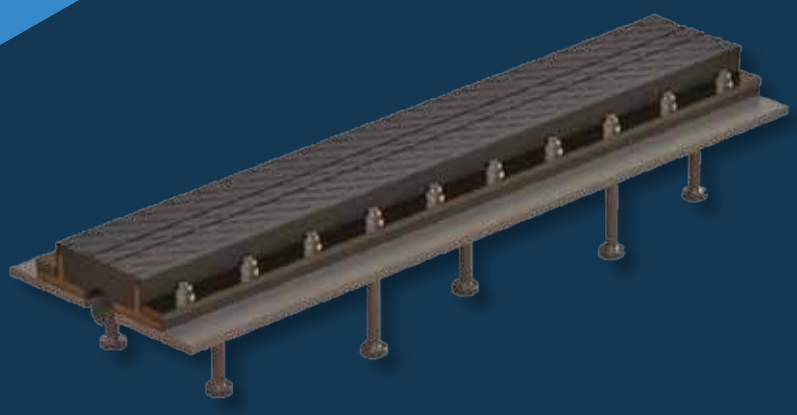
USL EKSPAN

EXPANSION JOINTS

T-MAT

RAILWAY BRIDGES
- MAT



www.uslekspan.com

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.

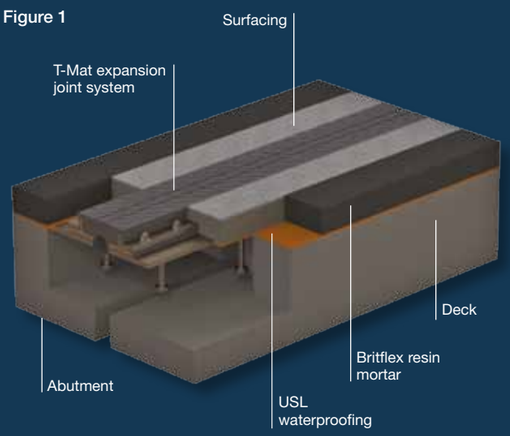
From design, manufacture and installation, to inspection, site maintenance and replacement work, our single point of responsibility offering, leaves USL Ekspan uniquely placed to solve complex challenges on a truly global scale.

Railway bridges in general have one critical point; joining the gaps between individual parts of the structure or elements and components.

The USL Ekspan T-Mat system has become the standard for solving the problem of sealing and bridging of gaps.

T-MAT EXPANSION JOINTS - Railway Bridges - MAT

Figure 1



APPLICATIONS

- Motorways
- Rail and road bridges
- Primary and secondary road
- Pedestrian walkways

SYSTEM BENEFITS

- Absolutely watertight
- For longitudinal movements from +/- 15 (T30) up to +/- 130 (T260)
- High stability under load
- Extra-long durability due to the property designed dimensions and high quality chloroprene
- Low noise - ideal near residential properties

CONTENTS

TECHNICAL - Design Criteria

Technical Documents

Shop Drawings USL Ekspan T-Mat DB/ST 30 to 260 for Bridges of Section

Structural Performance

The Expansion Joints System USL Ekspan T-Mat DB/ST is designed to satisfy all requirements as specified in the above functional specifications.
These are in particular (but not limited to):

- Provision for longitudinal movement between adjacent bridge decks.
  Note: The USL Ekspan T-Mat DB/ST expansion joint consists of a solid armoured expansion mat made of a high quality chloroprene with metal reinforcements (T-bars). The material is moulded and not extruded. The T-bars allow the installation of the expansion mat on a steel substructure which has been built into the bridge superstructure parallel to the expansion gap. The steel reinforcements are spaced in such a way that they guarantee great flexibility.
  The internal design of the expansion joints system USL Ekspan T-Mat DB/ST is such that due to the discontinuous steel reinforcement combined with the elasticity of the material (chloroprene) the expansion joint will not only allow for horizontal movement on either side of the joint, but will also allow for transverse and vertical relative movements of adjacent bridge decks.
- Structural safety during operation is guaranteed by the fact that the design of the expansion joint allows to carry and absorb the combined forces of load and traffic.
- The expansion joint is designed to be installed in such a way to ensure that its surface is flush with the bridge structure. This is to provide a smooth transition for vehicles crossing over the joint gap.
- The internal design as described above will also allow for vertical movement due to differential settlement of 5mm and more (up to ±70mm vertical and ±200mm transversal) without losing any of its other functional properties (see table below for movement capacities of each T-Mat type).
- This also applies to its ability to cope with distortions or other displacements of the structures.

Performance Fulfilment

The Expansion Joint Systems USL Ekspan T-Mat DB/ST perform as designed especially (but not limited) under the following conditions:

- There will be no negative influence of corrosion, since the corrosion protection specifications of all metal parts are imbedded in the chloroprene mat.
- The high quality chloroprene material is resistant against chlorides, oil, ozone, the sun under all climatic conditions. It also allows for vulcanisation on site to properly connect individual joints at joining gaps or at any interval for longitudinal joints so that there is always a homogenous and continuous seal. The materials of the actual expansion band do not age measurably.

Maintenance

- The elastomeric component (T-Mat) as a whole or even in individual segments is replaceable without any impact on the embedded substructure.
- Thus it will at no time and under no circumstances create any danger for the maintenance staff.
  All materials used are well known in the industry and have been used either individually or in combination for many years.
- Once installed, Expansion Joint Systems USL Ekspan T-Mat DB/ST is practically maintenance free.

Materials

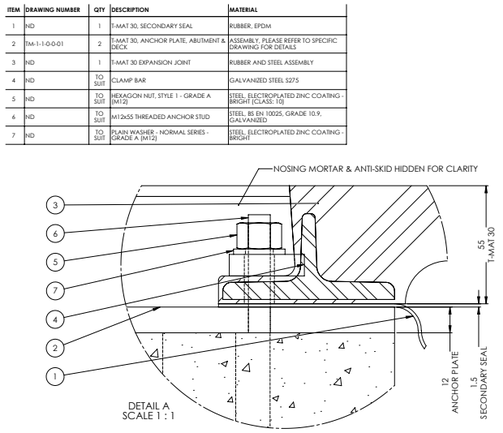
- Expansion Joint Systems USL Ekspan T-Mat DB/ST is designed for a technical life of ≥50 years.
  As discussed above these systems have been used for more than 25 years without showing any signs of neither aging nor damage to the joint which is limited to normal wear of the running surface.
- The elastomeric materials are of the highest quality chloroprene rubbers.
  The T-Mats are moulded and not extruded.
- All design, manufacture and installations of the Expansion Joint Systems USL Ekspan T-Mat DB/ST are made in accordance with the EN ISO 9001 2008.

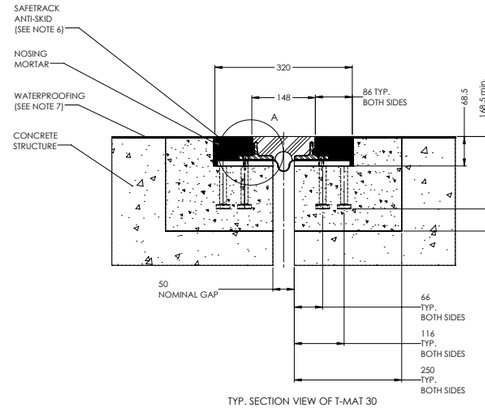
APPLICATION

The T-Mat expansion joint transition is available in four different types. The T-Mat 30, 80 and 130 models have a single joint arrangement. The T-Mat 160 and 260 models have a double joint arrangement.

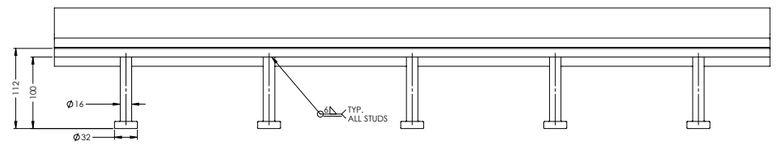
T-Mat 30 - MAT

ITEM	DRAWING NUMBER	QTY	DESCRIPTION	MATERIAL
1	IND	1	T-MAT 30, SECONDARY SEAL	RUBBER, EPDM
2	TM-1-1-0-0-01	2	T-MAT 30, ANCHOR PLATE, ABUTMENT & DECK	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING FOR DETAILS
3	IND	1	T-MAT 30 EXPANSION JOINT	RUBBER AND STEEL ASSEMBLY
4	IND	TO SUIT	CLAMP BAR	GALVANIZED STEEL S275
5	IND	TO SUIT	HEXAGON NUT, STYLE 1 - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT (CLASS 10)
6	IND	TO SUIT	M12x55 THREADED ANCHOR STUD	STEEL, BS EN 10025, GRADE 10.9, GALVANIZED
7	IND	TO SUIT	PLAIN WASHER - NORMAL SERIES - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT





TYP. SECTION VIEW OF T-MAT 30



TYP. ELEVATION VIEW ALONG JOINT OF T-MAT 30
SCALE 1:3

Dimensions

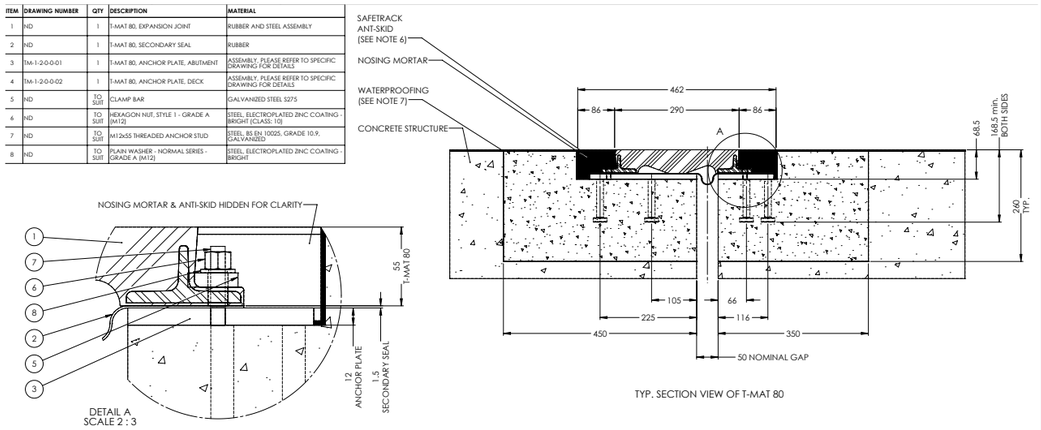
Joint Type	Width (mm)	Depth (mm)	Secondary Seal Thickness - (mm)	Width of Bolt Centres - (mm)	Fixings	Expansion Joint Gap Width - (mm)
T-Mat 30	214	55	2	176	M12	50

Movement Capacity

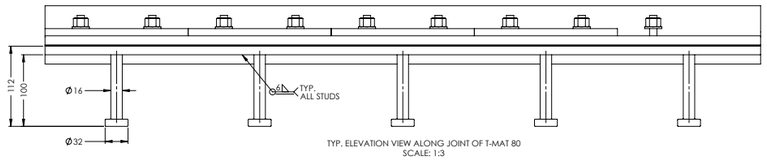
Longitudinal (X Axis):	+/- 15mm
Transverse (Y Axis):	+/- 40mm
Vertical (Z Axis):	+/- 30mm

T-Mat 80 - MAT

ITEM	DRAWING NUMBER	QTY	DESCRIPTION	MATERIAL
1	ND	1	T-MAT 80, EXPANSION JOINT	RUBBER AND STEEL ASSEMBLY
2	ND	1	T-MAT 80, SECONDARY SEAL	RUBBER
3	TM-1-2-0-0-01	1	T-MAT 80, ANCHOR PLATE, ABUTMENT	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING FOR DETAILS
4	TM-1-2-0-0-02	1	T-MAT 80, ANCHOR PLATE, DECK	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING FOR DETAILS
5	ND	TO SUIT	CLAMP BAR	GALVANIZED STEEL S275
6	ND	TO SUIT	HEXAGON NUT, STYLE 1 - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT (CLASS: 10)
7	ND	TO SUIT	M12x55 THREADED ANCHOR STUD	STEEL, BS EN 10025, GRADE 10.9, GALVANIZED
8	ND	TO SUIT	PLAIN WASHER - NORMAL SERIES - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT



TYP. SECTION VIEW OF T-MAT 80



TYP. ELEVATION VIEW ALONG JOINT OF T-MAT 80
SCALE: 1:3

Dimensions

Joint Type	Width (mm)	Depth (mm)	Secondary Seal Thickness - (mm)	Width of Bolt Centres - (mm)	Fixings	Expansion Joint Gap Width - (mm)
T-Mat 80	356	55	2	318	M12	50

Movement Capacity

Longitudinal (X Axis): +/- 40mm

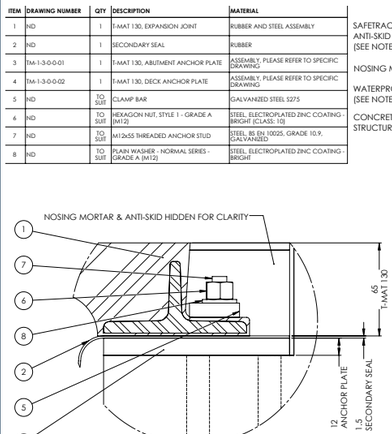
Transverse (Y Axis): +/- 60mm

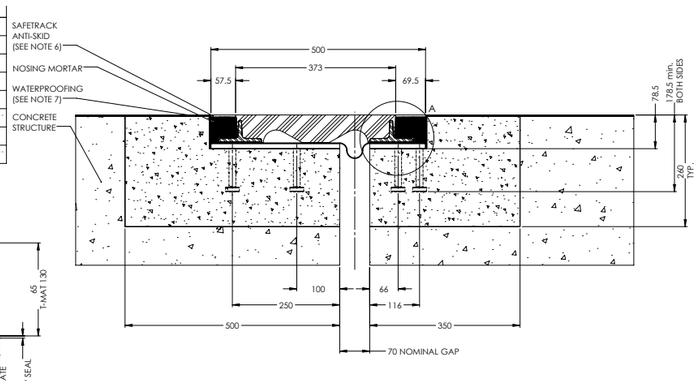
Vertical (Z Axis): +/- 40mm

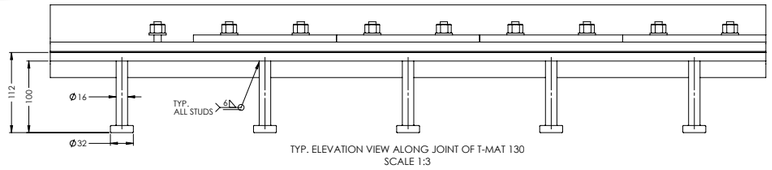
T-MAT EXPANSION JOINTS - Railway Bridges - MAT

T-Mat 130 - MAT

ITEM	DRAWING NUMBER	QTY	DESCRIPTION	MATERIAL
1	ND	1	T-MAT 130, EXPANSION JOINT	RUBBER AND STEEL ASSEMBLY
2	ND	1	SECONDARY SEAL	RUBBER
3	TM-1-3-0-0-01	1	T-MAT 130, ABUTMENT ANCHOR PLATE	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING
4	TM-1-3-0-0-02	1	T-MAT 130, DECK ANCHOR PLATE	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING
5	ND	TO SUIT	CLAMP BAR	GALVANIZED STEEL S275
6	ND	TO SUIT	HEXAGON NUT, STYLE 1 - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT (CLASS: 10)
7	ND	TO SUIT	M12x55 THREADED ANCHOR STUD	STEEL, BS EN 10025, GRADE 10.9, GALVANIZED
8	ND	TO SUIT	PLAIN WASHER - NORMAL SERIES - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT







TYP. ELEVATION VIEW ALONG JOINT OF T-MAT 130
SCALE 1:3

Dimensions

Joint Type	Width (mm)	Depth (mm)	Secondary Seal Thickness - (mm)	Width of Bolt Centres - (mm)	Fixings	Expansion Joint Gap Width - (mm)
T-Mat 130	439	65	2	414	M12	70

Movement Capacity

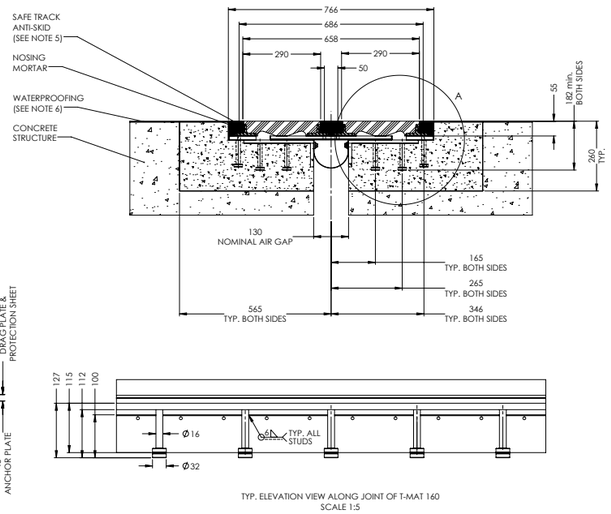
Longitudinal (X Axis): +/- 65mm

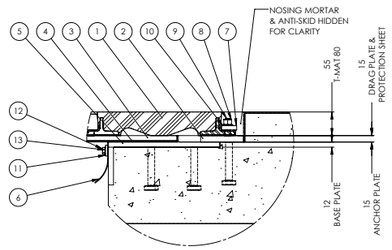
Transverse (Y Axis): +/- 100mm

Vertical (Z Axis): +/- 70mm

T-Mat 160 - MAT

ITEM	DRAWING NUMBER	QTY	DESCRIPTION	MATERIAL
1	ND	2	T-MAT 80, EXPANSION JOINT	RUBBER AND STEEL ASSEMBLY
2	TM-1-4-0-0-01	2	T-MAT 160, ANCHOR PLATE, ABUTMENT & DECK	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING FOR DETAILS
3	TM-1-4-0-0-30	1	T-MAT 160, DRAG PLATE	STEEL, BS EN 10025, S275
4	TM-1-4-0-0-60	1	T-MAT 160, PROTECTION SHEET	NEOPRENE
5	TM-1-4-0-0-05	2	T-MAT 160, BASE ANCHOR PLATE SUB-ASSEMBLY	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING FOR DETAILS
6	TM-1-4-0-0-03	1	T-MAT 160 SECONDARY SEAL	RUBBER
7	ND	TO SUIT	CLAMP BAR	GALVANIZED STEEL S275
8	ND	TO SUIT	HEXAGON NUT, STYLE 1 - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT (CLASS: 10)
9	ND	TO SUIT	M12x55 THREADED BAR	STEEL, BS EN 10025, GRADE 10.9
10	ND	TO SUIT	PLAIN WASHER - NORMAL SERIES - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT
11	TM-1-4-0-0-70	TO SUIT	T-MAT 160, SECONDARY SEAL CLAMP BAR	GALVANISED STEEL S275
12	ND	TO SUIT	HEXAGON HEAD SCREW - GRADE A (M8 x 16.0 LONG)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT (CLASS: 8.8)
13	ND	TO SUIT	PLAIN WASHER - NORMAL SERIES - GRADE A (M8)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT





TYP. ELEVATION VIEW ALONG JOINT OF T-MAT 160
SCALE 1:5

Dimensions

Joint Type	Width (mm)	Depth (mm)	Secondary Seal Thickness - (mm)	Width of Bolt Centres - (mm)	Fixings	Expansion Joint Gap Width - (mm)
T-Mat 160	728	55	2	318	M12	130

Movement Capacity

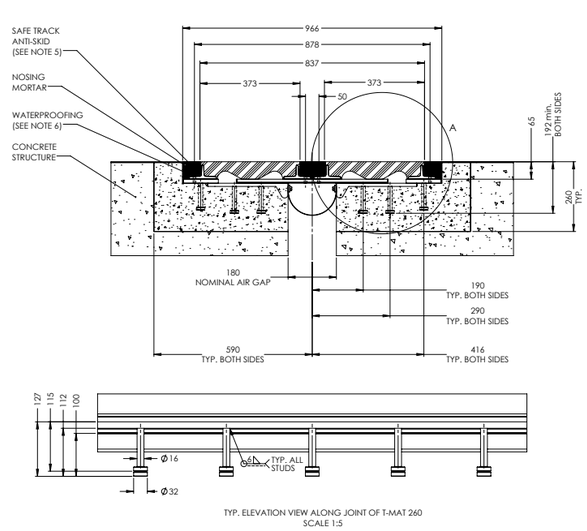
Longitudinal (X Axis): +/- 80mm

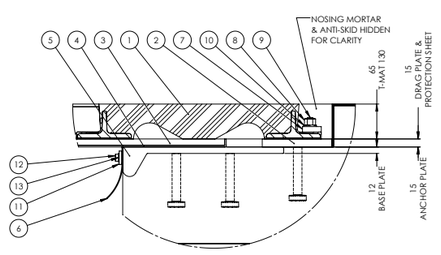
Transverse (Y Axis): +/- 120mm

Vertical (Z Axis): +/- 5mm

T-Mat 260 - MAT

ITEM	DRAWING NUMBER	QTY	DESCRIPTION	MATERIAL
1	ND	2	T-MAT 130, EXPANSION JOINT	RUBBER AND STEEL ASSEMBLY
2	TM-1-5-0-0-01	2	T-MAT 260, ANCHOR PLATE, ABUTMENT & DECK	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING FOR DETAILS
3	TM-1-5-0-0-30	1	T-MAT 260, DRAG PLATE	GALVANIZED STEEL S275
4	TM-1-5-0-0-60	1	T-MAT 260, PROTECTION SHEET	NEOPRENE
5	TM-1-5-0-0-05	2	T-MAT 260, BASE ANCHOR PLATE SUB-ASSEMBLY	ASSEMBLY, PLEASE REFER TO SPECIFIC DRAWING FOR DETAILS
6	TM-1-5-0-0-03	1	T-MAT 260 SECONDARY SEAL	RUBBER
7	ND	TO SUIT	CLAMP BAR	GALVANIZED STEEL S275
8	ND	TO SUIT	HEXAGON NUT, STYLE 1 - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT (CLASS: 10)
9	ND	TO SUIT	M12x55 THREADED BAR	STEEL, BS EN 10025, GRADE 10.9
10	ND	TO SUIT	PLAIN WASHER - NORMAL SERIES - GRADE A (M12)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT
11	TM-1-5-0-0-70	TO SUIT	T-MAT 160, SECONDARY SEAL CLAMP BAR	GALVANISED STEEL S275
12	ND	TO SUIT	HEXAGON HEAD SCREW - GRADE A (M8 x 16.0 LONG)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT (CLASS: 8.8)
13	ND	TO SUIT	PLAIN WASHER - NORMAL SERIES - GRADE A (M8)	STEEL, ELECTROPLATED ZINC COATING - BRIGHT





TYP. ELEVATION VIEW ALONG JOINT OF T-MAT 260
SCALE 1:5

Dimensions

Joint Type	Width (mm)	Depth (mm)	Secondary Seal Thickness - (mm)	Width of Bolt Centres - (mm)	Fixings	Expansion Joint Gap Width - (mm)
T-Mat 260	908	65	2	414	M12	180

Movement Capacity

Longitudinal (X Axis): +/- 130mm

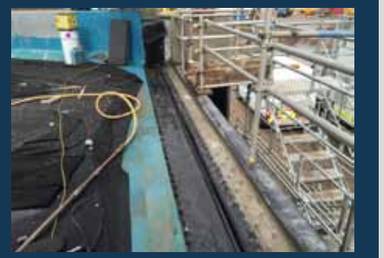
Transverse (Y Axis): +/- 200mm

Vertical (Z Axis): +/- 5mm

INSTALLATION

1. Install T-Mat joint sub-structure steel rails into abutment and bridge deck reinforcement.
2. Line and level steel rails to engineer's requirement.
3. Weld steel rails to reinforcement.
4. Cast concrete encasing reinforcement and steel rail shear studs.
5. Allow concrete to cure to manufacturers requirement.
6. Install expansion joint secondary seal.
7. Install secondary seal down pipe drain.
8. Install steel bridge plate (if installing T-Mat 160 and 260 expansion joint types).
9. Install the T-Mat joints to the pre-drilled M12 fixing locations
10. Apply clamp bars, washers and nuts to M12 fixing locations.
11. Torque fixings to required setting
12. Within the location to the transition strips (voids adjacent to the T-Mat) apply steel primers to steel surfaces; and concrete primers to concrete surfaces.
13. Allow primers to cure to manufactures requirement.
14. Install Britflex Nosing Mortar (including antiskid) to pre-primed transition strips.
15. Allow Nosing Mortar to cure to manufacturer's requirement.

PROJECTS



CREWE GREEN RAIL BRIDGE - Crewe, UK

Client: Morgan Sindall

Designer: Mott Macdonald

Project Remit: Supply and installation of USL Ekspan T-Mat 130 expansion joint on the west abutment of a new rail bridge.

PROJECTS

BERMONDSEY DIVE UNDER - London, UK

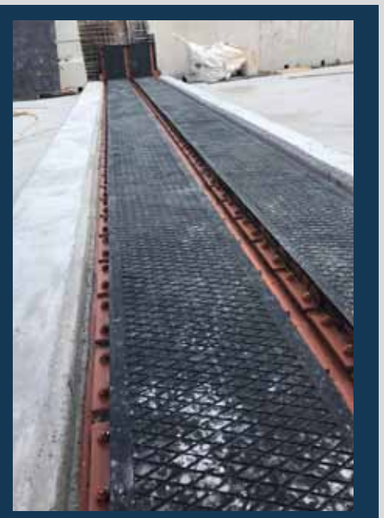
Client: Skanska

Designer: Ramboll

Project Remit: Supply and installation of USL Ekspan T-Mat 80 expansion joints on the new abutment and central pier of the 'Dive Under' link.

T-MAT EXPANSION JOINTS - Railway Bridges - MAT

PROJECTS



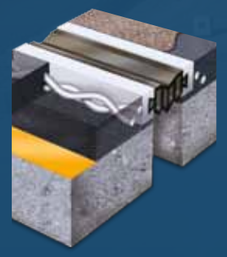
ORDSALL CHORD - Manchester, UK

Client: Network Rail

Contractor: Skanska Bam Nuttall Joint Venture

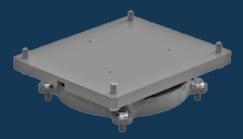
Project Remit: Supply and installation of USL Ekspan T-Mat 80, T-Mat 130 and T-Mat 260 expansion joints on Structures DSE146 and OCD4, on the new Ordsall Chord rail link.

USL EKSPAN - **PRODUCT RANGE**



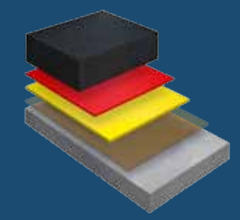
EXPANSION JOINTS - CD 357

Uniflex - Buried
BP1 - Buried
FEBA - Flexible Plug
Britflex NJ - Nosing
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
Finger Joint
Roller Shutter Joint



STRUCTURAL BEARINGS

EKE - Elastomeric (EN1337-3)
KE - Pot (EN1337-5)
DE - Linear Rocker (EN1337-6)
GE - Spherical (EN1337-7)
FE - Restraint & Guide (EN1337-8)
EA - Sliding Bearing
D - Linear Rocker (BS5400-9)
F - Restraint & Guide (BS5400-9)
G - Spherical (BS5400-9)
J - Roller (BS5400-9)
K - Pot (BS5400-9)
Link Bearing (BS5400-9)
EKR - Rubber Pad & Strip
EQF - 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

GROUP BRANDS

A world wide service offering effective solutions in:-

Inspection • Design • Manufacture • Supply • Installation • Commissioning • Planned Maintenance

Issue 01 - September 2020

ADDITIONAL INFORMATION

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 inservice performance requirements and economic solutions. A recommended inspection and maintenance statement is available and will also be issued at the time of installation.

Health & Safety

USL Ekspan operate a strict policy on health and safety, and details are available on request.

With a comprehensive portfolio of products and a highly developed global network, USL EKSPAN are focussed on providing specialist construction solutions on a truly global basis.

USL EKSPAN

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