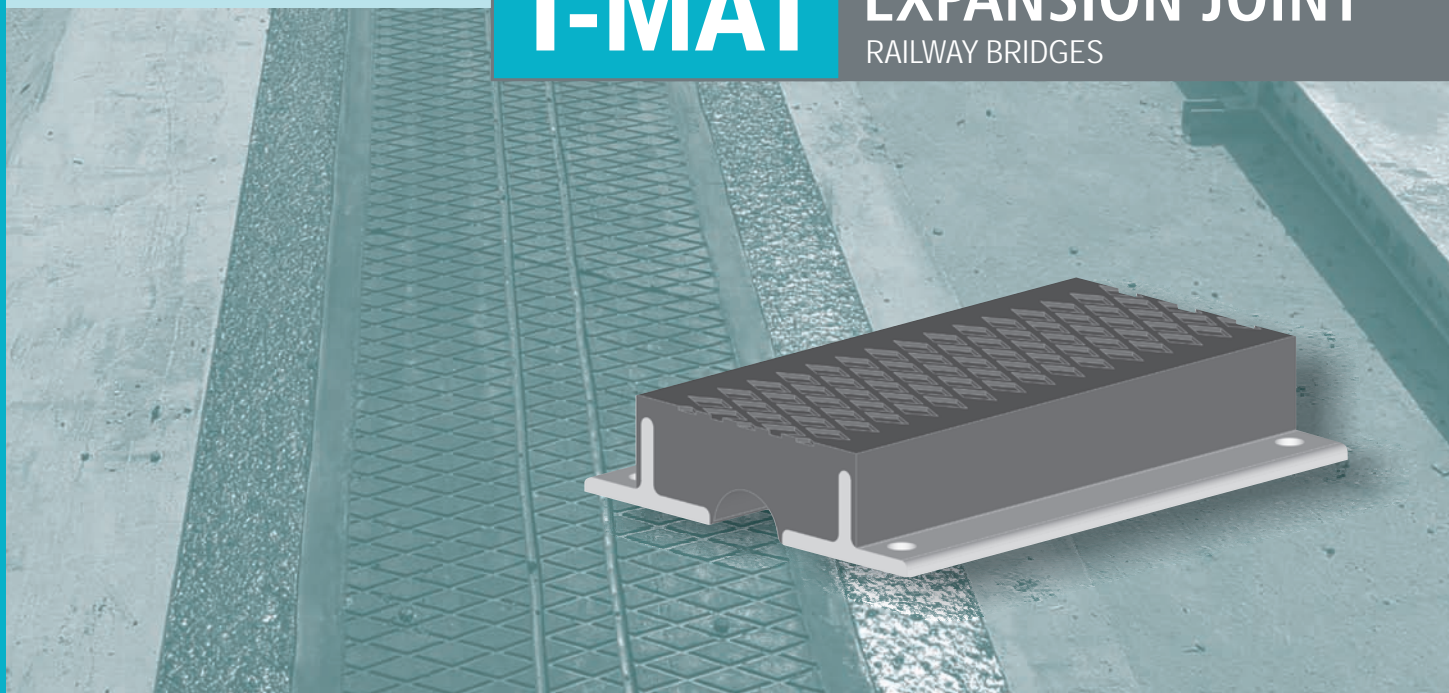




T-MAT

EXPANSION JOINT
RAILWAY BRIDGES



Expansion Control Solutions

www.ekspan.com

CONTENTS

Introduction	3
Technical	4
Application	6
Installation	11
Quality	12
Projects	13

INTRODUCTION

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

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

The Principles:

- Absolutely watertight
- High stability under load, which minimises the need to tamp the ballast
- Extra-long durability due to the property designed dimensions and high quality chloroprene materials
- Standardised internal quality control (ISO 9001)



T-Mat expansion joint used on rail bridges

TECHNICAL

Design Criteria

1. Technical Documents

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

2. Structural Performance

The Expansion Joints System 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 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 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 in order to guarantee a monolithic structure. For Railways structures ballast can be put directly on top of the joint without any additional protection or treatment required. The surface of the expansion joint is flush with the surface of the protection layer and ballast mats.
- The internal design as described above will also allow for vertical movement due to differential settlement of 5mm and more (up to ± 70 mm vertical and ± 200 mm 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.

3. Performance Fulfilment

The Expansion Joint Systems 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.

Note: Expansion Joints System Ekspan T-Mat DB/ST and their steel sub-structures have been installed on bridges in the UK and Europe for more than 25 years. None of these installations, which were executed in conjunction with the above specifications have neither aged visibly nor corroded. All installations are still in service.

- The Expansion Joint Systems Ekspan T-Mat DB/ST is designed to be waterproof
- Since the system is flush with the bridge deck surface and tied into the bridge waterproofing system, it has no effect at all on the overall drainage systems of the bridge decks.
- The Expansion Joint Systems Ekspan T-Mat DB/ST does not generate any noise or vibration during traffic operation.
- Movements in all directions are possible: Short term vertical movements due to different loads on the individual superstructures, long term vertical movements due to differential settlements, long term horizontal movements due to creep, shrinkage and temperature.
- Deflections caused by dynamic actions during traffic operation are absorbed as well

4. 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 Ekspan T-Mat DB/ST is practically maintenance free.

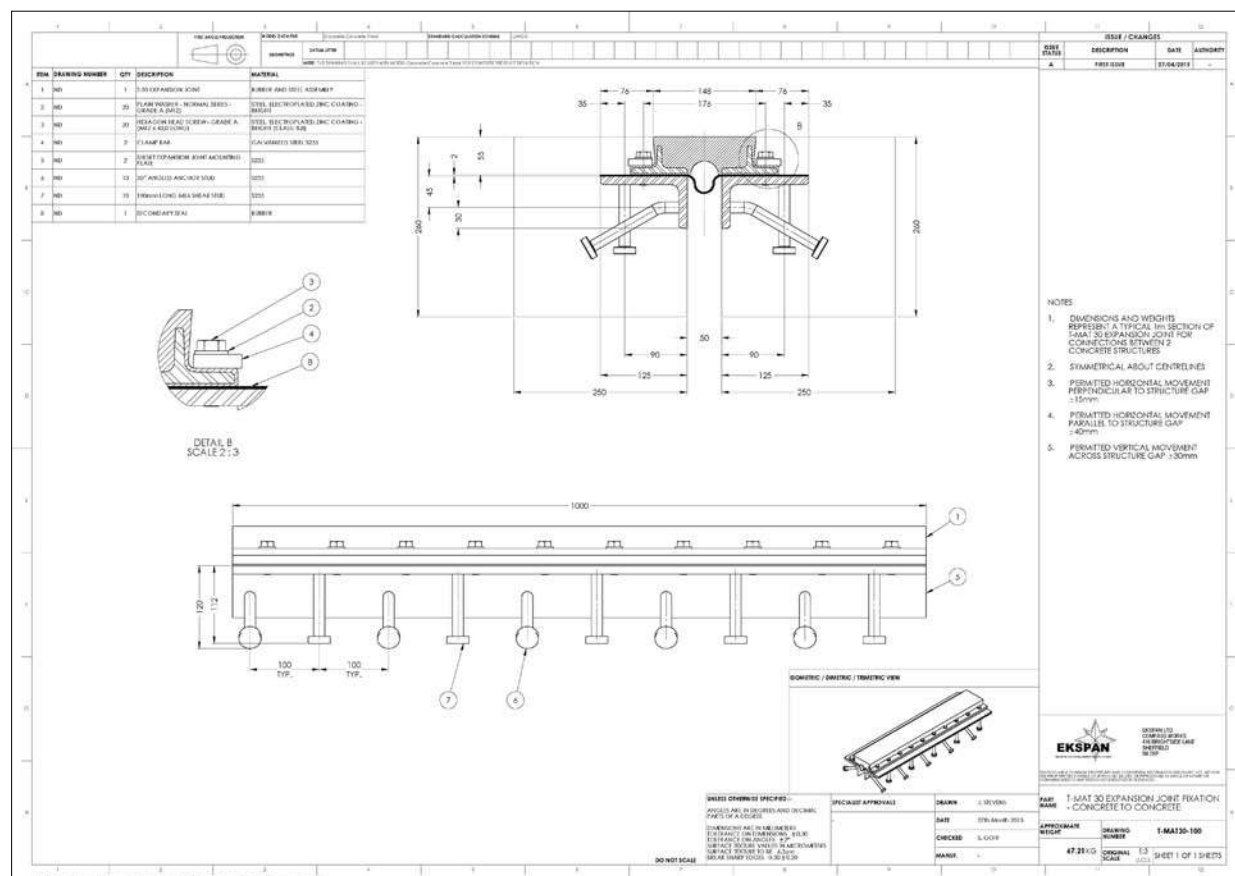
5. Materials

- Expansion Joint Systems 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 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.

Ekspan T-Mat 30 Expansion Joint



Dimensions

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

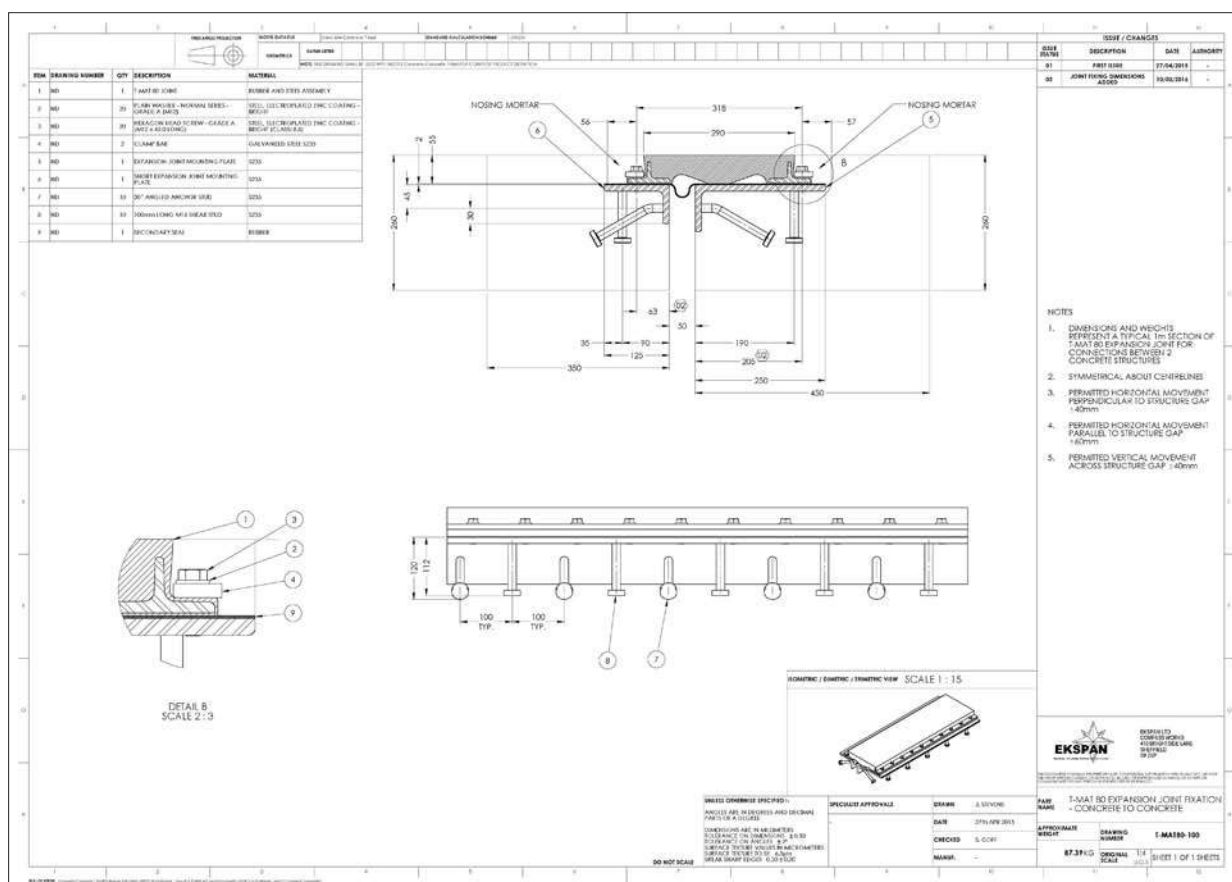
Movement Capacity

Longitudinal (X Axis): +/- 15mm

Transverse (Y Axis): +/- 40mm

Vertical (Z Axis): +/- 30mm

Ekspan T-Mat 80 Expansion Joint



Dimensions

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

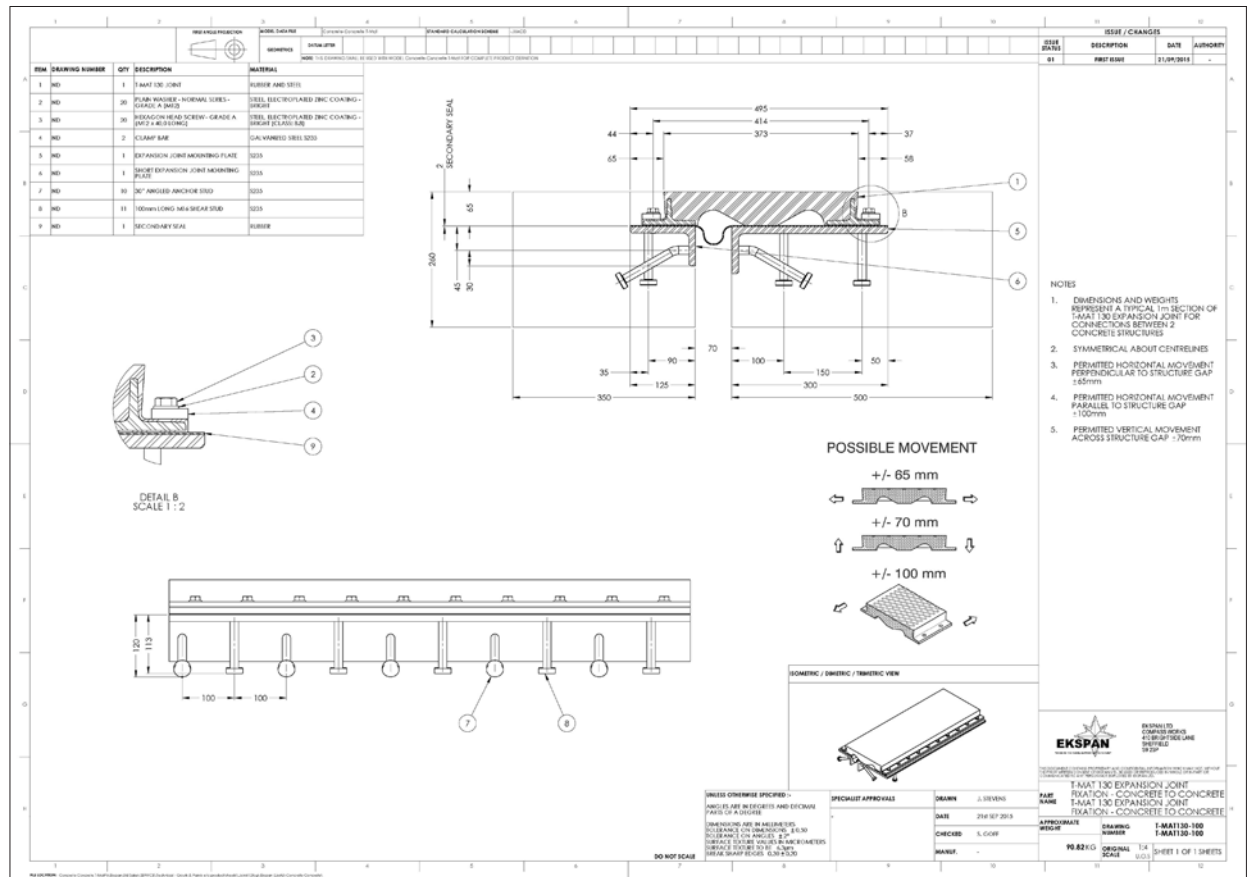
Movement Capacity

Longitudinal (X Axis): +/- 40mm

Transverse (Y Axis): +/- 60mm

Vertical (Z Axis): +/- 40mm

Ekspan T-Mat 130 Expansion Joint



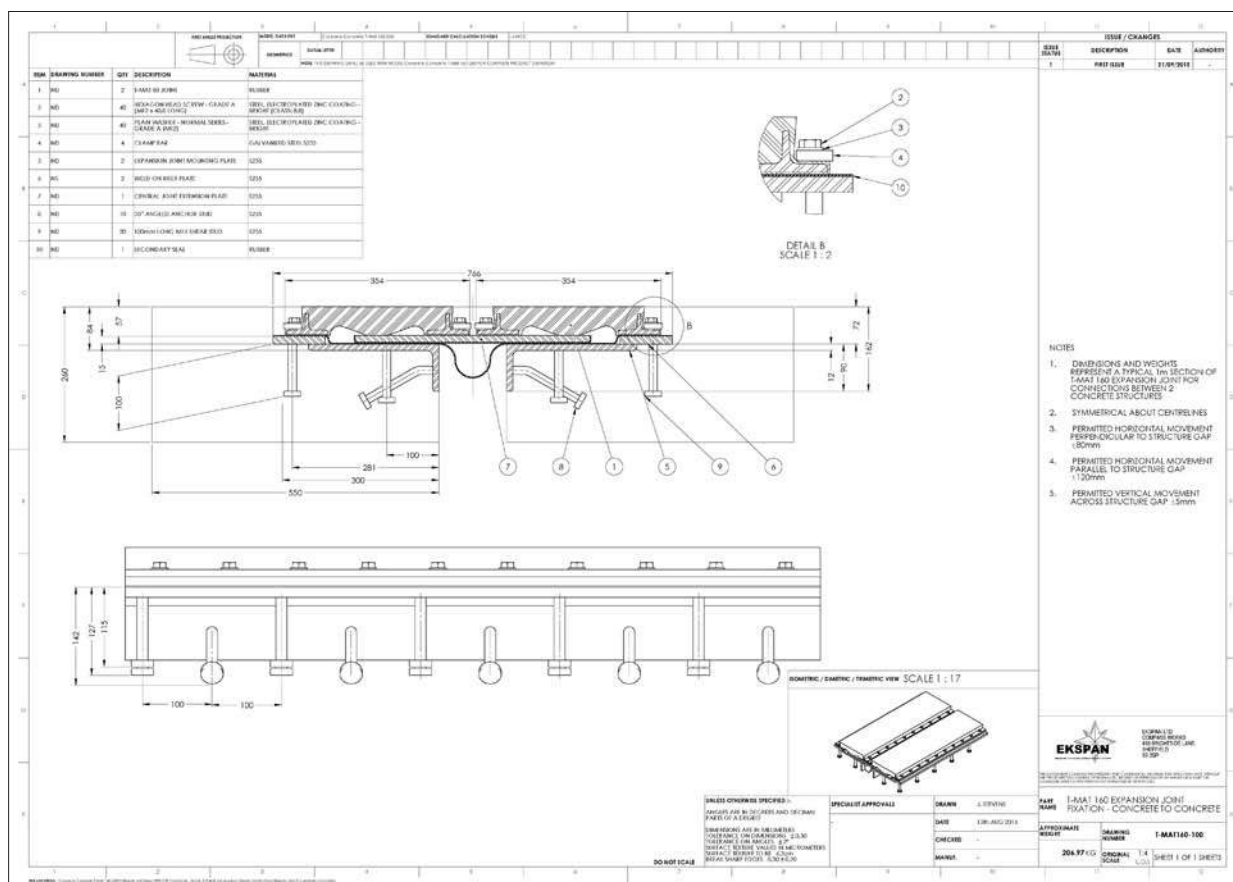
Dimensions

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

Movement Capacity

Longitudinal (X Axis): +/- 65mm
Transverse (Y Axis): +/- 100mm
Vertical (Z Axis): +/- 70mm

Ekspan T-Mat 160 Expansion Joint



Dimensions

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

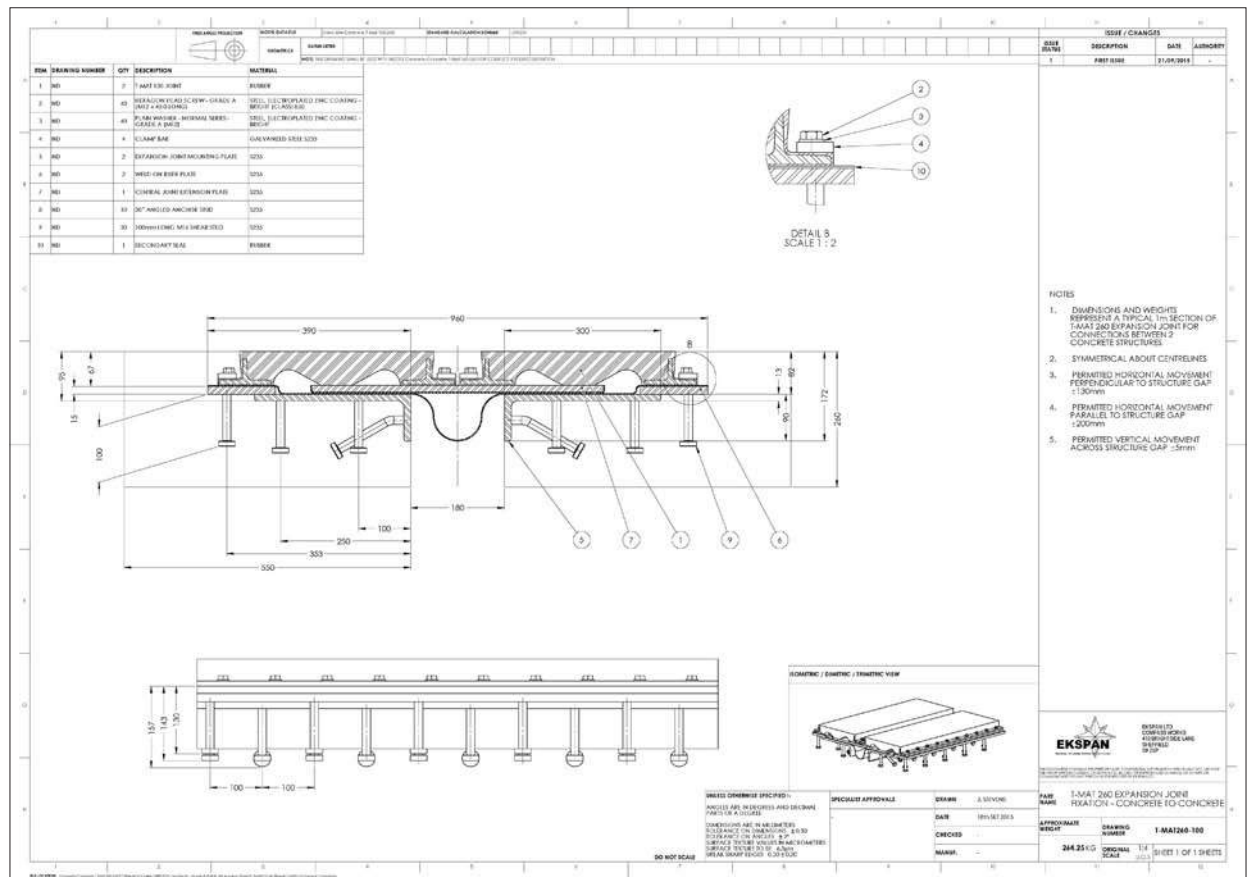
Movement Capacity

Longitudinal (X Axis): +/- 80mm

Transverse (Y Axis): +/- 120mm

Vertical (Z Axis): +/- 5mm

Ekspan T-Mat 260 Expansion Joint



Dimensions

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

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 Zed's 94 primers to steel surfaces; apply Par1 primers to concrete surfaces
13. Allow primers to cure to manufactures requirement
14. Install Sentinel Nosing Mortar to pre-primed transition strips
15. Allow Nosing Mortar to cure to manufacturer's requirement

QUALITY

T-Mat joint transitions are manufactured in accordance with strict quality requirements. Our production processes and procedures are registered and certified in accordance with ISO 9001.



Certificate No.: LRQ 4008849

In terms of the mechanical properties of the elastomer, T-Mat joint transitions satisfy the following requirements:



Certificate of Approval

This is to certify that the Management System of:

Ekspan Ltd

Compass Works, 410 Brightside Lane, Sheffield, S9 2SP, United Kingdom

has been approved by LRQA to the following standards:

ISO 9001:2015

David Derrick

David Derrick

Issued By: Lloyd's Register Quality Assurance Ltd

Current Issue Date: 16 December 2016
Expiry Date: 15 December 2019
Certificate Identity Number: 10007736

Original Approvals:
ISO 9001 12 December 2014

Approval Numbers: ISO 9001 – 0009446

The scope of this approval is applicable to:

Design and manufacture of structural, industrial and offshore bearings, expansion joints and machined fabrications. Site inspection, installation and maintenance services to the civil, structural, mechanical engineering and offshore industries.



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PROJECTS

Project: Crewe Green Rail Bridge

Location: Crewe, UK

Client: Morgan Sindall

Designer: Mott Macdonald

Date: April 2015

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

Ekspan Subcontract Value: £70,000.00



Ekspan T-Mat 130 expansion joint installed below ballast level

Project: Bermondsey Dive Under

Location: London, UK

Client: Skanska

Designer: Ramboll

Date: February 2015

Brief: Supply and installation of Ekspan T-Mat 80 expansion joints on the new east abutment and central pier of the dive under link

Ekspan Subcontract Value: £60,000.00



Bermondsey Dive Under, London

Project: Blackfriars Rail Bridge

Location: London, UK

Client: Volkerlaser

Designer: Arup

Date: March 2014

Brief: Supply and installation of Ekspan T-Mat 80 expansion joints on the south abutment of the new refurbished rail bridge

Ekspan Subcontract Value: £70,000.00

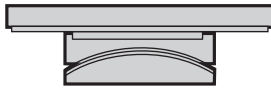


Ekspan T-Mat 130 expansion joint installed below ballast level

BRIDGE & INDUSTRIAL BEARINGS



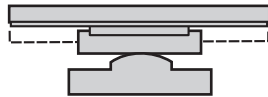
B Series Sliding Bearings
with elastomer base



E Series Anticlastic Bearings



G & GE Series
Spherical Bearings



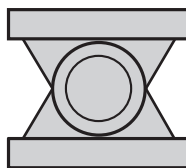
D Series Line Rocker Bearings



Elastomeric Bearings



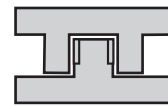
K & KE Series Pot Bearings



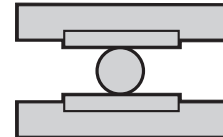
Link Bearings



EA Series Sliding Bearings



F & FE Series
Pin and Guide Bearings



J Series Roller Bearings

EXPANSION & SEAL TYPE JOINTS



Multi Element Expansion Joints



Roller Shutter Expansion Joints



Finger Type Expansion Joints



TF Expansion Joints



T-Mat Expansion Joints



TF B-75 and TF B-7
Expansion Joints



Single Element Expansion Joints



EC Seal Expansion Joints



ES Seal Expansion Joints



EW Seal Expansion Joints

A world wide service offering effective solutions in:-
Inspection • Design • Manufacture • Supply
Installation • Commissioning • Planned Maintenance

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Issue 01 - 2016

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Ekspan Limited, Compass Works, 410 Brightside Lane, Sheffield S9 2SP, United Kingdom

Tel: +44 (0)114 2611126 • Fax: +44 (0)114 2611165

E-mail: enquiry@ekspan.co.uk • Website: www.ekspan.com

