EXPANSION JOINTS
BRITFLEX MEJS
MODULAR
Introduction

Market Leaders In Expansion Joint Technology.

We are a world class, multi-disciplined engineering solution provider, with core competencies in structural protection and movement control.

We offer an unrivalled range of specialist services including spray applied bridge deck membranes, bridge deck expansion joints, structural bearings, bridge deck drainage as well as bespoke structural fabrications.

Through early project engagement with stakeholders, we are able to provide high quality engineering solutions by way of consultancy support or the delivery of a complete project management service.

From design, manufacture and installation, to inspection, site maintenance and replacement work, our single point of responsibility offering, leaves USL Ekspan uniquely placed to solve complex challenges on a truly global scale.

THE SYSTEM

The Modular Expansion Joint System (Britflex MEJS) is a mechanical device installed in bridge expansion joint openings. The primary function of the Britflex MEJS is to allow vehicle traffic to travel smoothly across large expansion joint openings. It does this by dividing the large expansion joint openings into a series of smaller openings called cells.

These cells work together to accommodate the necessary thermal bridge movement (expansion and contraction) while providing a smooth riding surface for bridge vehicle traffic. The Britflex MEJS is normally used for expansion joints with a movement range exceeding 75 mm.

The Britflex MEJS also has the secondary function of protecting the surrounding bridge superstructure and substructure. All Britflex MEJS cells are equipped with watertight sealing elements that prevent debris, water and corrosives such as de-icing chemicals from passing through bridge expansion openings and corroding superstructure and substructure components (see Figure 1).

EXPANSION JOINTS WITH SKEW

Because bridge expansion joints open and close in the direction of traffic, a bridge skew or radius creates movement that is not parallel to the normal movement of the Britflex MEJS. If the direction of movement of the Britflex MEJS is not perpendicular to the joint axis but skewed with the angle. (Figure 2).

Note: The direction of movement does not, in each case, need to be identical to the movement of the bridge axis.
Figure 3 - Modular Expansion Joint Types & Sizes

<table>
<thead>
<tr>
<th>Type</th>
<th>B1 (mm)</th>
<th>B2 (mm)</th>
<th>H (mm)</th>
<th>F (mm)</th>
<th>F60 (mm)</th>
<th>F70 (mm)</th>
<th>F80 (mm)</th>
<th>G (WT) (kg/m)</th>
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<td>400</td>
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</table>

Figure 4 - Modular Expansion Joint Components and Construction Materials

- **Component**: Centre Beam/Support Bar, Edge Beam, Slide Spring, Slide Bearing, Support Bar Box, Control Spring, Strip Seal Gland, Centre Beam Bracket

**Physical Data**

- **Movement Range**: The movement range of the Britflex MEJS is accommodated by the planned operating range of the neoprene seal and by the number of seals. That is, if the planned operating range of the neoprene seal equals 80 mm, the LG2 Britflex MEJS achieves a movement range of 960 mm (12 × 80 mm = 960 mm).

- **Joint Width**: The width of a closed joint is the width of a closed joint. Joint widths 60, 70, and 80 mm are used inside the support bar boxes. This support system permits an optimum load transmission while attaining the flexibility to provide movement in three directions (See Figure 5).

- **Support System**: In the Single Bar – LG Britflex MEJS design, all centre beams are supported by a single support bar. Elastic, prestressed sliding elements are contained by brackets/strips welded to the centre beam at a spacing based on the design code applied. The same elastic, prestressed sliding elements are used inside the support bar boxes.

- **Control System**: Along with the elastomeric profiles, elastomeric control springs coordinate the individual movements to form a dynamic system that simultaneously absorbs braking and accelerating forces. The reaction of these controlling forces on the joint edges can be assumed to act in the direction of displacement with the following maximum values: Tension – max. 3 kN/m; Compression – max. 4 kN/m (See Figure 6).
PRODUCT IN BRIEF

1. Quality Control (MEJS Birth Certificate) – Tight tolerances permit long term success. USL Ekspan develops a “checklist” of tolerances to be recorded for each joint. This checklist is like a birth certificate, it describes every step of production, every critical measurement is recorded and this document is provided to the client as proof of complete quality control.

2. Elastic Connection – Modular Expansion Joint Design does not weld the Centre Beam to the Support Bar, instead using Elastic components, USL’s design creates an Elastic Connection. This eliminates a fatigue problem of welds and permits damping of the modular joints through the elastomeric component.

3. Corrosion Resistance – All exposed steel components of each Britflex MEJS are protected against corrosion through sand blast cleaning and being either hot dipped galvanized or painted with an inorganic zinc paint system. Method depends on the specifications of each individual project.

4. Parallel Support Bars – Britflex MEJS design has Parallel Support Bars that can be aligned with the wheel lanes. Parallel Support Bars provide sufficient clearance for concrete and reinforcing steel. Support bar spacing can be reduced for larger truck loading conditions.

5. Outside the Box – Britflex MEJS design accommodates easy replacement of all the smaller components such as Slide Bearings and Slide Springs. This is due to these smaller components being outside of any restrictive box, allowing accessibility for quick and easy replacement when necessary.

SWIVEL CAPABLE EXPANSION JOINT

Transverse Movement

USL Ekspan’s Swivel Joint is designed to minimise any potential damage at the expansion joints from earthquake displacements. Often these anticipated seismic displacements are beyond the normal thermal longitudinal movement capacity of the expansion joint and also anticipate transverse movements (sideways) and vertical rotations (See Figure 7 and 8).

By utilising “swiveling-capable” modular expansion joints, designers are able to mitigate these problems. The extent of the swiveling (pivoting) and rotating of an expansion joint is a function of the geometry of the support bar boxes which permit movement of the support bars, trumpeting them to permit the required additional movements, and use of spherical bearings for vertical rotations. Extra-long support bars which extend beyond the normal thermal movement requirements are used to accommodate any longitudinal seismic movements. Modifications needed by these designs from normal modern modular expansion joint systems are relatively minor. Any “Single Bar” modular expansion joint is capable of swiveling.

DESIGN AND PHYSICAL STRENGTHS

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PROJECT REFERENCES

Project: Western Peripheral Route
Location: Aberdeen, Scotland, UK
Product: 55 metres (2 joints of 4-cell modular)

Project: Tees Viaduct
Location: Middlesborough, England, UK
Product: 50 metres (2 joints of 4-cell and 2 joints of 5-cell modular)

Project: Blaydon Haugh Viaduct
Location: Gateshead, England, UK
Product: 30 metres (2 joints of 5-cell modular)

EXPANSION JOINTS - CD 357
Uniflex - Buried
BP1 - Buried
FEBA - Flexible Plug
Britflex NJ - Folding
EC & EW - Joint Seal
Transflex & Transflex HM - Mat
T-MAT - Mat

Britflex BEJ - Modular
Britflex MEJS - Modular
LJ - Longitudinal Joint
ES - Joint Seal
Aqueduct/Immersed Joint
Open Type Joint - Rail Joint
Britflex UCP - Footbridge Joint

STRUCTURAL BEARINGS
EKE - Elastomeric (EN1337-3)
KE - Pot (EN1337-5)
DE - Line Rocker (EN1337-6)
GE - Spherical (EN1337-7)
FE - Restraint & Guide (EN1337-8)

D - Line Rocker (BS5400-9)
F - Restraint & Guide (BS5400-9)
G - Spherical (BS5400-9)
J - Roller (BS5400-9)
K - Pot (BS5400-9)

Link Bearing (BS5400-9)
EA - Sliding Bearing
EKR - Rubber Pad & Strip
EOF - Sliding Bearing
Bespoke Bearings

STRUCTURAL WATERPROOFING - CD 358
Pitchmastic PmB
Polyurethane (Pu) Waterproofing System
Britdex MDP
Methyl Methacrylate (MMA) Waterproofing System

Britdex CPM Tredseal
Combined Waterproofing and Anti-Skid Surfacing (MMA)
Uradeck BC
Combined Waterproofing and Anti-Skid Surfacing (Pu)

SUB-SURFACE BRIDGE DRAINAGE
Ekspan 325 Channel
Ekspan 302 System
ES Seal System
DriDeck

SURFACE BRIDGE DRAINAGE
Envirodeck
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