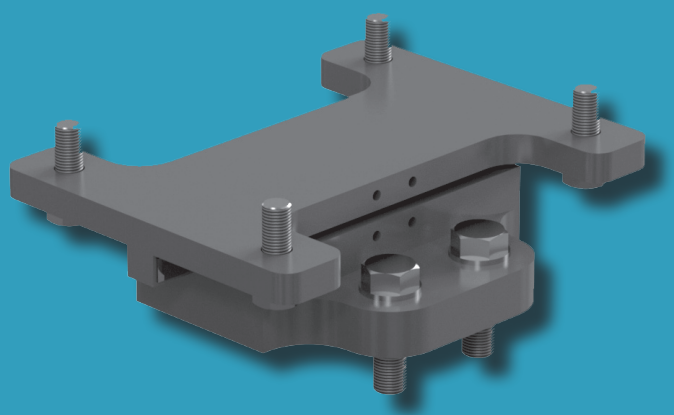
USL EKSPAN

FIXED & GUIDE BEARINGS

F

BS5400-9



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Description

F Series is a range of structural bearings for locating structures. They are designed to react only horizontal loads. Fixed and guided bearings are available as standards for loads up to 2352 kN. The bearings fully meet the requirements of BS5400 Section 9. They are manufactured to meet quality standards applicable throughout the world.

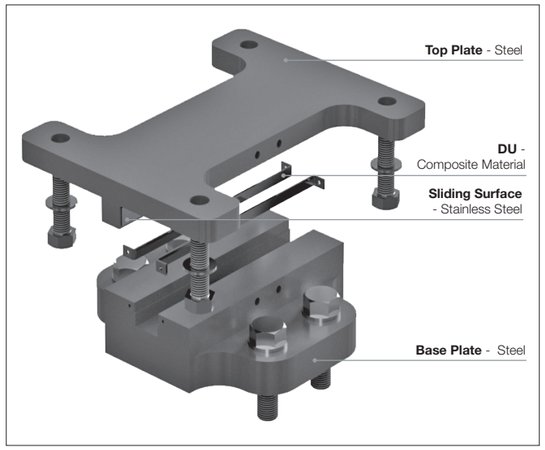
Bearing Types

The F range of bearings are available in three forms: -

10F Fixed
11F & 21F Free to move in one horizontal direction

In addition all bearings can accept compressive movements of up to 3mm which facilitates their use with bearings (such as elastomeric types) which deflect noticeably under load.

Bearing Details - Exploded View



Attachment

All three types, 10F, 11F and 21F, have the facility for bolted attachment of the base to sockets, or an independent attachment plate. 10F and 21F top plates can also be fixed by way of bolts to sockets or an independent attachment plate.

The 11F bearing has been designed such that the top plate takes the form of a tang permanently embedded in infill concrete between adjacent precast elements.

Support and Installation

Important - See pages 8 - 10 for Installation and Maintenance.

The bearings are fitted with transport brackets which maintain a clearance for vertical movement. These must be removed after installation.

Concrete Stress

Where suitable reinforcement has been provided the allowable concrete stress is dependent on the relative dimensions of the bearing/structure interface, the total support area and the characteristic strength of the concrete. The stress on the structure should therefore be checked to ensure that it is acceptable.

With these bearings it is important to ensure that the sockets are embedded in structural concrete not less than the depth indicated on page 6 and in the case of 11F types that the tang is embedded to dimension H on page 5.
A material of adequate strength must be used in conjunction with suitable reinforcement to resist bursting and tensile forces.

Design Loads

The designation of loading varies from country to country. These bearings are designed to BS5400 limit state loads. It may be assumed that the Serviceability Limit State load may be substituted for the maximum load in a working stress design.

Rotation

All the bearings can rotate at least 0.01 radians about the transverse horizontal axis. The **10F** can rotate at least 0.01 radians about all other axes.

Translations

The dimensions for the **11F** & **21F** bearings allow for a longitudinal movement of ± 50mm. Additional movements in increments of 50mm total can be supplied.

We will be pleased to advise, but this will change the top plate dimensions.

Note: 11F & 21F bearings should not be used where movement at right angles to the guided direction is required.

Designation of Part No.

The part number of a bearing is simply built up as below –

Examples:

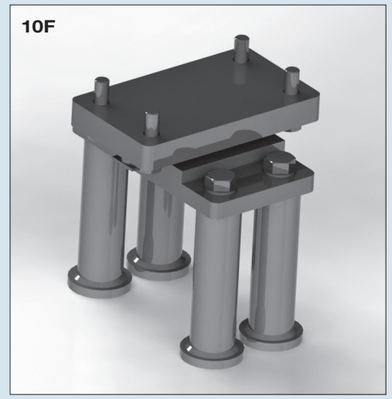
	Type	Maximum Working Load (kN)	Movement Longitudinal (mm)	Fixings Top	Fixings Base
a	**10F**	250		S	S
b	**11F**	250	100	N	S
c	**21F**	250	100	B	S

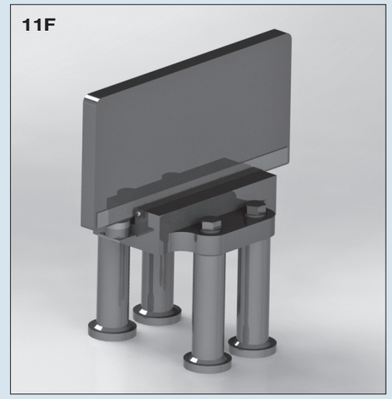
The basic part number is shown in the tables on pages 4, 5 and 6. Select the type of attachment required and the smallest bearing in that range which can accommodate the specified operating conditions.

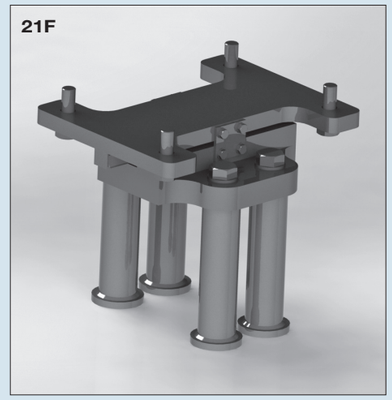
e.g. For **a** the full part number would be **10F25/SS**
b the full part number would be **11F25/100/NS**
c the full part number would be **21F25/100/BS**

'**c**' above denotes a guide bearing with bolted attachment to the top plate and bolts and sockets to the base plate.
Maximum load capacity is 254kN SLS/420kN ULS and total movement capacity is 100mm.

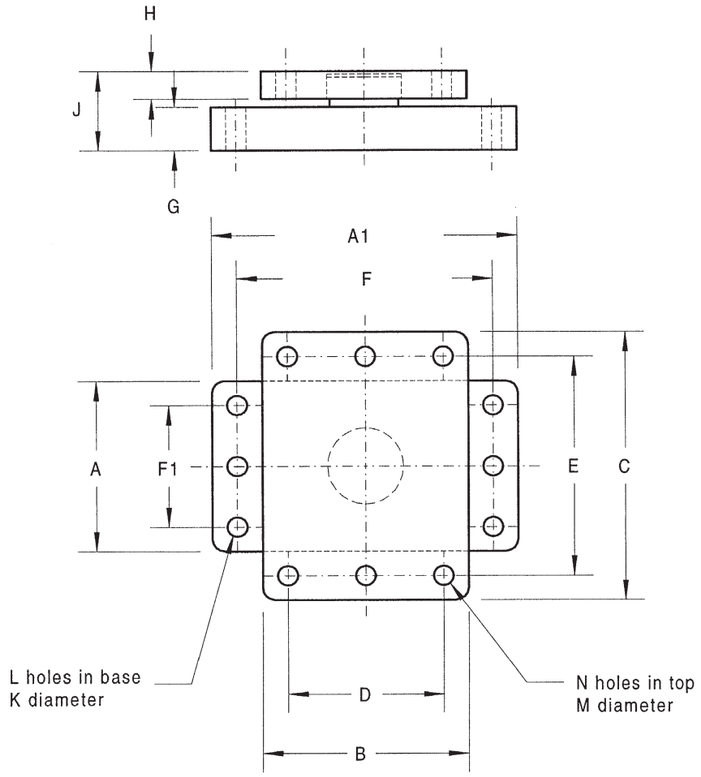
Fig. 1 Standard F Type Range







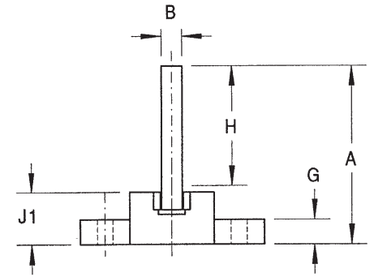
10F - Fixed Bearing



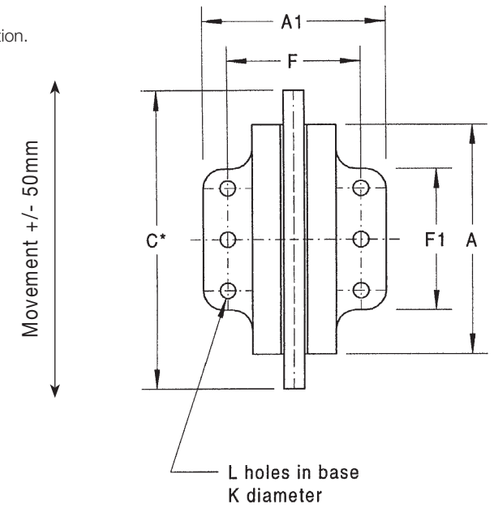
Bearing Part No.	Installation Dimensions (mm)															SLS Load (kN)	ULS Load (kN)	Approx Weight *(Kg)
	A	A1	B	C	D	E	F	F1	G	H	J	K	L	M	N			
10F15	140	260	140	240	90	190	200	80	35	30	77	22	4	18	4	170	229	18
10F25	170	330	190	290	130	230	260	100	45	30	87	26	4	22	4	254	420	33
10F35	210	410	250	350	180	280	330	130	55	35	103	32	4	26	4	450	630	61
10F50	280	440	280	440	200	360	360	200	65	40	118	32	6	32	4	620	840	101
10F80	280	490	330	440	250	360	410	200	70	45	128	32	6	32	4	873	1100	126
10F120	360	640	440	520	360	440	540	260	80	50	144	38	6	32	6	1320	1720	234
10F170	410	750	530	610	430	510	640	300	95	55	165	44	6	38	6	1742	2352	368

***** Weight excludes fixings

11F - Guide Bearing



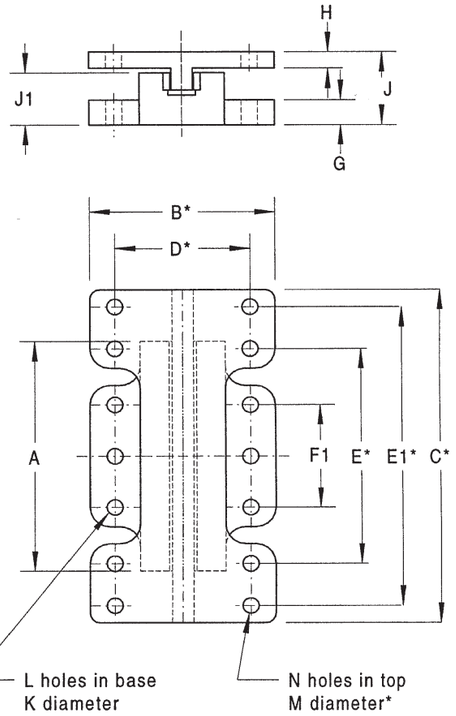
* Increase to suit additional translation.
See page 2



Bearing Part No.	Installation Dimensions (mm)												SLS Load (kN)	ULS Load (kN)	Approx Weight *(Kg)
	A	A1	B	C	F	F1	G	H	J	J1	K	L			
11F15	210	210	22	350	160	80	25	126	188	52	18	4	170	229	19
11F25	260	290	27	400	210	90	35	174	251	67	26	4	254	420	39
11F35	340	340	32	480	240	110	40	210	297	77	32	4	450	630	66
11F50	400	350	37	540	250	110	45	228	325	87	32	4	620	840	90
11F80	470	370	42	610	270	210	50	245	360	105	32	6	873	1100	138
11F120	580	430	52	720	320	230	60	310	435	115	38	6	1320	1720	235
11F170	660	490	57	800	360	280	70	366	511	135	44	6	1742	2352	347

***** Weight excludes fixings

21F - Guide Bearing



* Increase to suit additional translation.
See page 2

Bearing Part No.	Installation Dimensions (mm)																	SLS Load (kN)	ULS Load (kN)	Approx Weight *(Kg)
	A	A1	B	C	D	E	E1	F	F1	G	H	J	J1	K	L	M	N			
21F15	210	210	210	320	160	270	0	160	80	25	20	80	52	18	4	18	4	170	229	19
21F25	260	290	290	370	210	310	0	210	90	35	23	98	67	26	4	22	4	254	420	36
21F35	340	340	340	450	240	340	0	240	110	40	29	114	77	32	4	26	4	450	630	63
21F50	400	350	350	510	250	360	0	250	110	45	31	127	87	32	4	32	4	620	840	84
21F80	470	370	370	680	270	440	620	270	210	50	33	147	105	32	6	26	8	873	1100	135
21F120	580	430	430	790	320	500	710	320	230	60	43	167	115	38	6	32	8	1320	1720	228
21F170	660	490	490	890	360	570	800	360	280	70	61	206	135	44	6	38	8	1742	2352	368

* Weight excludes fixings

Standard F Bearing Fixings

The fixings detailed below are designed to suit the requirements of F Series bearings.

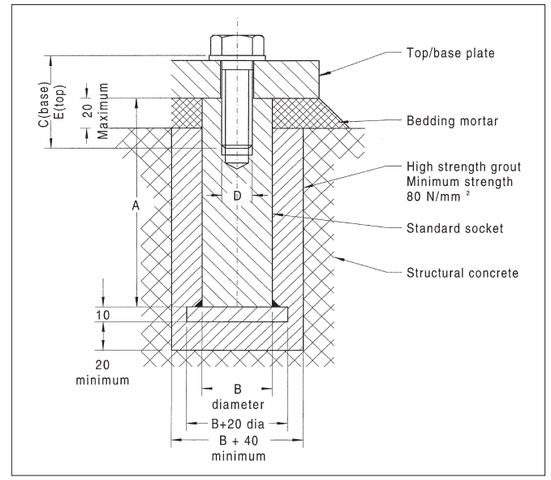
By adding a two letter suffix to the bearing part number the type of fixing may be designated -

First letter - Top plate fixing
Second letter - Base plate fixing

N - No fixings
B - Bolts and washers only
S - Bolts, washers & sockets

e.g. /BS signifies -
B (top plate fixing) Bolts & washers
S (base plate fixing) Bolts, washers & sockets

N.B. If standard F bearing fixings are not used, care should be taken to ensure that bolts can be fitted without dismantling the bearing.



Bolts are hexagon head to BS 3692 grade 10.9. Sockets are steel to EN 10025 grade S275.

Bolts and Sockets - 10F

Bearing Size	Base				Top			
	Socket (mm)		Bolt (mm)		Socket (mm)		Bolt (mm)	
	B	A	D	C	B	A	D	E
15	50	170	20	70	40	140	16	60
25	55	200	24	90	50	170	20	70
35	70	240	30	110	55	200	24	80
50	70	240	30	120	70	240	30	90
80	70	240	30	120	70	240	30	100
120	80	300	36	140	70	240	30	100
170	105	360	42	160	80	300	36	110

Bolts and Sockets - 11F and 21F

Bearing Size	Base				Top			
	Socket (mm)		Bolt (mm)		Socket (mm)		Bolt (mm)	
	B	A	D	C	B	A	D	E
15	40	140	16	50	40	140	16	50
25	55	200	24	80	50	170	20	60
35	70	240	30	90	55	200	24	70
50	70	240	30	100	70	240	30	80
80	70	240	30	100	55	200	24	70
120	80	300	36	120	70	240	30	90
170	105	360	42	140	80	300	36	120

Installation

CONSIDER THE EFFECTS IF BEARINGS ARE NOT CORRECTLY INSTALLED

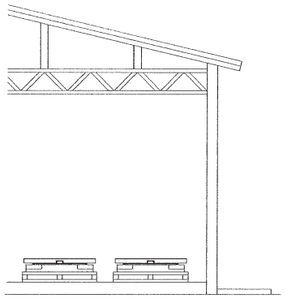
Our structural bearings are manufactured to close tolerances by skilled technicians working in clean conditions. To obtain the requisite performance from bearings it is imperative that they are properly handled at the work site and installed with the same care as when they were assembled in the factory. The following notes will assist those responsible for specifying and supervising the installation of structural bearings.
Please note that Ekspan are able to provide installation and supervision.

Bearings must be installed with precision to meet the bridge and bearing design criteria.

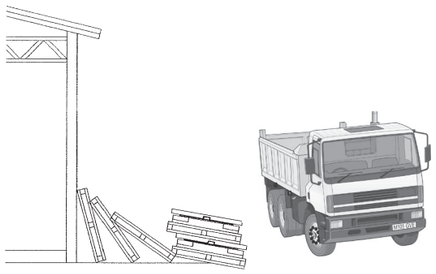
Storage

Our structural bearings are protected from contamination under normal working conditions by an efficient sealing system. Care should be taken in storage to prevent contamination and damage to the working surfaces.

CORRECT



INCORRECT

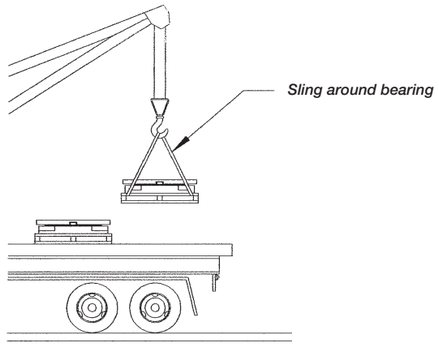


Handling

Robust transportation devices are fitted to all bearings to ensure that the components are maintained in their correct relative positions before and during installation. The devices are normally finished in red paint. Unless special devices have been specified, they should not be used for slinging or suspending the bearings beneath beams.

Due to unpredictable conditions, which may occur during transportation or handling on site, the alignment and presetting (if applicable) of the assembled bearing should be checked against the drawing. Do not endeavour to rectify any discrepancies on site. The bearing should either be returned to Ekspan or, where practical, an Ekspan engineer should be called in to inspect and reassemble. Bearings too heavy to be lifted by hand should be properly slung using lifting equipment.

CORRECT



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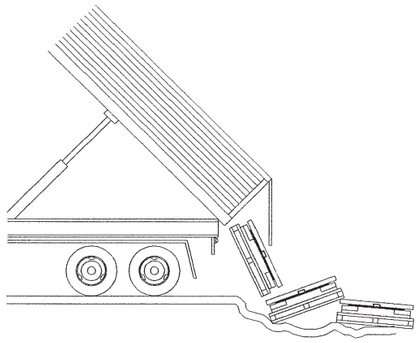


HANDLING, STORAGE,
INSTALLATION & MAINTENANCE

Presetting

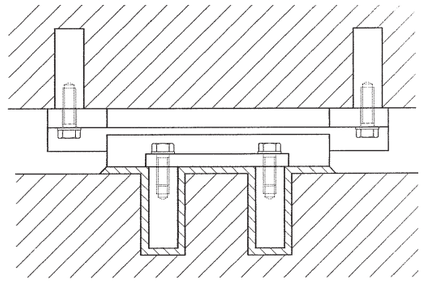
If bearings are required to be preset eg where once only large movements may occur during stressing operations, this should be specified as a requirement and should only be carried out in our works prior to despatch. Do not attempt this operation on site.

Bedding

Bearings must be supported on a flat rigid bed. Steel spreader plates must be machined flat and smooth to mate exactly with the bearings' upper and lower faces. Bearings may also be bedded on epoxy or cement mortar or by dry packing. Whichever system is preferred for the particular structure it is of extreme importance that the final bedding is free from high or hard spots, shrinkage, voids, etc.

Unless there is a specific design requirement, the planar surfaces must be installed in a horizontal plane. The correct installation of bearings is vital for the bearing performance. Costly repairs become necessary all too often due to inadequate specification or poor site supervision. The bearings should not be loaded until the bedding mortar has cured.

Fixing bearings to concrete using permanent anchor plates

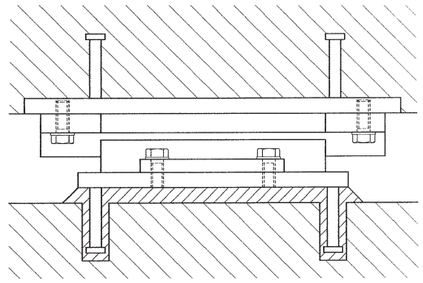


Cast-In-Situ Structures

Care must be taken to ensure that the bearings are not damaged by the formwork or contaminated by concrete seepage. The interface between the top plate and the formwork should be protected and sealed.

Owing to the loading effects of a wet concrete mass, the top plates should be propped to prevent rotation and plate distortion.

Fixing cast-in-situ structures ensure that the bearing working surfaces are protected and supported to prevent distortion and rotation.



Bearing Removability

Where possible, bearings should be fixed in such a manner as to facilitate removal. Our bearings have generally been designed with this in mind. However, when selecting the bearing type preferred, the removability feature should be highlighted in your enquiry.

Removal of Transport Brackets

These brackets, normally painted red should only be removed once the bearing is properly installed and ready for operation.

Bearing Installation Check List

DO -

1. Handle carefully and where necessary with adequate craneage.
2. Store in a clean dry place.
3. Ensure that the bearings are installed in the correct location and orientation.
4. Ensure that the bearings are installed on a flat rigid bed before the design loads are applied.
5. Ensure that the fixings are uniformly tightened.
6. Complete any site coatings and make good paint damaged during handling and installation.
7. Protect working surfaces during the placing of in-situ concrete.
8. Keep the bearings and surrounding areas clean.
9. Remove any temporary transit clamps etc. before the bearings are required to operate.
10. Take special care to support top plates when casting in-situ concrete.

HANDLING, STORAGE, INSTALLATION & MAINTENANCE

DO NOT -

1. Dismantle the bearing on site.
2. Leave bearings uncovered.
3. Attempt to modify without our approval.
4. Install without qualified supervision.

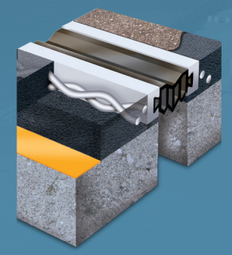
Site Coating

Care should be taken to ensure that working surfaces are not damaged in any site coating operation. After installation damaged coatings must be repaired irrespective of any call for site coatings. Exposed fixing bolts should be protected after final tightening. Any tapped holes exposed after removal of transportation brackets etc. (coloured red) should be sealed with self-vulcanizing silicone sealant.

Routine Maintenance of Bearings

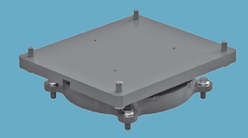
1. Immediately following installation bearings shall be inspected to ensure that all aspects of 'Installation of bearings' have been adhered to and bearings shall subsequently be re-inspected not less frequently than every two years after their installation.
2. Paint and /or other specified protective coatings must be maintained in good and efficient condition and free from scratches or chips. Any areas of the protective coating showing damage or distress must be rectified.
3. Areas surrounding the bearings must be kept clean and dry and free from the adverse effects of external influences such as airborne debris or water/salt (for example emanating from leaking joints).
4. The wearing surfaces of the bearing must be checked to ensure that they are continuing to operate efficiently.
5. Fixing bolts must be checked for tightness.
6. Any bedding material showing signs of distress or ineffectiveness must be replaced and the reason for its failure investigated and corrected.
7. Routine inspections shall include a check that translational and rotational capacities of the bearing have not been exceeded and show no sign of being likely to exceed the requirements specified at the design stage.

USL EKSPAN - **PRODUCT RANGE**



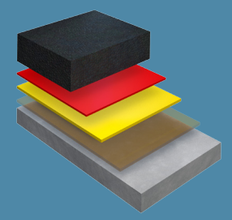
EXPANSION JOINTS - CD 357

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

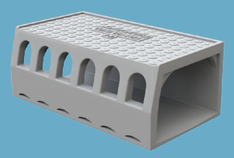


STRUCTURAL WATERPROOFING - CD 358

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

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