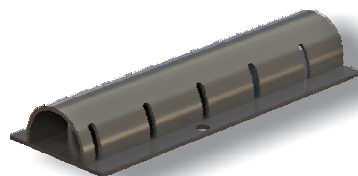


"Bridging the years, Supporting the future"



325, 302, ES

## Sub-Surface Drainage - Water Management Solutions



[www.ekspan.com](http://www.ekspan.com)

# Intergrated Sub-Surface Drainage Systems

300 Series

## Water Trapped Within Surface Layers

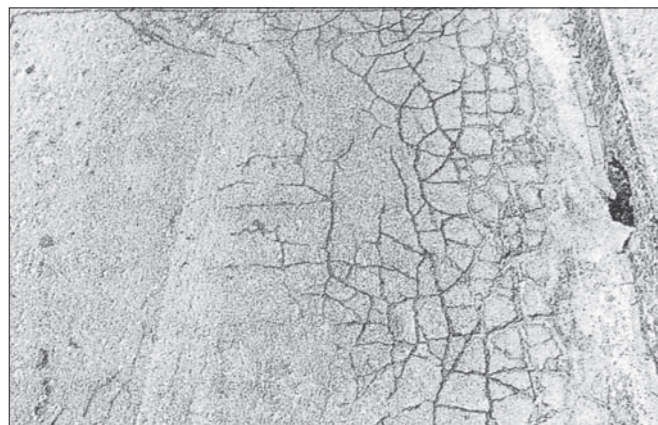
Due to seepage and condensation water can collect on top of the structure's waterproof membrane, be it in a bridge deck or road. Humidity and variations in temperature can cause vapour pressure to build up under the waterproof membrane and over time this can result in breakage of the surfacing as well as causing damage to the internal components of the structure, such as the bearings and expansion joints.

Over time water penetrating the road surface will migrate to the lowest point on the deck, at which point ponding can occur.

## Water the Common Enemy of Structures

Surface water when left unmanaged can lead to irreversible damage to the structure. It is essential to release seepage water and vapour pressure in order to maintain the integrity of the deck waterproofing and road surface.

Below - Examples of damage caused by trapped sub-surface water



## Three Common Problematic Effects Water has on Structures:

- **High Temperatures** - High temperatures during the day can evaporate trapped water, this generates a pressure gradient within the surfacing matrix.
- **Low Temperatures** - In winter months freezing water trapped within the structure surfacing can result in an increase in water volume, causing damage to the surfacing when the frozen water thaws.
- **Passage of Traffic** - Traffic, especially HGVs cause a pressure wave within the seepage water, much like the effects of ice and water vapour, this can cause breakage of the road surfacing.

## Why Sub Surface Drainage is Required

All structures require a comprehensive sub surface drainage system if the maximum design life of the structure is to be achieved. Special care should be taken to ensure functionality and access for maintenance around key areas of the structure, such as the location of the expansion joints. Poorly installed, inconsistent or unmaintained drainage can often contribute to failures such as deterioration of the concrete, bar corrosion and concrete spalling.

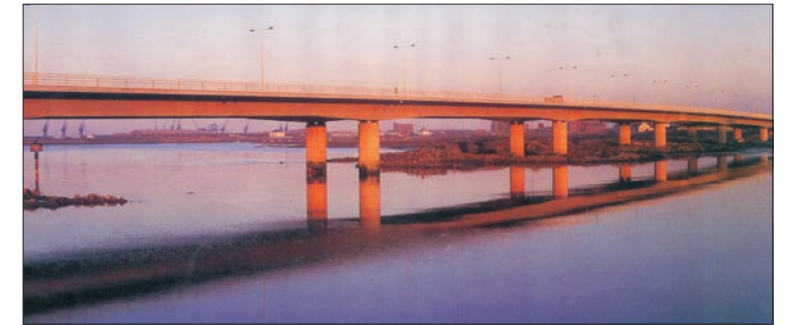
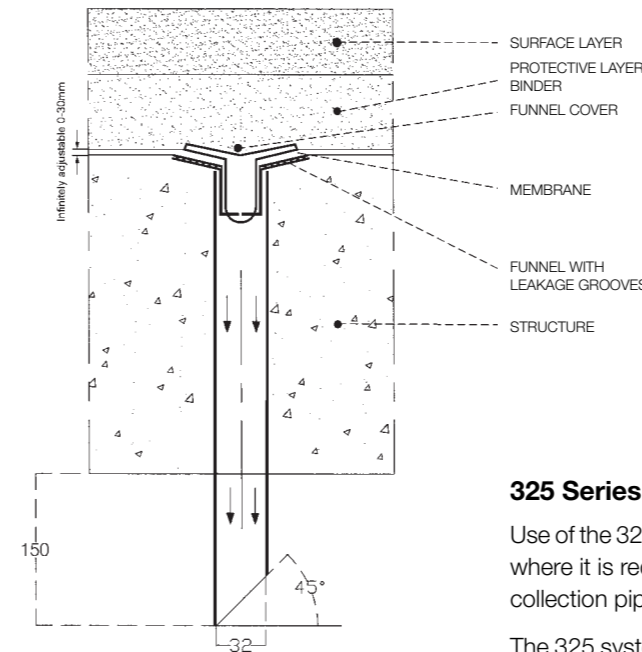
# Intergrated Sub-Surface Drainage Systems

300 Series

## The Solution

The Ekspan 300 Series Sub-Surface Drainage System is designed to prevent the common issues caused by poor drainage, hence eliminating the requirement for costly repairs.

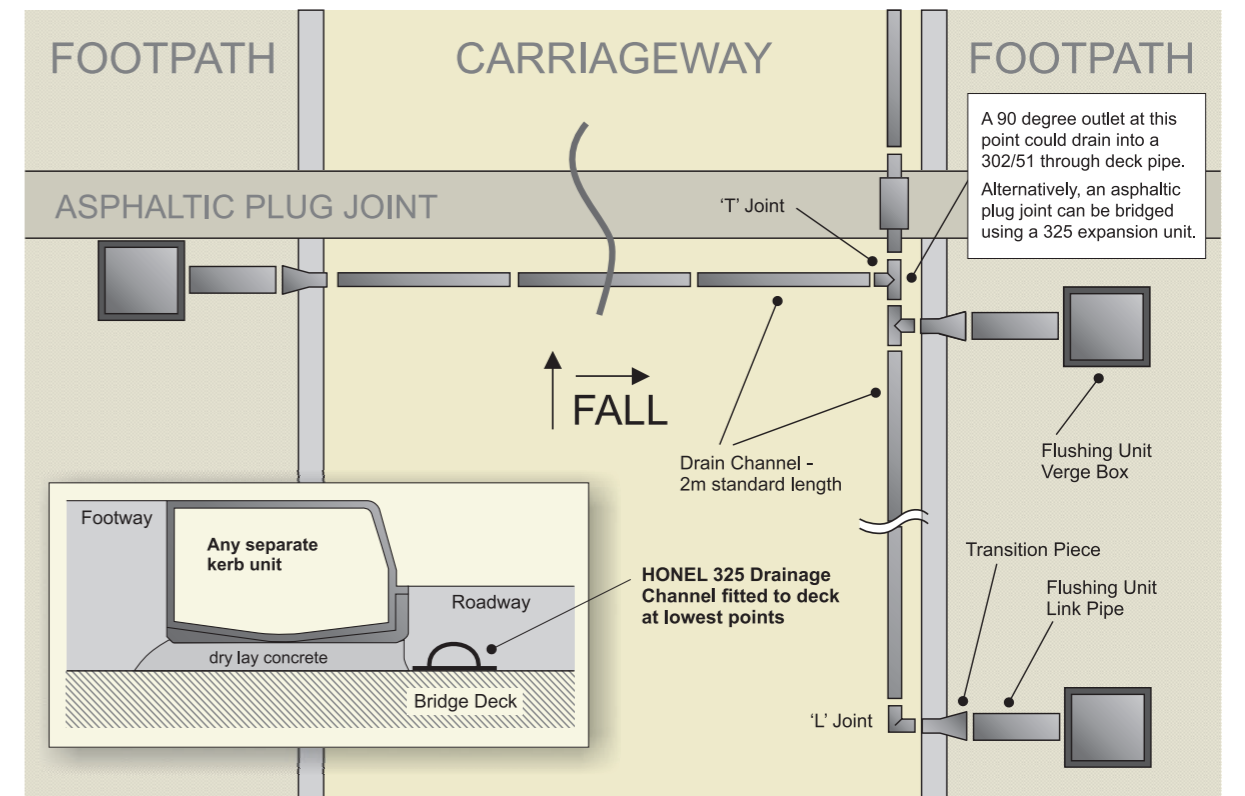
### 302 Series



### 325 Series

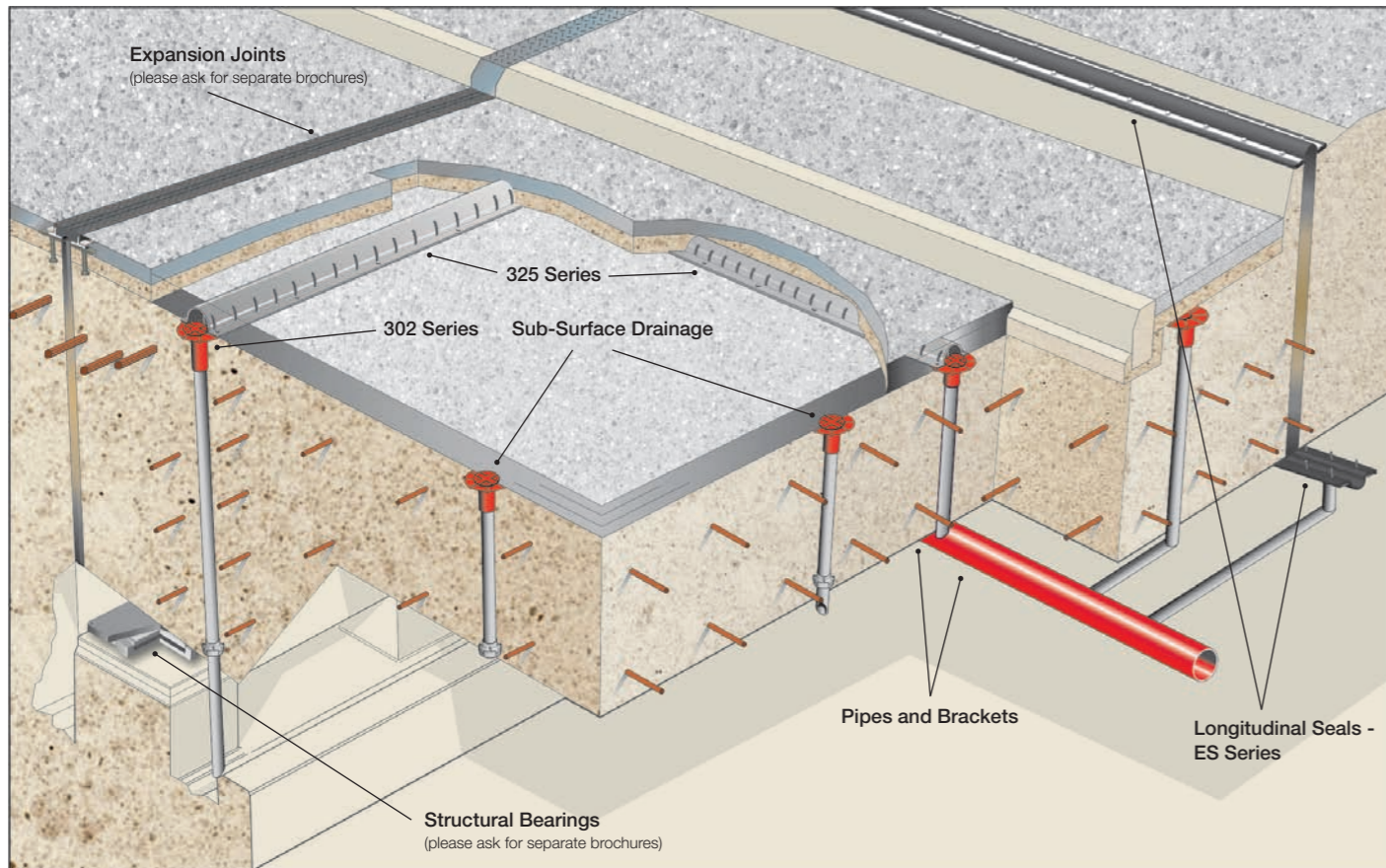
Use of the 325 system enables collection and direction of water flow at the membrane surface where it is required. This minimizes the need for through deck drain points and subsequent collection pipes.

The 325 system is fitted as a retrofit drainage improvement in addition to use on new decks.



# Intergrated Sub-Surface Drainage Systems

300 Series - Product Range



## 302 System

The 302/51 and 302/2 through deck drain units are designed to provide 'Spot drainage' points wherever needed or to be used in conjunction with the 325 channel system to provide a wider area of water collection. Corresponding 325 straight outlets will fit into the 302/51 or 302/2 funnels to create a comprehensive sub surface drainage solution.

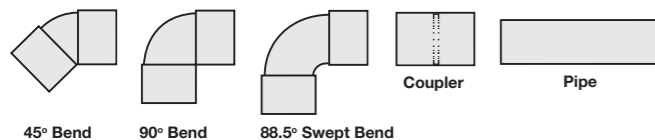
The through deck system is provided in two sizes, 50mm and 32mm diameter. The 32mm 302/02 system is ideal for retrofit applications to overcome ponding or to drain a bridge deck between pre-stressed beams.

Most highways applications favour the 50mm diameter 302/51 system due to its increased discharge capacity.

## 302/2 & 302/51 Pipe Component and Accessories

A number of component uPVC bends and fittings are available for use with the 302 through deck system.

Please contact us for further information.



## Retrofit



Funnel Cover

Funnel

Tube - square cut or 45° tip

## New Decks



Funnel Cover

Funnel

Through Deck Tube

Coupler

# Intergrated Sub-Surface Drainage Systems

300 Series - Product Range

## 325 Channel

Ekspan's 325 is a durable galvanised mild steel section designed to efficiently remove water away from the bridge deck. The channel is supplied in two-metre lengths for ease of installation and is compliant with the Highways England BA26/94.

The 325 channel is installed directly onto the waterproofing layer using a polyester resin to prevent any voids forming during installation. The channel is blacktop heat proof and we recommend coverage of a minimum of 80mm.

A compatible flushing box is also available to ensure that the 325 channel is easily maintainable, ensuring the system's integrity and life time operation.

## Drain Section

Can be fitted to any required length. The standard unit is 2m long. Channel end caps are used at all open ends to prevent ingress of blacktop and debris.



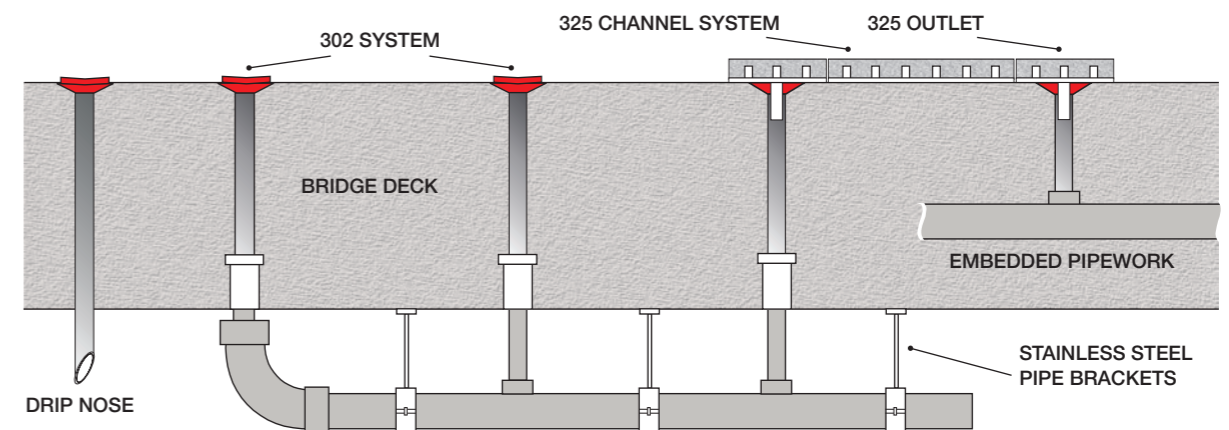
## Outlets

All of our outlets are designed to be compatible with the 325 sub-surface channel and the 302 through decks. They are available in a straight outlet format as shown, or at a 90 degree crank as well as a four-way X piece.



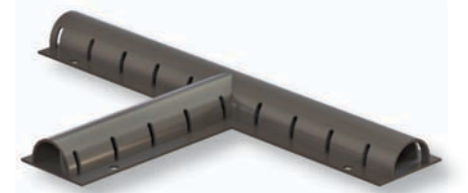
## Outlet Arrangements

Below the bridge deck the drain units can be linked to water collection pipes or allowed to drain free below via the drip nose attachment. e.g. over non navigable rivers and streams.



## Joints

We provide a number of different joints to enable interconnectivity of the channel throughout the deck surface. Joints available are the T joints as shown, as well as left and right hand 90 degree cranked, and left hand and right hand 45 degree Y joints.



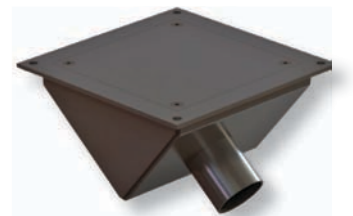
## Transition Pieces

The transition piece as shown connects the 325 channel to the flushing unit.



## Flushing Unit Verge Box

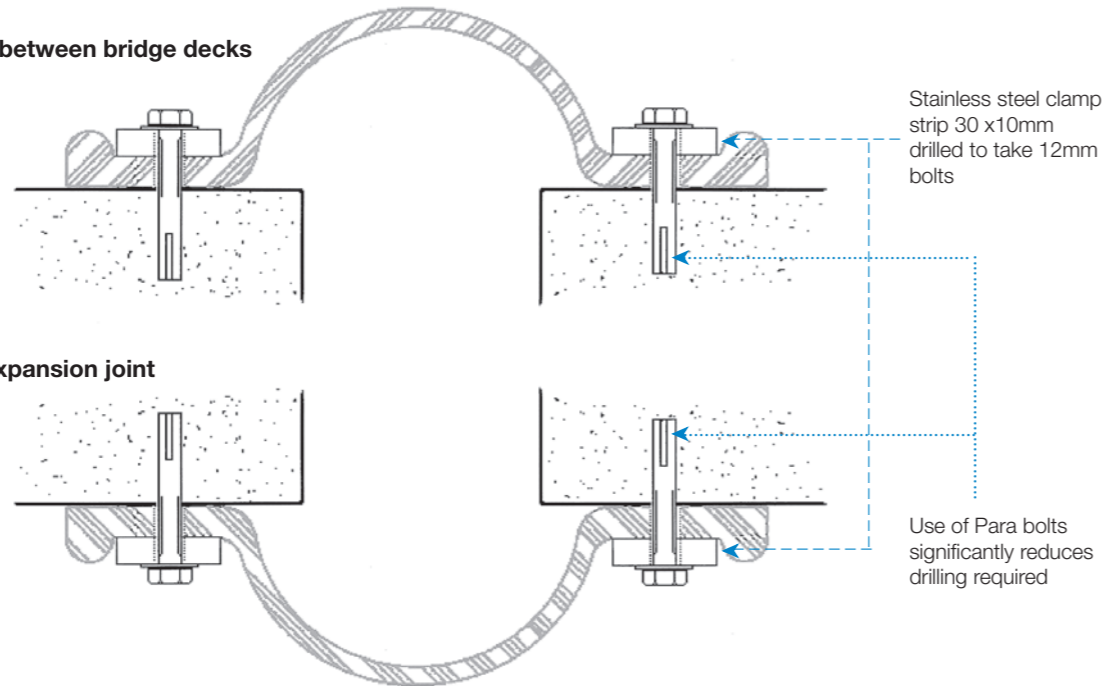
The flushing box allows access to the installed 325 sub-surface drainage system to enable jetting equipment to remove any silt build-up. This ensures that the system is working to its full capacity throughout its service life.



### ES Seal System

The ES Seal system is designed to provide a flexible water seal connection between adjacent structures. The clamping profile used to fix the system into place is offered in corrosion resistant stainless steel and the robust fibre reinforced seals are manufactured to any required length.

#### Seal fitted longitudinally between bridge decks



#### Seal suspended below expansion joint

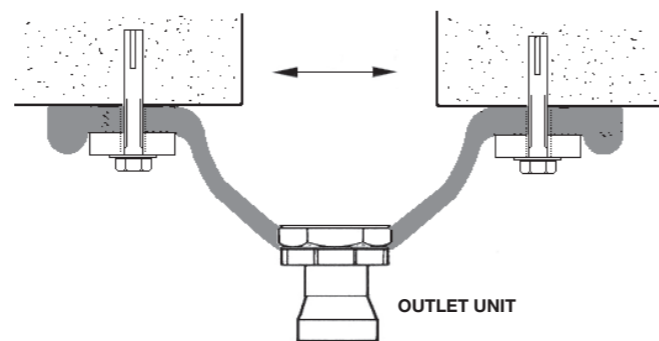
### ES Seal Selection Table

Type	Nominal Gap (mm)	Movement Range (mm)	Overall Width (mm)	Bolts (standard capacity)	Weight (kg/m)
ES200-25	≤ 50	-50 to +40	200	M8 / M10	2.8
ES240-40	80	-40 to +60	240	M10	4.5
ES300-70	140	-70 to +65	300	M12	5.4
ES360-100	200	-100 to +90	360	M12	7.1
ES400-100	200	-100 to +90	400	M12	8.8

(For further seal applications and data please refer to our Expansion Joints & Seals product catalogue)

### ES Seal Used As A Gully Across Expansion Joint In Bridge Structure

An outlet unit can be added to the gully should it be required. 90 degree corners can also be vulcanised into the seal to allow the seal to be fitted around corners and vertically up the structure.

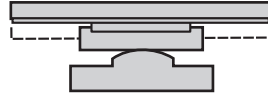


CONVERSION TABLE	
<b>METRIC</b>	
<b>Length</b>	1 mm = 0.03937 in
	1 m = 3.281 ft
	1 m = 1.094 yd
<b>Area</b>	1 mm <sup>2</sup> = 0.00153 in <sup>2</sup>
	1 m <sup>2</sup> = 10.764 ft <sup>2</sup>
	1 m <sup>2</sup> = 1.196 yd <sup>2</sup>
<b>Force</b>	1 N = 0.2248 lbf
	1 kN = 0.1004 tonf
<b>Stress and pressure</b>	1 N/mm <sup>2</sup> = 145 lbf/in <sup>2</sup>
	1 N/mm <sup>2</sup> = 0.0647 tonf/in <sup>2</sup>
	1 N/m <sup>2</sup> = 0.0208 lbf/ft <sup>2</sup>
	1 kN/m <sup>2</sup> = 0.0093 tonf/ft <sup>2</sup>
<b>IMPERIAL</b>	
<b>Length</b>	1 in = 25.4 mm
	1 ft = 0.3048 m
	1 yd = 0.9144 m
<b>Area</b>	1 in <sup>2</sup> = 645.2 mm <sup>2</sup>
	1 ft <sup>2</sup> = 0.0929 m <sup>2</sup>
	1 yd <sup>2</sup> = 0.8361 m <sup>2</sup>
<b>Force</b>	1 lbf = 4.448 N
	1 tonf = 9.964 kN
<b>Stress and pressure</b>	1 lbf/in <sup>2</sup> = 0.0068 N/mm <sup>2</sup>
	1 tonf/in <sup>2</sup> = 15.44 N/mm <sup>2</sup>
	1 lbf/in <sup>2</sup> = 47.88 N/m <sup>2</sup>
	1 tonf/ft <sup>2</sup> = 107.3 kN/m <sup>2</sup>

## BRIDGE & INDUSTRIAL BEARINGS



**B Series** Sliding Bearings  
with elastomer base



**D Series** Line Rocker Bearings



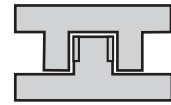
**EA Series** Sliding Bearings



**E Series** Anticlastic Bearings



Elastomeric Bearings



**F & FE Series**  
Pin and Guide Bearings



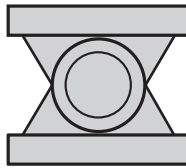
**G & GE Series**  
Spherical Bearings



**K & KE Series** Pot Bearings



**J Series** Roller Bearings



Link 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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