't always perfect and this helps ensure a successful seal.

What about skew? Skew puts forces on the material in unpredictable ways. Our foam at the microscopic level is just a sphere, so it doesn't matter what direction it gets pulled in, as long as the overall movement is within the material's capability. We can oversize BEJS to provide additional movement as needed. BEJS is one of the few materials that can handle skew with its +60% and -60% movement (120% total) capability.



2014 Dr. J. Don Brock
TRANSNOVATION AWARDS
Recognizing Outstanding Civil Infrastructure Transportation



EMSEAL's BEJS Award Winning Technology

The BEJS SYSTEM builds on a track record of over 30 years of sealing horizontal and vertical plane joints with precompressed, composite 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.

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. It features low temperature flexibility not previously available in asphalt, wax, or isobutylene-based predecessors or competitors. BEJS is suitable for applications including joint-face adhered installations on bridge decks, wing wall abutments, jersey barriers, precast panels, etc.

EMSEAL provides fully trained support from the design office, right through the completed installation on site. EMSEAL bespoke CAD detailing service is also available for customers.

For more information including an installation video visit EMSEAL's website at www.emseal.com/bridge For UK based technical support call 01257 266696 or email: technical@nccinaction.co.uk



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