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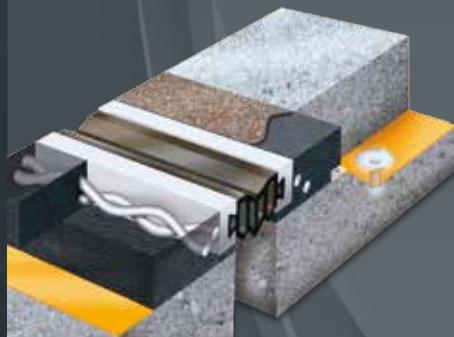
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Approved Installer

Britflex BEJ Expansion Joints

Elastomeric In Metal Runners





Market Leaders in Expansion Joint Technology

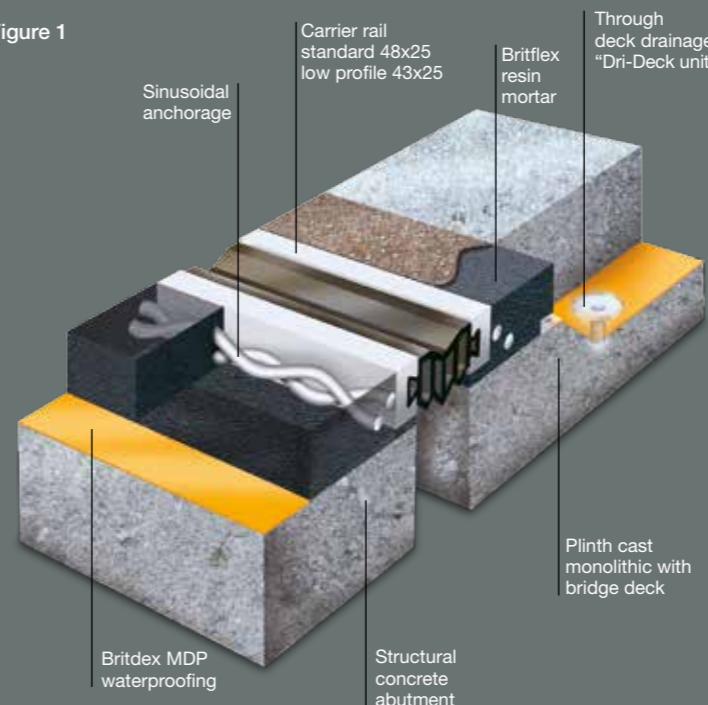
USL BridgeCare provides a complete service to the civil engineering industry for bridge deck protection which includes the supply and installation of expansion joints and spray applied bridge deck waterproofing membranes.

The bridge expansion joint range of products caters for movements from 20mm through to 330mm and includes the "Britflex BEJ" which is the most popular joint used on the UK's motorway and trunk road network with over one hundred thousand linear metres currently in use.

The division also manufactures and applies their Britdex MDP waterproofing system which is a rapid curing, spray applied methyl methacrylate membrane. All of USL's products have a proven track record and comply with the latest Highways Agency requirements.

Through their technical department USL BridgeCare are able to offer a complete package of services to clients and will review a particular application from initial design to final installation to ensure the selection of the most appropriate and cost effective solution.

Figure 1



The product in brief

A close up of the BEJ expansion joint system not normally seen by the travelling public.



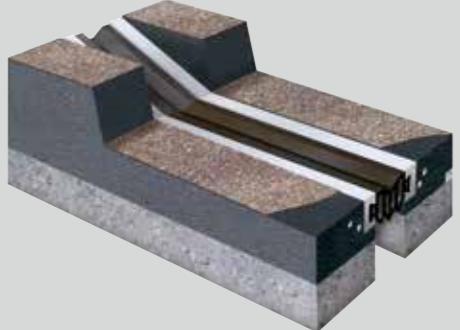
The Britflex 'BEJ' for Maintenance

The 'BEJ' Expansion Joint is a surface mounted mechanical system, with an elastomeric insert between two metal runners or carrier rails. It is unique in that the rails which house the insert are set into a rapid curing elastomeric resin compound known as Britflex Resin Mortar (See figure 1).

Anchorage to the deck is achieved through the excellent bonding qualities of the polyurethane resin, without the need for any mechanical fixings. The system has an unrivalled worldwide track record of in-service performance in excess of 30 years.

The 'BEJ' system is registered with the UK Highways Agency for use on highway bridge decks on all classes of roads and motorways. (Department of Transport BD 33/94: Joint Type 6 refers). The Britflex 'BEJ' system is included in the Highways Agency list of approved products SA1. Britflex Resin Mortar is also included in SA1 as an approved transition strip material for types 5 and 7 expansion joints. 'BEJ' Expansion Joints incorporate cellular elastomeric inserts which are load bearing enabling a range of movement to be accommodated up to 150mm.

The Britflex 'BEJ' is ideally suited for maintenance schemes to replace other failed joint systems. The benefits of rapid on site assembly allow phased working outside peak traffic hours resulting in minimum traffic disruption which results in a significant saving of associated traffic management costs. The track record of the system ensures that future maintenance costs are minimised.

Figure 4 Alternative at kerbline or into parapet recess**Figure 5** Alternative at change on plan**Design detail****a) Carriageway**

In new works or when re-surfacing in maintenance schemes, it is necessary to temporarily cover the expansion gap to prevent ingress of materials into the deck expansion gap. Any such coverings should be easily removed when the trench is excavated for the joint.

Temporary saw-cuts into the newly laid surfacing above the deck expansion gap may be required if appreciable deck movement is predicted after surfacing and before joint installation. This may not be necessary when the joint is installed shortly after the surfacing is laid.

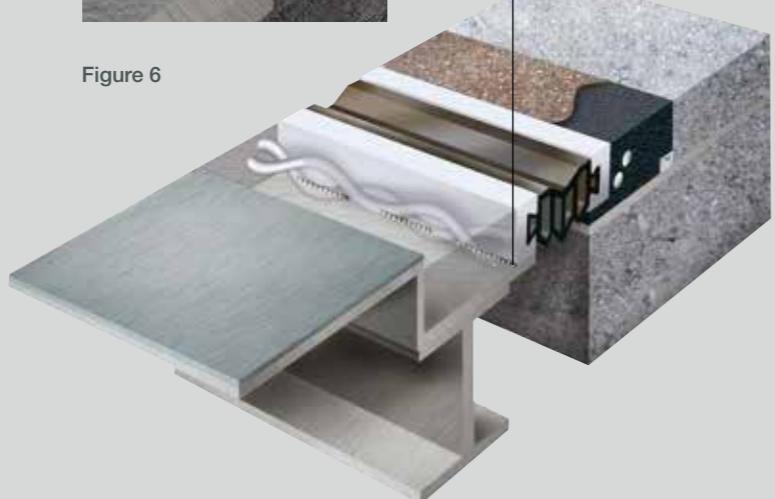
b) Verges

Granular verge and central reserve construction immediately adjacent to the joint is not recommended.

A concrete verge infill is recommended adjacent to the joint and a trench should be formed to accommodate the required joint width.

**Figure 6**

Stitch welding (intermittent)

**Other Applications****c) Service Ducts**

If flexible surfacing is required over any verge concrete the prepared trench may be temporarily backfilled and the position of the trench referenced on the kerb and parapet by the main contractor.

Any newly placed concrete should be nominally seven days old and cured in accordance with the contract. Concrete of at least grade 30 is recommended.

d) Kerbs

Kerbs should be laid starting flush with and working away from the expansion gap. The kerbs are saw cut to the appropriate trench width and removed during the joint installation.

Ducts and sleeves may be in UPVC or other similar materials provided they do not appreciably soften below 80°C. Cables should not be drawn until after the joint is installed, if at all possible.

e) Footway Areas

Kerb cover plates or footway cover plates can be provided as an optional addition. The USL Technical and Advisory Service should be consulted regarding their inclusion.

Ducts/sleeves through the 'Britflex BEJ' require a minimum of 50mm clearance above the deck and spaced 125mm between each other to allow continuity of the resin mortar material. Where there are 4 or more ducts present in any one verge/footway further advice should be sought from a USL technical advisor.

i) As an improvement over asphaltic plug joints for low movement joints in heavily trafficked areas. On heavily skewed joints or steeply graded carriageways however, the NJ system may prove to be more suitable (see NJ literature for more information).

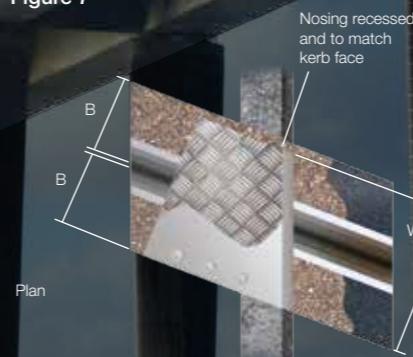
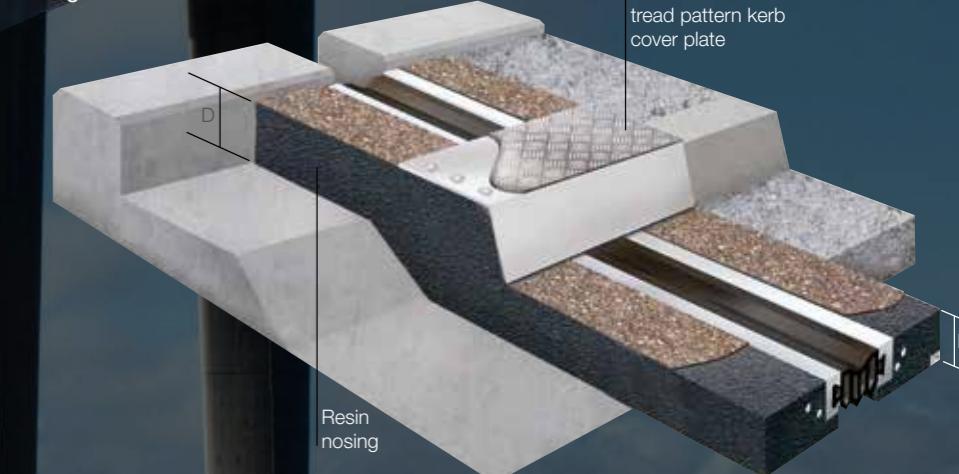
ii) As a longitudinal joint between two deck halves however, the LJ system may be more suitable (see LJ literature for more information).

iii) On building structures, car parks and elevated ramps with a need for heavy duty expansion systems.

iv) On marine quayside structures

v) On footbridges, however the UCP system may be more suitable.

vi) Britflex Resin Mortar may be used for new and replacement transition strips to elastomeric joints and general carriageway ironmongery. It may also be used as a transition to the metalwork of existing proprietary expansion joints where the adjacent surfacing is distressed.

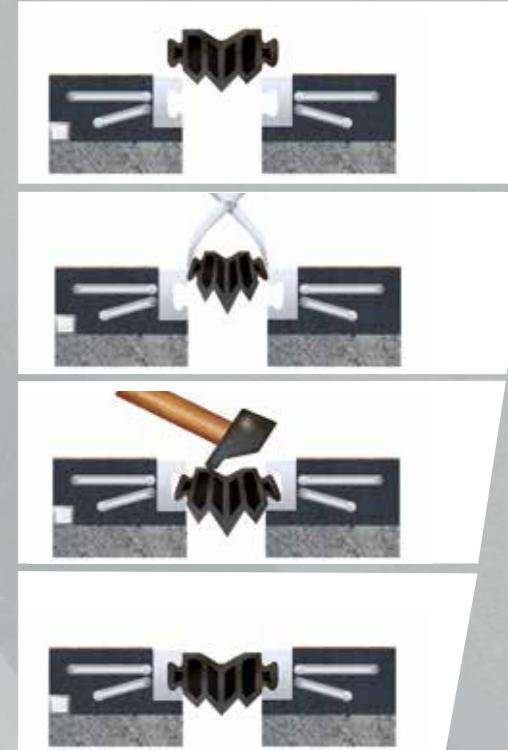
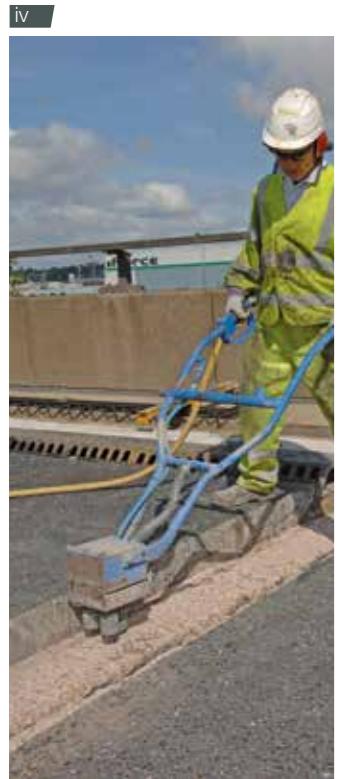
**Figure 7****Figure 8****Specification for The 'BEJ' Expansion Joint****Materials**

- i) **Polyurethane Resin**
The Britflex Polyurethane Resin is a two part liquid system comprising one clear component (Base) and one black (Hardener). Packed in colour coded drums.
- ii) **Aggregate**
The aggregate is a graded mix supplied in 20kg sealed plastic bags.
- iii) **Carrier Rails**
The metal rails are supplied in either mild steel to EN10025:2004 Grade S355JO with factory applied corrosion protection. Stainless steel rails are available at an additional cost. The rails are nominally 25mm wide x 48mm deep with welded sinusoids to provide anchorage into the Britflex Resin Mortar. The rails are generally delivered in 7500mm lengths and cut to length on site.

If specified, the channel is installed to the deck side of the joint along the carriageway length.

For special applications a 25mm wide x 43mm deep carrier rail is available.
- iv) **Kerb Units**
The metal carrier rails are cut, mitred and welded on site, to suit the kerb upstand detail.
- v) **Elastomeric Insert**
The extruded EPDM insert is available in various sizes, each capable of accommodating a different range of movement. The inserts are supplied in coils of lengths between 25 to 60m.
- vi) **Hydraulic Relief**
Standard hydraulic relief channel is 20 x 20mm square aluminium tubing, in 5 metre lengths. The channel has 11mm diameter holes drilled on one face at 90mm nominal centres.

They are available in 5mm increments.
- vii) **Discharge Tube**
When an in-joint hydraulic relief channel is specified, this is terminated with a braided PVC flexible tube with a 25mm internal diameter (32mm external diameter), discharging to a suitable collection point.
- viii) **Polystyrene**
25mm and 50mm sheets of expanded polystyrene are cut to size to form a temporary shutter in the expansion gap between the nosings and also in the kerb area.
- ix) **Spacer Plates**
The spacer plates set the rails at the appropriate gap setting during installation.
- x) **Strongbacks/Hangers**
The spacer plates are connected to the hangers which suspend the rails over the expansion gap at carriageway level.
- xi) **Kerb/Footway Cover Plates (Optional Additions)**
These may be supplied fabricated from 4.5mm thick aluminium plate with five bar tread pattern.



Installation

- a) General steps in the installation of the 'BEJ' Expansion Joint
- i) The two resin components are warmed in oil jacketed gas/diesel fired heaters and maintained at 65° - 85°C
- ii) The width is marked out on the asphalt surfacing and saw cut to provide a trench in the carriageway. The trench width will depend on the selected nosing width, type of joint and the required gap setting.
- iii) The surfacing or the existing failed joint is broken out and removed.
- iv) The concrete deck and any previously formed recess in the verge/central reserve is lightly scabbled and/or wire brushed and substandard asphalt/concrete removed.
- v) All loose arisings and any standing water are removed with compressed air.
- vi) All exposed surfaces should be dried before priming, by using compressed air and/or hot air depending upon the weather conditions.
- vii) If hydraulic relief is specified, prime beneath the position of the drainage channel with a mix of the two resin components. (See section xi). The channel is fixed with masonry nails into the surfacing and protected from the resin ingress with masking tape. The flexible discharge tube is then fitted at the low end of the channel and routed appropriately.
- viii) The polystyrene shutter is cut to size and placed in the expansion gap, ensuring it is firmly in the gap. The complete trench is then primed with the resin mix (See section xi).
- ix) The carrier rails are cut and welded to suit any general changes in level or direction.
- x) The rails are positioned on spacer plates of the selected size, attached to the hangers/strongbacks, positioned over the expansion gap and set for line and level.

- xii) The polyurethane resin is batched from calibrated jugs of the two components and mixed with a powered paddle until homogeneous and streak free.
- xiii) The resin mortar is batched by first pre-heating one 20kg bag of aggregate to approximately 70°C in a powered mixer. One batch of the resin compound (see xi) is then added and mixed until homogeneous.
- xiv) If required a measure of 'Aerosil' may be added towards the end of the mixing cycle to stiffen up the mix for placing in steeply graded areas.
- xv) The resin mortar is placed into the prepared trench in the carriageway and trowelled flush with the rails and surfacing.
- xvi) Apply an anti skid aggregated scatter to the resin mortar prior to full cure.
- xvii) The resin mortar will cure after two to three hours at approximately 70°C. It is then allowed to cool before the spacer plates, hangers and polystyrene shuttering are removed.
- xviii) The sections of joints in the verges/central reserve are installed in a similar manner.
- xix) The elastomeric insert is installed using compression tongs into the carrier rails.
- xx) If specified, any kerb cover, footway or parapet plates are fitted.

Installation

- b) Weather and Temperature Criteria

The polyurethane resin may be installed in temperatures of up to 50°C. It is not affected by freezing, but care must be taken to ensure the substrate is frost free and sufficiently dry before the priming stage.

Once the exposed surfaces have been primed, the joint is effectively sealed. At temperatures below 5°C the resin will be dormant until heat is applied. At warmer temperatures, the resin will cure unaided.

Britflex Polyurethane Resin does not emulsify in water. Consequently the resin mortar may be placed with care in periods of rain, provided the resin is placed in such a way as to prevent water from being trapped in the trench.
- c) Time lag after completion and before opening to traffic

Once the resin mortar has cured the elastomeric element can be inserted and the joint opened to traffic. During phased working the joint can be opened to traffic after curing with or without the elastomeric element in place to suit the sequence of installation and minimise traffic disruption.
- d) Other Notes

When the 'BEJ' system is bonded to steel, this should be prepared by grit blasting or mechanically abrading just prior to the priming operation.

The 'BEJ' insert should be protected from white-lining materials, e.g. with sand.

The preliminary operations of saw cutting and breaking out can be undertaken during inclement weather.



Additional Information

Notes

The colours used in the illustrations may not be indicative of the finished product.

USL BridgeCare reserve the right to update and improve the 'BEJ' Expansion Joint and its specification without notice and Engineers and Contractors should satisfy themselves that they have full and up to date information.

Britflex is a registered trade mark of Universal Sealants (UK) Limited.

Technical & Advisory Service
Further technical information may be obtained on request and consultation is encouraged to ensure choice of materials selected and detailing are optimised to suit in-service performance requirements and economic solutions.

Health & Safety
USL BridgeCare operate a strict policy on health and safety and details are available on request.

USL Product Range

Expansion Joints

- **Uniflex Expansion Joint**
(BD33/94: Type 1: Buried Joint Under Continuous Surfacing)
- **FEBA HM**
(BD33/94: Type 2: Asphaltic Plug Joint)
- **NJ Expansion Joint**
(BD33/94: Type 4: Nosing joint with Preformed Compression Seal)
- **Transflex, Waboflex & Euroflex**
(BD33/94: Type 5: Reinforced Elastomeric)
- **LJ**
Longitudinal Joint System
- **UCP**
Footbridge/Pedestrian Joint System

Bridge Deck Waterproofing

- **Britdex MDP**
Methyl Methacrylate (MMA) Waterproofing Membrane
- **Britdex CPM**
Combined Waterproofing and Anti Skid Surfacing
- **Britdex CPM Tredseal**
Combined Waterproofing and Wearing Course





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