



Bridge Preservation

*achieved through low cost
watertight joint solutions*

14 May 2019
Western Bridge Preservation Partnership
Reno, NV

Nathan Peters
EMSEAL Joint Systems, Ltd.

***Bridge Preservation
&
Low-Cost Retrofit
Solutions***



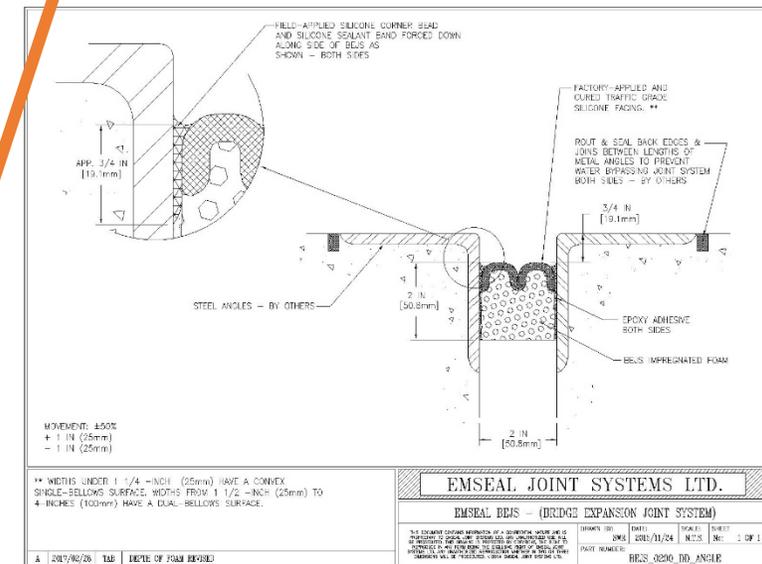
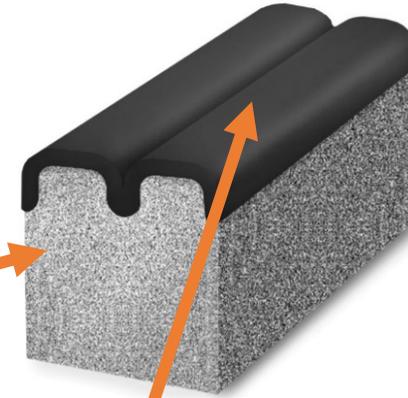


Bridge Preservation

*Low Cost Watertight
Expansion Joint Solutions*

What is BEJS & Foam Supported Silicone?

- Open Cell Foam*
- 100% Acrylic Impregnation*
- Infused Acrylic Microspheres offer increased resiliency and longevity*
- Coated with factory applied and cured traffic-grade, UV resistant silicone coating*
- Silicone-Foam Composite Joint*
- Designed for 120% Total Movement (+/- 60%)*
- Watertight By Design*

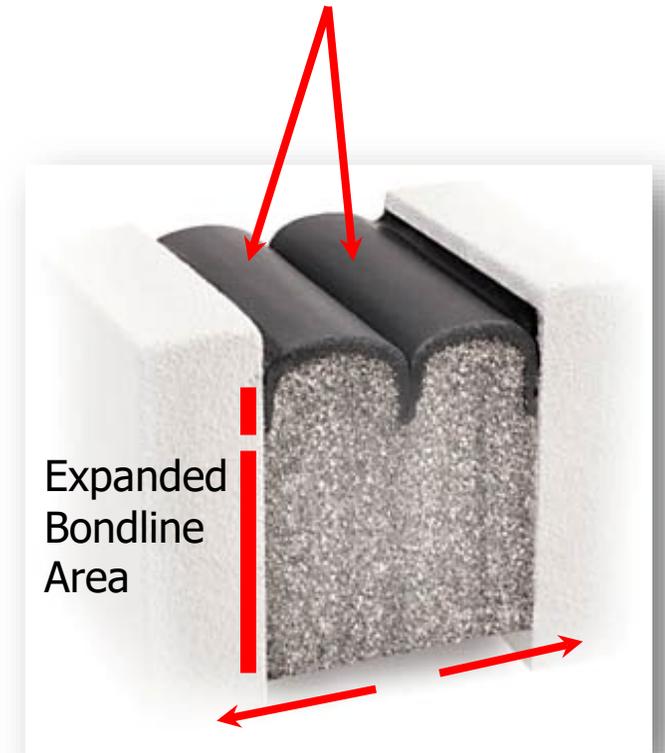


BEJS: Bridge Expansion Joint System

How & Why it Works?

- ❑ ***Resilient backing system to Primary Seal***
- ❑ ***Tensionless Bellows (Eliminates Adhesive Failures)***
- ❑ ***Multiple Points of Adhesion***
 - ❑ ***Expanded Bond-Line & Injected Sealant at Bond-line***
 - ❑ ***2 Part Epoxy Adhesive***
 - ❑ ***2.5 psi backpressure***
- ❑ ***Stages as multiple units, cures as one monolithic joint seal***
- ❑ ***Fully Customizable: Foam Density, Foam Depth, Silicone Thickness, Pre-Fabricated Transitions, Compressed to Fit for ease of installation***

BEJS is installed with 3/4" recess - limits debris buildup, unnecessary traffic loading & direct point loads.

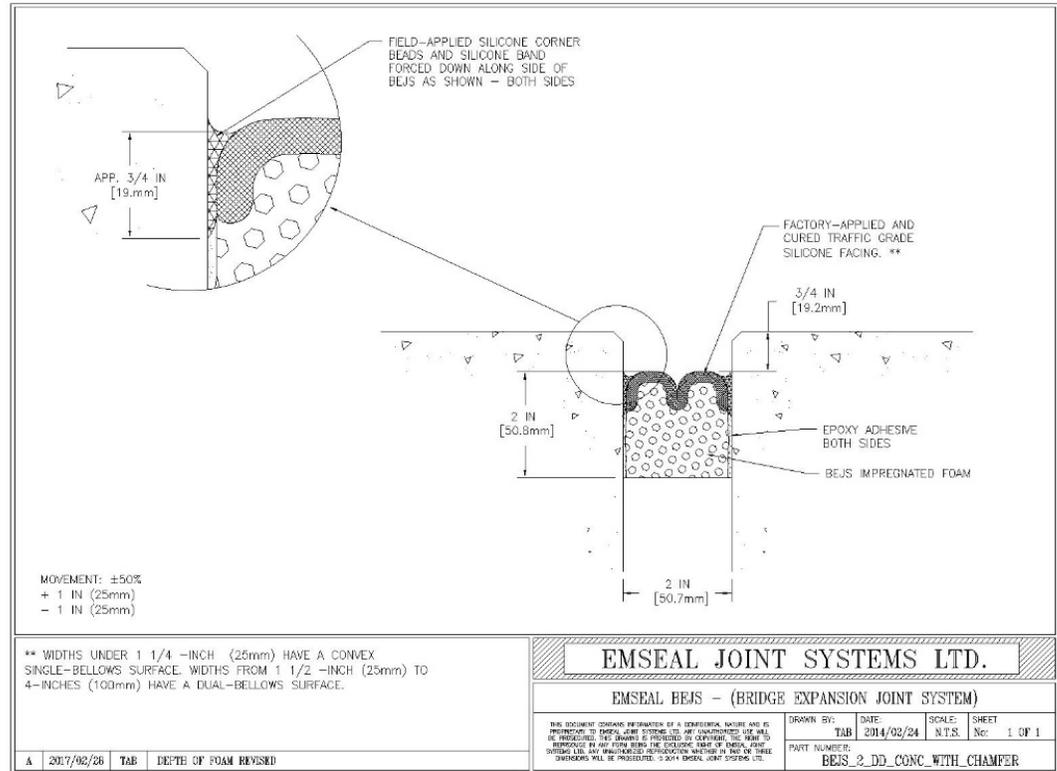


Foam exerts **2.5 psi** backpressure

BEJS: Bridge Expansion Joint System

❑ *Can be installed against various substrate types and profiles:*

- ❑ *Concrete*
- ❑ *Metal*
- ❑ *Elastomeric Concrete (Polyurethane)*
- ❑ *PPC (Polyester Concrete)*
- ❑ *Epoxy Joint Nosing Materials*





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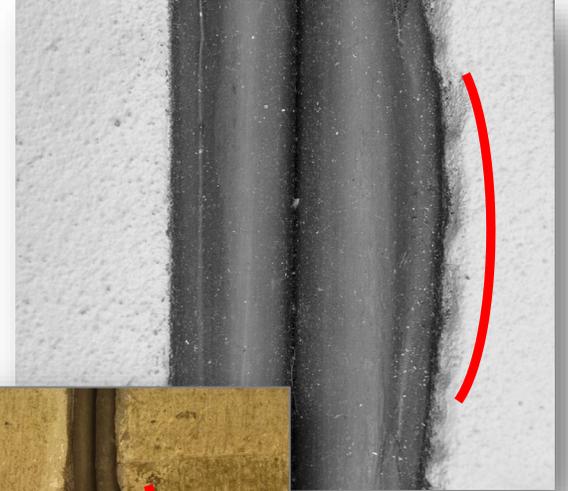
metal angles



header material



spalled or irregular concrete





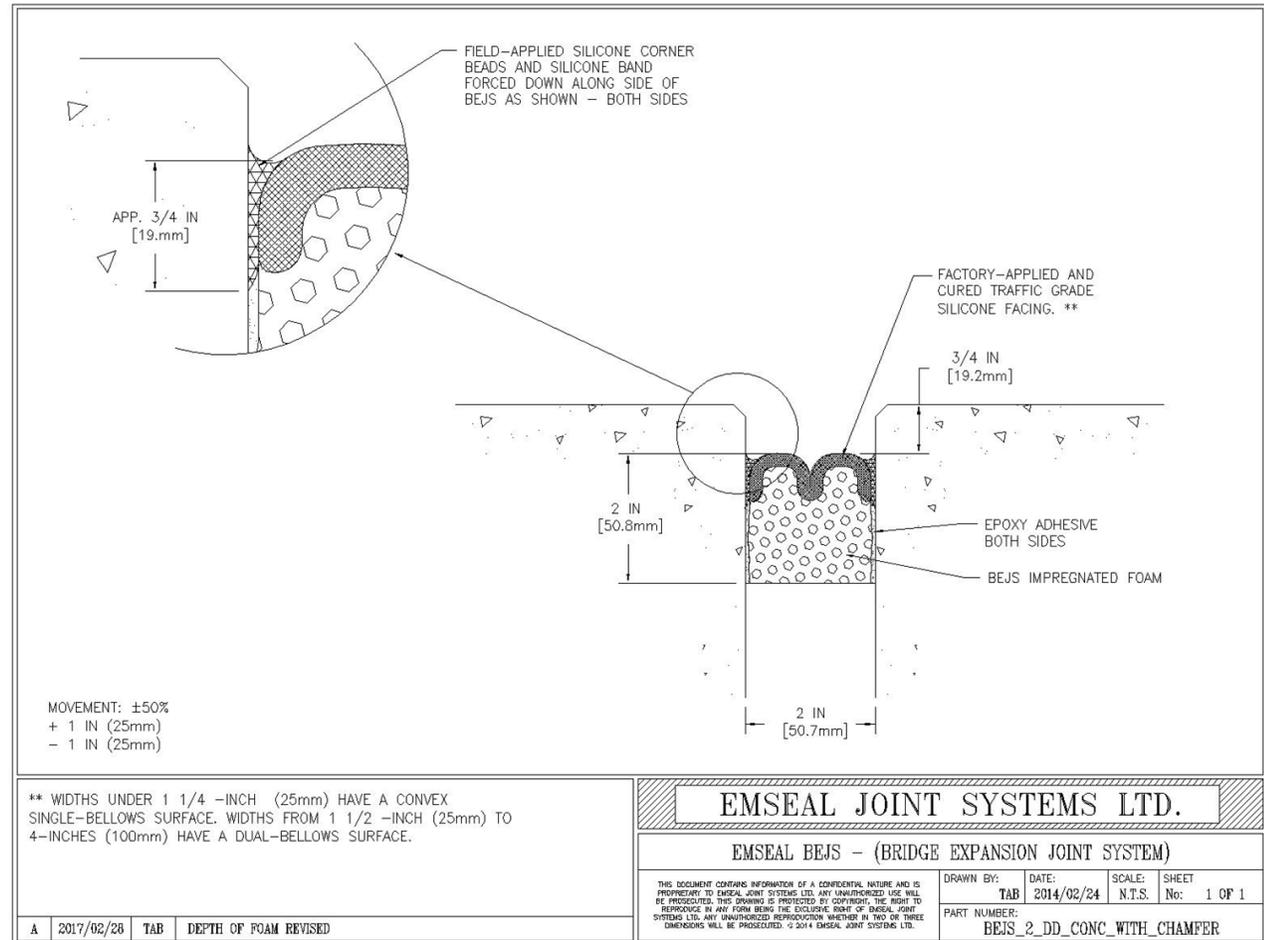
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BEJS: Bridge Expansion Joint System

BEJS in Concrete

- **CSP-2 (Concrete Surface Profile 2 per ICRI)**
- **Can be achieved through grinding w/ demo saw & diamond tip blade, or sandblasting**





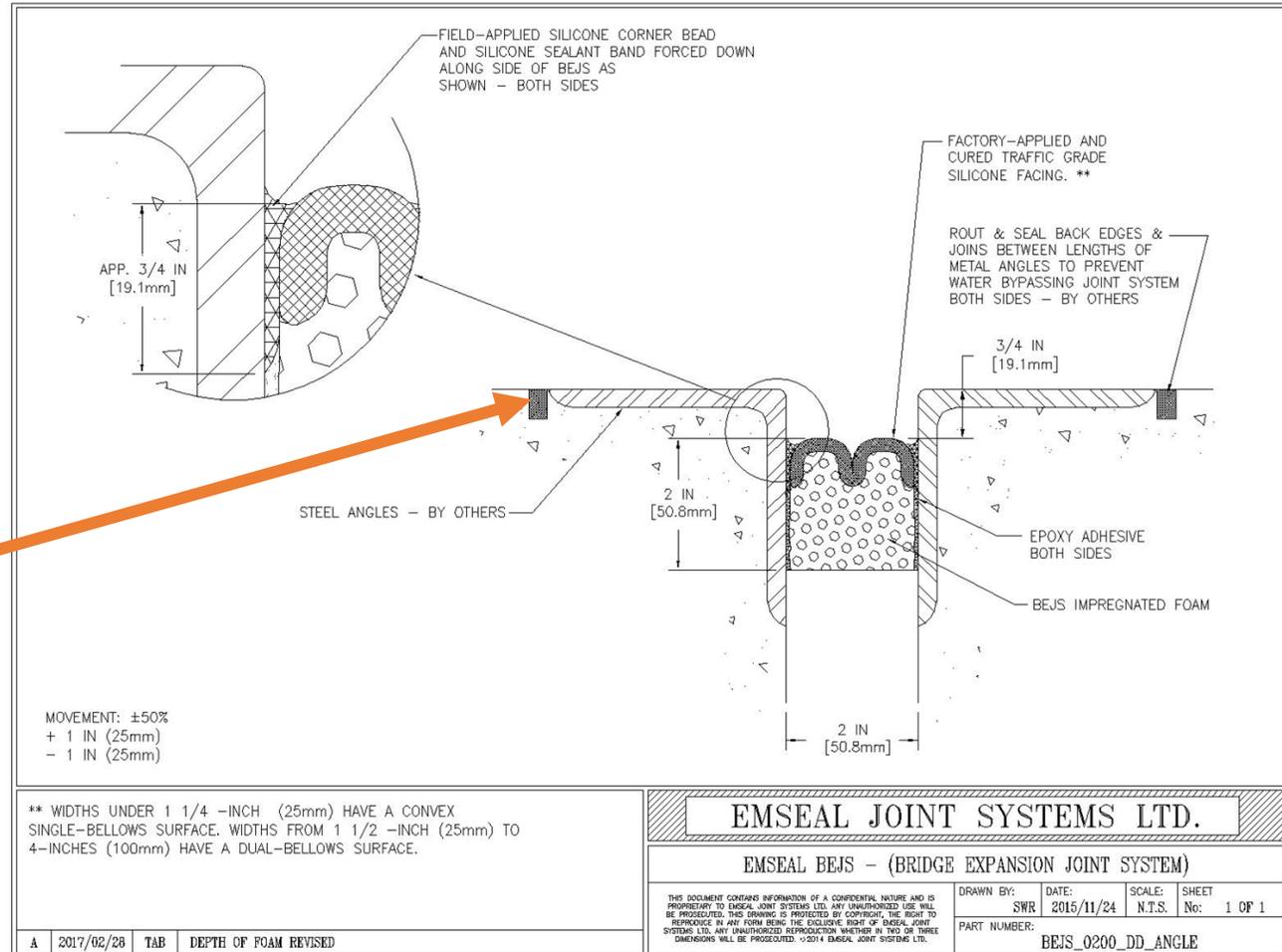
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BEJS: Bridge Expansion Joint System

BEJS in Metal

- **Sandblast or grind metal to near white condition prior to seal installation**
- **Use of elastomeric nosing material to preserve metal bond to concrete**





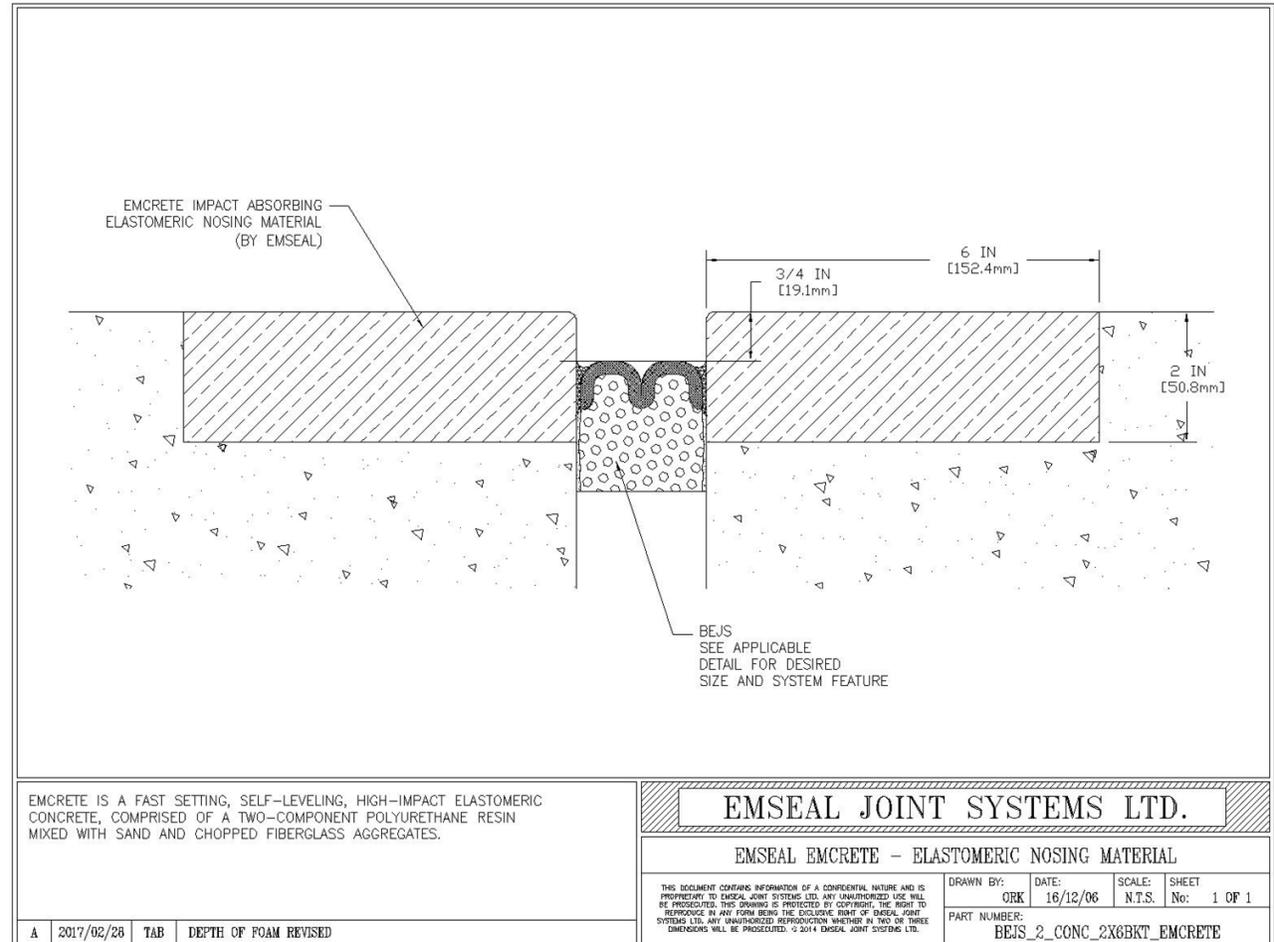
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BEJS: Bridge Expansion Joint System

BEJS in Elastomeric Concrete (EMCRETE)

- **3:1 Blockout Ratio**
- **Prime, Mix, & Pour!**
No rebar required!





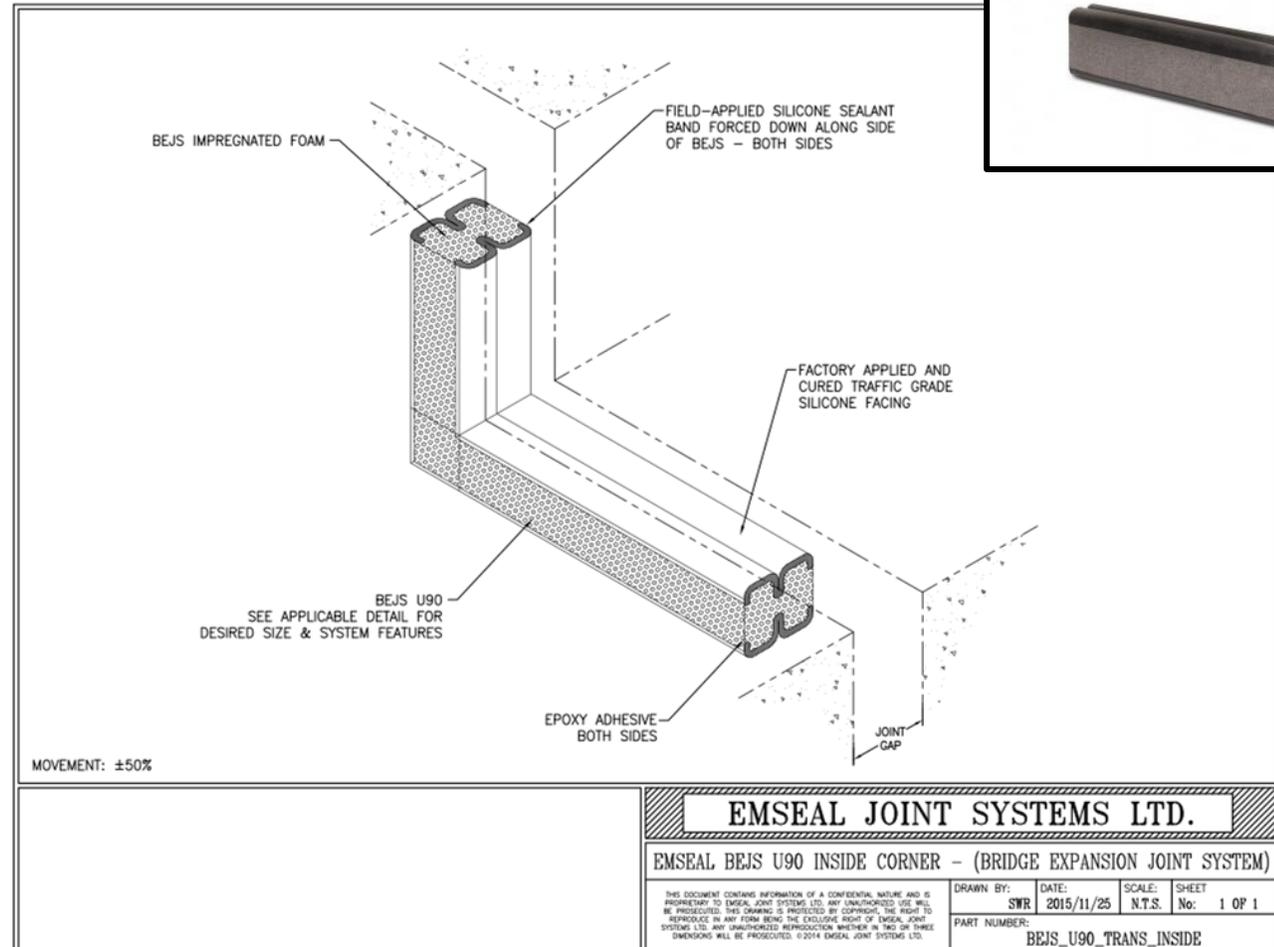
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BEJS: Bridge Expansion Joint System

Universal Transitions

- **Factory Fabricated & Warranted transition**
- **Efficient watertight solution for changes in plane**
- **Standard 90 Degree but can be customized to any angle**

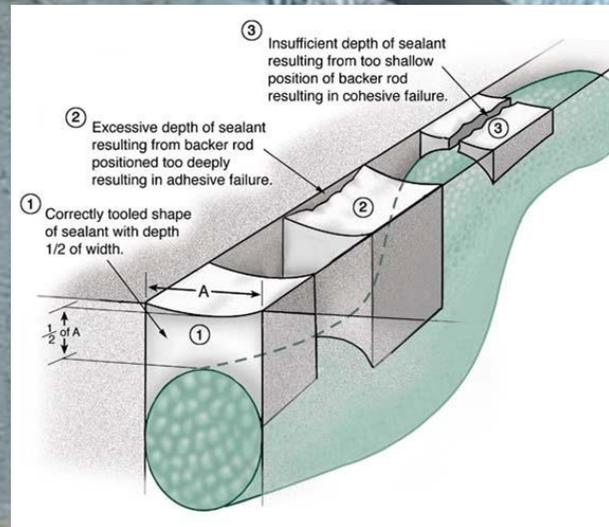


Typical Problems with Expansion Joints

- ***Not Watertight***
- ***Hypersensitive to proper installation***
- ***Does not stage well***
- ***Joint material suffers from compression set***
- ***Unable to adapt to irregular substrates***
- ***Unable to seamlessly adapt to changes in plane***
- ***Difficult to install***
- ***Difficult to Repair***

✓ *Non-sag poorly tooled*

✓ *Adhesive Failure*



Field Card
Date: 08/28/21
Project: 19-051 (300)
Inspector: SB Jett #1
3 JOINTS

- **Adhesive Failure**
- **Compression Set**



***- Gland failures not easily
repairable***



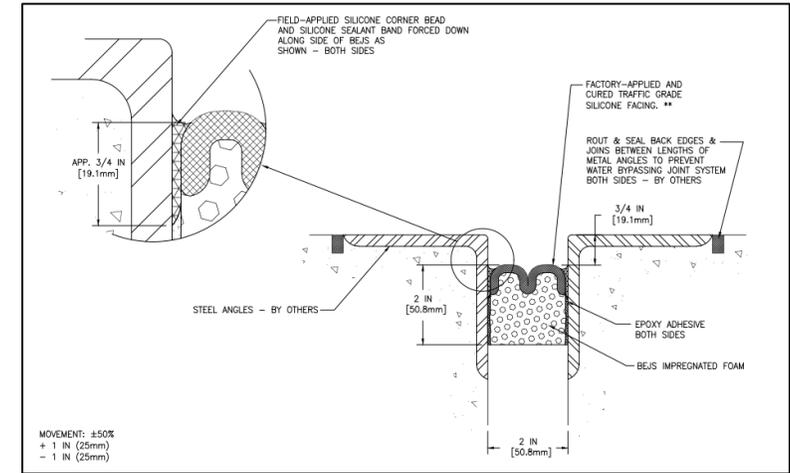
- Limited Bondline

Foam Supported Silicone

- Impregnated Foam (Memory Foam)**
- Uniform Solid Foam Block Construction**
- Coated with UV Resistant & Waterproof Material**
- Adhered to substrate with multiple adhesive components**

Benefits

- High Range of Movement (5"+ with 120% Total Movement)**
- Conforms to irregular substrates**
- Factory Transitions Available**
- Most for Staged Construction**
- Easily Repairable**



✓ Joins every 5 to 6 Feet

✓ Ideal for Staging & Quick Repair





✓ *Watertight Joint*

✓ *Foam*

✓ *Sealant Band*



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✓ ***Seals Wide
Vertical Joints***

✓ ***Parapets,
Backwalls, etc***



✓ BEJS ON-A-REEL

✓ 15 Year Life

✓ Factory Cured Silicone

✓ Resilient Foam Backer

✓ 100% Movement



BEJS-On-A Reel

- Ideal for Joint Gaps of .5”
– 1.25”***
- Most economical for
small movement joints***
- 100% Watertight***
- 120% Total Movement***





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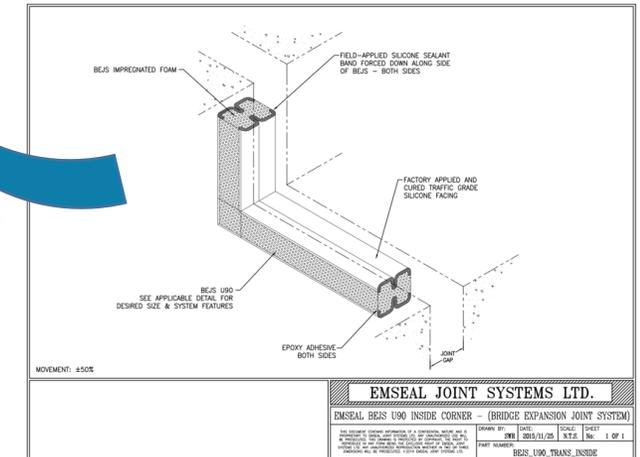
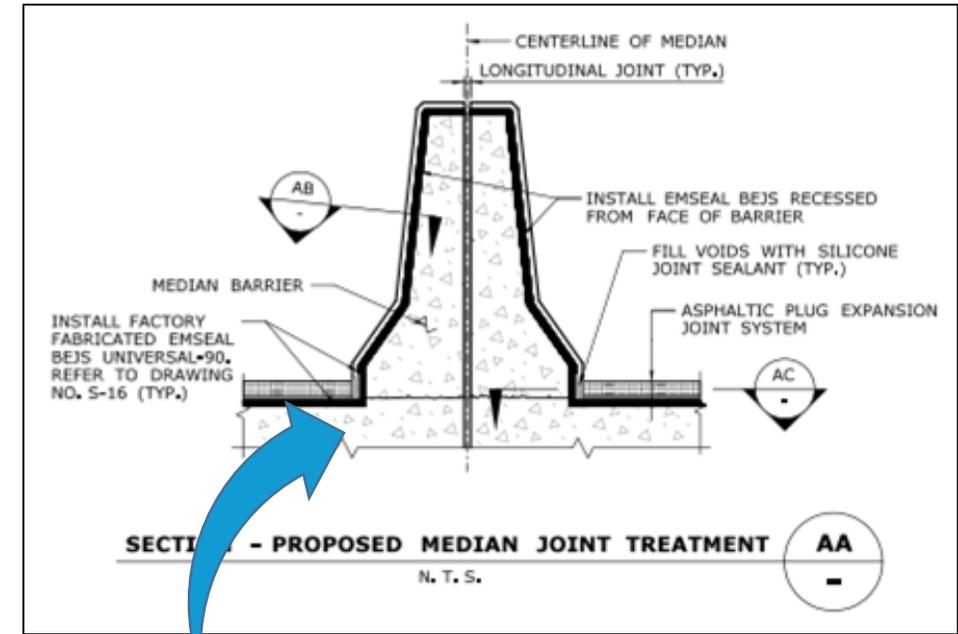
Low Cost Watertight
Expansion Joint Solutions

Asphaltic Plug Joints

- ❑ **Curbs are a Critical Leak Point**
- ❑ *Poured Sealants do not handle changes in plane well*
- ❑ *Silicone Geometry is difficult to Achieve as a secondary seal*

Foam Supported Silicone System

- ❑ **Factory Fabricated Transitions**
- ❑ *Deliver Watertight Changes in Plane*
- ❑ *Single Unit That Is Easy to Install*
- ❑ *Factory Fabricated Transitions are Warranted*

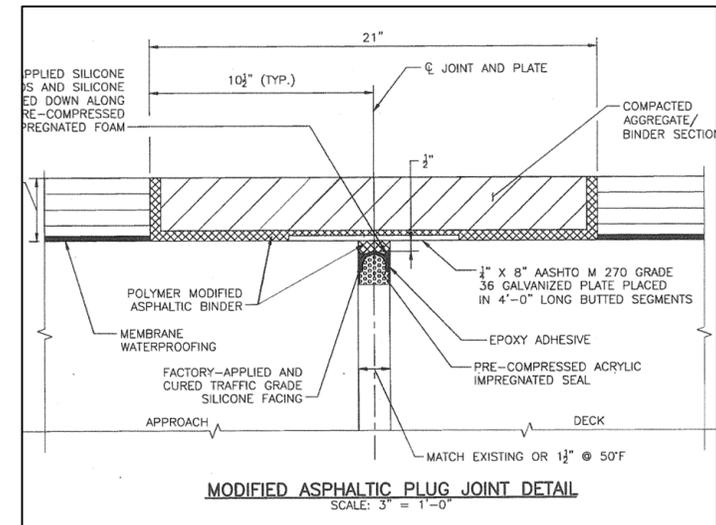
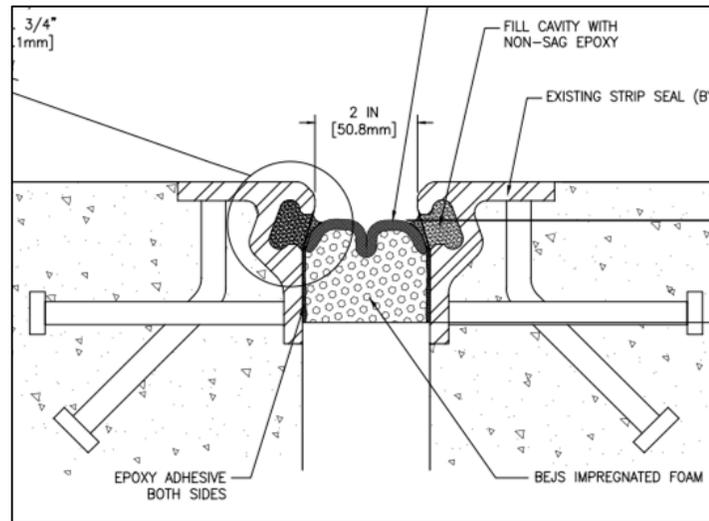
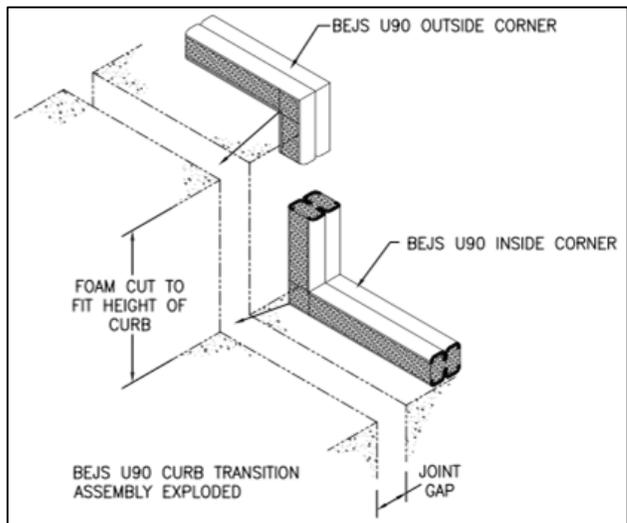
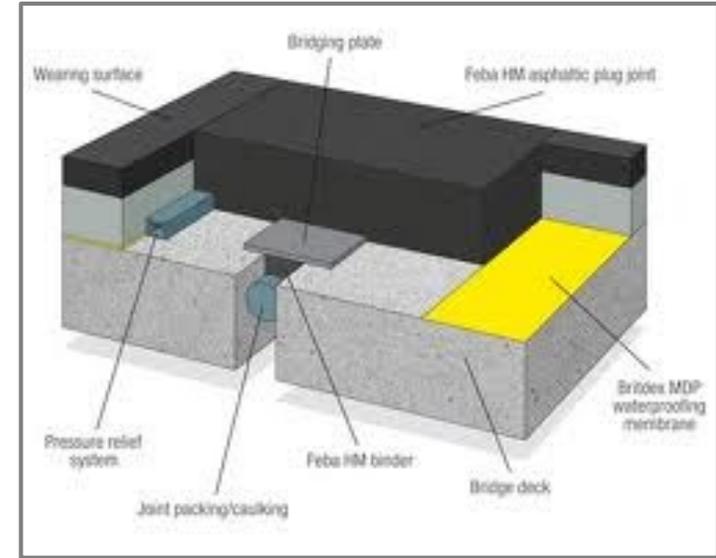
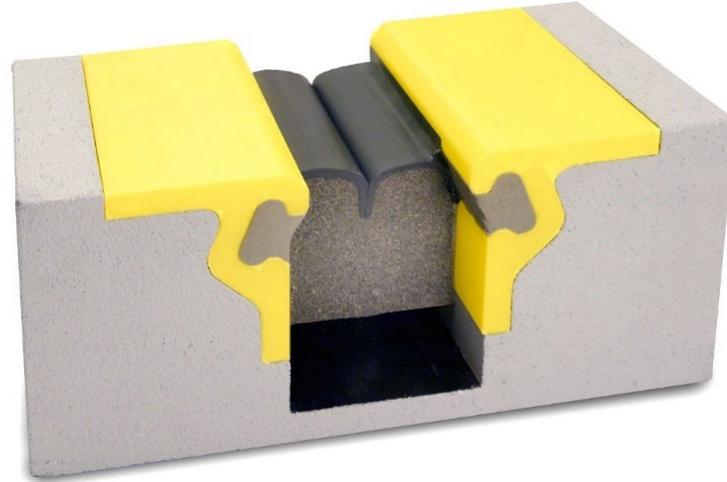


✓ Critical Leak Point



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Low Cost Watertight Expansion Joint Solutions



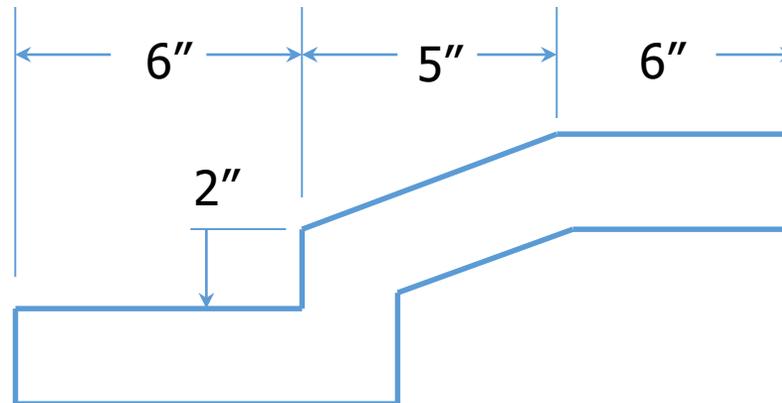


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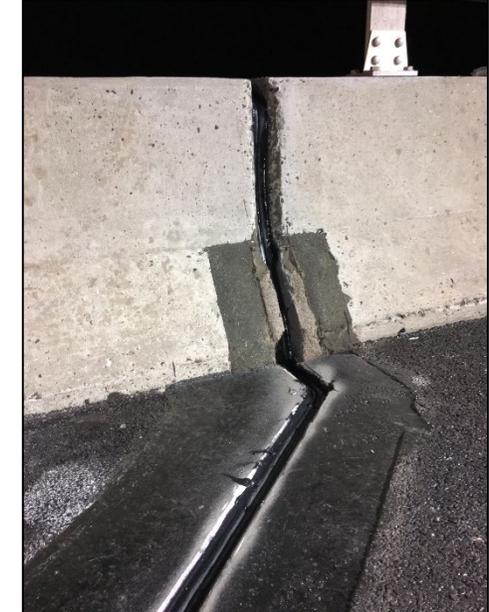
Fully Customizable Factory Fabricated Transitions

- ❑ Watertight Solutions from Out-to-Out
- ❑ Purposefully designed to shed water away from critical substructure components



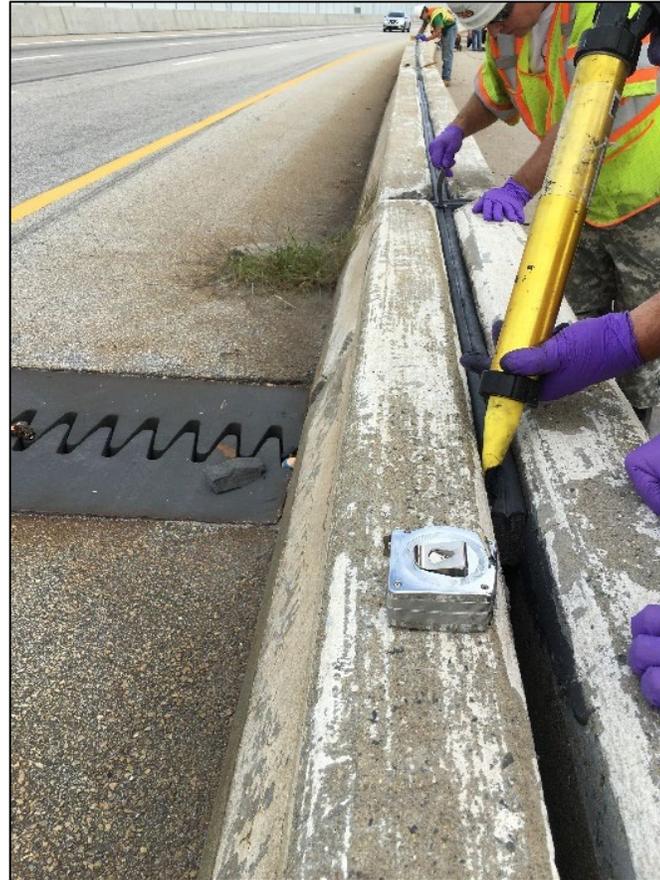
Irregular Joint Conditions

- Skew***
- Joint Tapers***
- Joint Jogs***
- Longitudinal Joints***
- Jersey Barriers/Parapets***



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4-STEP BRIDGE CHECKLIST COMPLETE (1) BRIDGE CHECKLIST PER JOINT

1.) GENERAL INFO

Name _____ Company/Agency _____ Date _____
 Phone _____ Fax _____ Email _____
 Bridge Location _____ Mile Marker _____ Lane Direction _____
 (City/State)
 Bridge Name _____ Description _____
 (Include NBI#) (e.g. Main St over Rte. 66)

2.) BRIDGE MEASUREMENTS

A.) Abutment
 Span "A": _____ LF
 FIX EXP

B.) Pier
 Span "A": _____ LF | Span "B": _____ LF
 FIX EXP

C.) Joint Length: (Out-To-Out) _____ LF

D.) Ambient Temp _____
 Deck Temp _____

3.) JOINT GAP MEASUREMENTS

A.) Joint Dimensions
 Joint Gap Width "A": _____ in.

B.) Is Joint On A Skew?
 Skew No Skew
 Skew Angle: _____ °

C.) Does Joint Width Vary?
 Yes No

D.) Is Joint Subject to Traffic?
 Yes No

4.) TRANSITIONS

Select Joint Termination Condition:

A.) Off Deck
 Qty: _____

B.) Through Curb
 Qty: _____

C.) Up Curb/Parapet
 Qty: _____

D.) Custom Termination
 Angle: _____ °
 Qty: _____



MOVEMENT CALCULATIONS

At Deck Temperature (Degrees F)	Compress to Fit (Inches)
102	1.29
100	1.47
104	1.56
96	1.65
77	1.83
68	1.92
59	2.01
51	2.09
42	2.18
33	2.27
24	2.36
15	2.45
6	2.54
-3	2.62
-12	2.71

Order 2.00 Inch Material - Compress to fit #N/A Inches

The Right Fit

BEJS receives 2 national transportation industry awards!

BEJS selected for 2014 AASHTO Innovation Initiative*

BEJS, selected for 2014 ARTBA TransOvation Award



The purpose of the AASHTO (American Assoc. of State Highway Transportation Officials) Innovation Initiative is to identify and champion the implementation or deployment of a select few proven technologies, products or processes that are:

- Ready for implementation
- Stand out above the rest
- Proven in use
- Will be of significant benefit to other agencies

*Additionally Selected Technologies (ASTs)
 The AII cannot always fund all of the nominated technologies that are ready for implementation and stand out above the rest. Because of this the AII has created this new designation. Based on a technology's potential benefits, each has been sorted into one or more categories. BEJS is listed in the Construction, Maintenance, and Design categories.



The Transportation Development Foundation of ARTBA established this award in order to recognize and honor innovative transportation infrastructure-related products...that:

- Quantitatively improve transportation safety
- Save transportation users and taxpayer's time and money and/or
- Make our transportation infrastructure more environmentally sustainable.

BEJS certified 3 times to





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iPad usage note: Open this PDF file in Adobe Reader

4-STEP BRIDGE CHECKLIST

COMPLETE (1) BRIDGE CHECKLIST PER JOINT

1.) GENERAL INFO

Name _____ Company/Agency _____ Date _____

Phone _____ Fax _____ Email _____

Bridge Location _____ Mile Marker _____ Lane Direction _____
(City/State)

Bridge Name _____ Description _____
(Include NBI#) (e.g. Main St over Rte. 66)

2.) BRIDGE MEASUREMENTS

A.) Abutment

Span "A": _____ LF

B.) Pier

Span "A": _____ LF | Span "B": _____ LF

C.) Joint Length: (Out-To-Out)

_____ LF

D.) Ambient Temp _____ °

Deck Temp _____ °

3.) JOINT GAP MEASUREMENTS

A.) Joint Dimensions

Joint Gap Width "A": _____ in.

B.) Is Joint On A Skew?

Skew No Skew

Skew Angle: _____ °

C.) Does Joint Width Vary?

Joint Varies from: _____ in. to _____ in.

Joint Tapers Spalled Substrate

Joint Jogs Longitudinal Joint

D.) Is Joint Subject to Pedestrian Traffic?

Yes No

4.) TRANSITIONS

Select Joint Termination Condition:

A.) Off Deck

Qty: _____

B.) Through Curb

Qty: _____

C.) Up Curb/Parapet

Qty: _____

D.) Custom Trans.

Angle: _____ °

Qty: _____

EMSEAL

INSTRUCTIONS FOR SIZE SELECTION

Step 1
Measure Joint Gap

Step 2
Longest Joint-to-Joint Length
A or B or C?

Step 3
Measure Deck Temperature

BEJS SELECTION CHART*†					
JOINT GAP	Step 1 Longest Length A or B or C	Step 3 (Size of BEJS) Deck Temperature at time of installation:			
		40-60	60-80	80-100	100-120
1"	50	1" BEJS	1" BEJS	1" BEJS	1" BEJS
	100	1" BEJS	1" BEJS	Contact EMSEAL	2" BEJS
	150	Contact EMSEAL	Contact EMSEAL	Contact EMSEAL	2" BEJS
	200	Contact EMSEAL	Contact EMSEAL	Contact EMSEAL	2" BEJS
1.5"	50	2" BEJS	2" BEJS	2" BEJS	2" BEJS
	100	2" BEJS	2" BEJS	2" BEJS	2" BEJS
	150	2" BEJS	2" BEJS	2" BEJS	2" BEJS
	200	Contact EMSEAL	2" BEJS	2" BEJS	3" BEJS
2"	50	2" BEJS	2" BEJS	2" BEJS	2" BEJS
	100	2" BEJS	2" BEJS	2" BEJS	2" BEJS
	150	2" BEJS	2" BEJS	2" BEJS	2" BEJS
	200	2" BEJS	3" BEJS	3" BEJS	3" BEJS
2.5"	50	2" BEJS	3" BEJS	3" BEJS	3" BEJS
	100	2" BEJS	3" BEJS	3" BEJS	3" BEJS
	150	2" BEJS	3" BEJS	3" BEJS	3" BEJS
	200	3" BEJS	3" BEJS	3" BEJS	3" BEJS
3"	50	3" BEJS	3" BEJS	3" BEJS	3" BEJS
	100	3" BEJS	3" BEJS	3" BEJS	3" BEJS
	150	3" BEJS	3" BEJS	3" BEJS	3" BEJS
	200	3" BEJS	3" BEJS	3" BEJS	3" BEJS
3.5"	50	3" BEJS	3" BEJS	3" BEJS	3" BEJS
	100	3" BEJS	3" BEJS	3" BEJS	3" BEJS
	150	3" BEJS	3" BEJS	3" BEJS	3" BEJS
	200	3" BEJS	4" BEJS	4" BEJS	4" BEJS
4"	50	3" BEJS	4" BEJS	4" BEJS	4" BEJS
	100	3" BEJS	4" BEJS	4" BEJS	4" BEJS
	150	3" BEJS	4" BEJS	4" BEJS	4" BEJS
	200	4" BEJS	4" BEJS	4" BEJS	4" BEJS

*Engineer of record shall confirm BEJS size

Movement Capability of BEJS by Size is:		
BEJS Size:	Closes to:	Opens to:
1"	1/2"	1 1/2"
2"	1"	3"
3"	1 1/2"	4 1/2"
4"	2"	6"

*Chart is based on the assumption that the bearings are in the typical fixed and then moving sequence.

For structures with joint gap sizes and span lengths not listed here, please contact EMSEAL for assistance. EMSEAL Bridge and Highway Department: 508-836-0280.





Bridge Preservation

achieved through low cost watertight joint solutions

✓ The Right Fit

- ✓ Material Recommendations can come direct from the manufacturer
- ✓ Each joint seal accurately sized and made to order
- ✓ Measure twice cut once!

✓ Benefits

- ✓ Assurance knowing you have the appropriately sized material
- ✓ Lower margin for error on material sizing
- ✓ Assist with the Specification Process
- ✓ Each Joint seal tailored and custom fit

Prepared for: Product Training
 Project: Our Value
 Date: 27-Feb-17
 Product(s): BEJS

Material offered are based on information provided and on the assumptions made in this chart. The results are additionally based on the assumption that the slab affecting movement at each joint are unrestrained and free to move from their midpoint. The following information is offered for use subject to confirmation of its accuracy. We are not structural engineers. Material is supplied with the understanding that a qualified structural engineer has confirmed that actual joint movements are within specified product capabilities.

MOVEMENT CALCULATIONS

Length of Slab A (LF)	150
Length of Slab B (LF)	150
State	MA
Recording City	Boston
Max Concrete Temp. (Degrees F.)	122
Min Concrete Temp. (Degrees F.)	-12
Mean Concrete Temp. (Degrees F.)	55
Overall Temp Range (Degrees F.)	134
Coefficient of Expansion, Dense Concrete (Inches/LF/Degrees F.)	0.000066
Temp. of Deck at Joint Measurement	69
Width of Joint @ Above Temp. (Inches)	2
Select the smallest acceptable size material. Green indicates size is within range.	2.00 Material Size Will Work

	Joint Gap	Product Range
Max Opening	2.71	3.00
Min Opening	1.39	1.00

Select temperature closest to the time of install: 53

At Deck Temperature: (Degrees F)	Compress to Fit (Inches)
122	1.39
113	1.47
104	1.56
95	1.65
86	1.74
77	1.83
68	1.92
59	2.01
51	2.09
42	2.18
33	2.27
24	2.36
15	2.45
6	2.54
-3	2.62
-12	2.71

Joint Gap Range VS Material Size Range

Joint Movement Range: 2.71" (Max Opening) to 1.39" (Min Opening)

Material Movement Range: 3.00" (Material Opens to) to 1.00" (Material closes to)

00 Inch Material - Compress to fit #N/A Inches



✓ www.EMSEAL.com

✓ [*EMSEAL BEJS Installation Video*](#)

✓ ***Resources***

✓ ***CAD Library***

✓ ***Guide Spec***

✓ ***Bridge Checklists***

✓ ***Tech Data***

✓ ***Info Guide Requests***

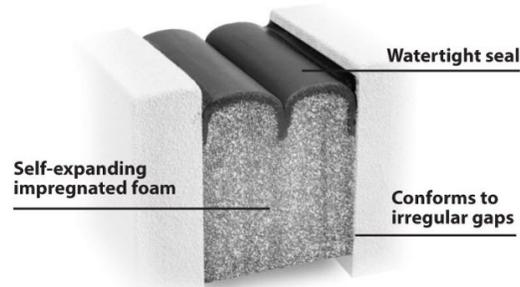




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*Low Cost Watertight
Expansion Joint Solutions*

Innovation in Bridge Expansion Joints



BEJS - Bridge Expansion Joint System

- ✓ Long-lasting watertight solution
- ✓ Handles extreme thermal movement
- ✓ Simple to install
- ✓ Fills imperfect substrate conditions
- ✓ Easy to repair
- ✓ Continuity of seal at curbs and parapets
- ✓ Cost effective



EMSEAL Joint Systems, Ltd. (508) 836-0280 / www.emseal.com/bridge

QUESTIONS?

