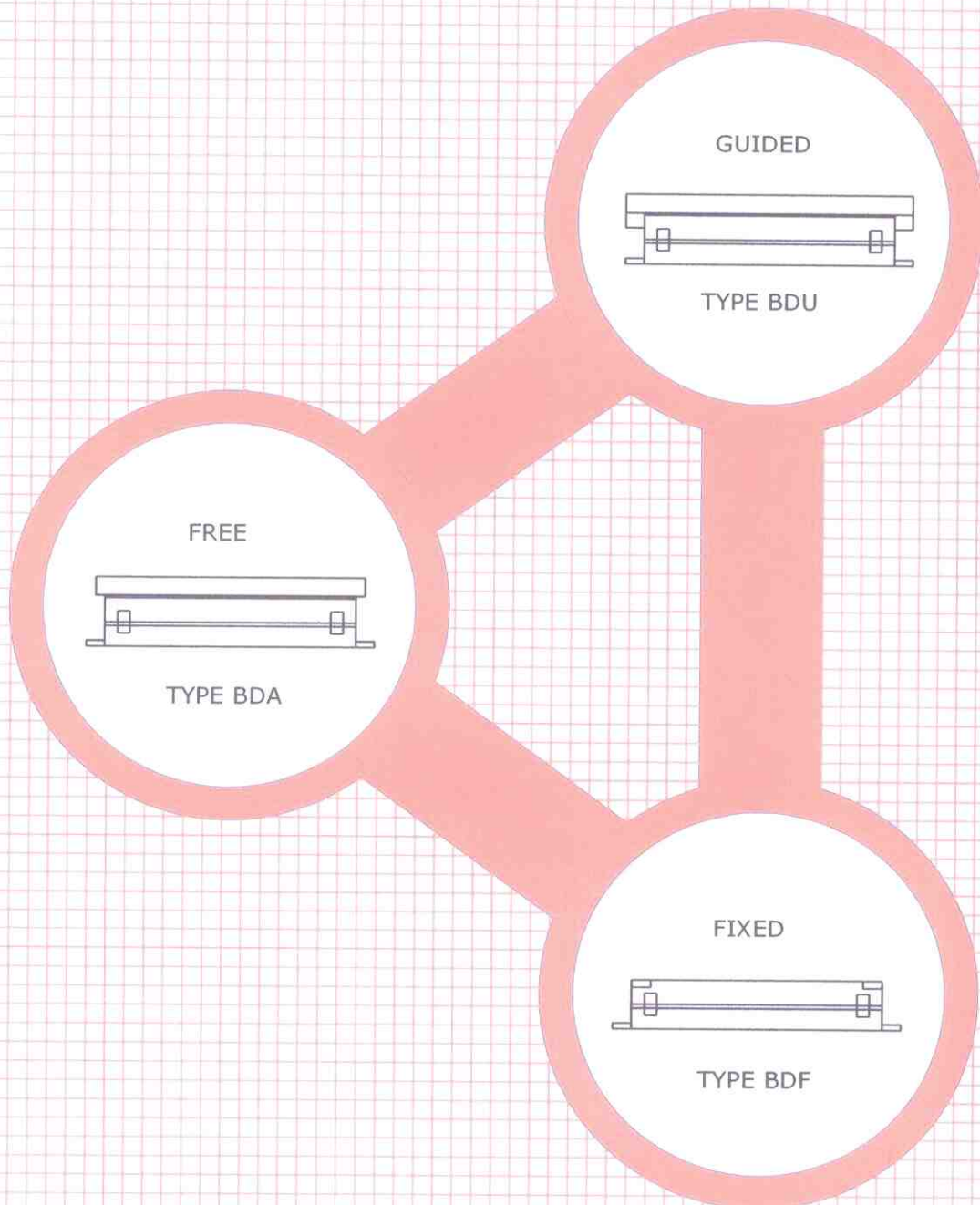


## LINE ROCKER BEARINGS FOR BRIDGES AND STRUCTURES



## LINE ROCKER BEARINGS

In most concrete and steel structures accommodation must be made for relative movement between structural members in order to avoid the build-up of dangerous stresses. The source of this movement may be:

- ❑ Thermal expansion and contraction
- ❑ Permanent creep and shrinkage
- ❑ Post tensioning strain
- ❑ Live load deflections
- ❑ Earth movement

It is usually desirable to minimise the resistance forces and moments resulting from these movements and this is the primary function of Structural Bearings.

*BEARING TECHNOLOGIES* range of Line Rocker Bearings provide this function by the most efficient method using well proven concepts combined with modern manufacturing technology and advanced materials.

This is achieved by exploiting the unique low-friction sliding properties of PTFE (polytetrafluoroethylene) and a simple line contact rocker for rotation.

### PTFE

PTFE is a well known polymer which possesses some remarkable properties. The coefficient of friction when sliding against a polished surface can be as low as 0.01 which compares with ice sliding on ice. In addition, its coefficient of friction is the lowest at highest specific pressures which make it particularly suitable for use in structural bearings.

### GLACIER "DU"®

Glacier DU is a proprietary composite material comprising a PTFE mixture impregnated into a metallic structure. It is capable of withstanding extreme pressures whilst possessing similar friction properties to those of pure PTFE. It is used in *BEARING TECHNOLOGIES* Line Rocker Bearings for side restraints.

### LINE ROCKER PRINCIPLE

The main feature of Line Rocker Bearings is their ability to provide relatively large amounts of rotation about the transverse axis whilst constraining rotation of the superstructure about its longitudinal axis. The bearings are relatively narrow in the longitudinal direction and wide in the transverse direction. This feature makes them particularly suitable for precast beam constructions not only because of their minimum width requirements on the piers but also for their inherent transverse stability during erection.

## INSTALLATION

Correct installation of all types of structural bearings is critical to their performance. The most important aspects of installation are:

- ❑ Ensuring intimate surface contact with the structure-there must be absolutely no voids above or below the bearings.
- ❑ Cementitious or epoxy grout must be properly mixed and must be of adequate strength.
- ❑ Bearing orientation and presets must be carefully checked and adjusted where necessary.
- ❑ Horizontal and vertical alignment.
- ❑ Where applicable, anchor bars must be substantially encased within the steel reinforcement of concrete members.
- ❑ Prevention of contamination, especially slurry, of the exposed stainless steel sliding surfaces.
- ❑ Preventing mechanical damage to the corrosion protection system.

## SUPPLEMENTARY INFORMATION

### ROTATION

BT Line Rocker Bearings are designed for 0.02 radians rotation about the transverse axis. When rotation occurs the moment of resistance from the rolling friction is transferred to the structure. The value of this moment is approximately:

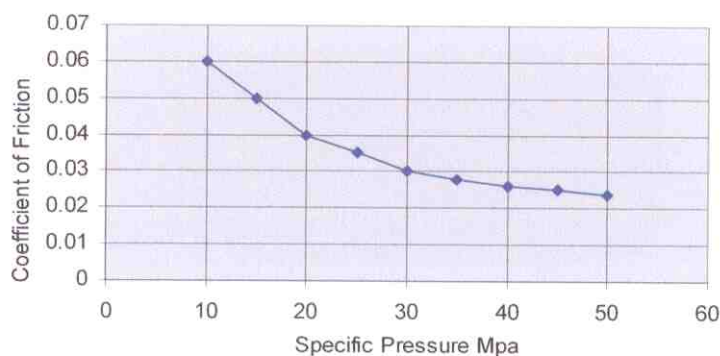
$$M_r = .0075W \text{ kN-m} \quad \text{where } W \text{ is the vertical load (kN)}$$

This moment results in an increase in concrete pressure along one transverse edge of the bearing and a corresponding decrease along the opposite edge:

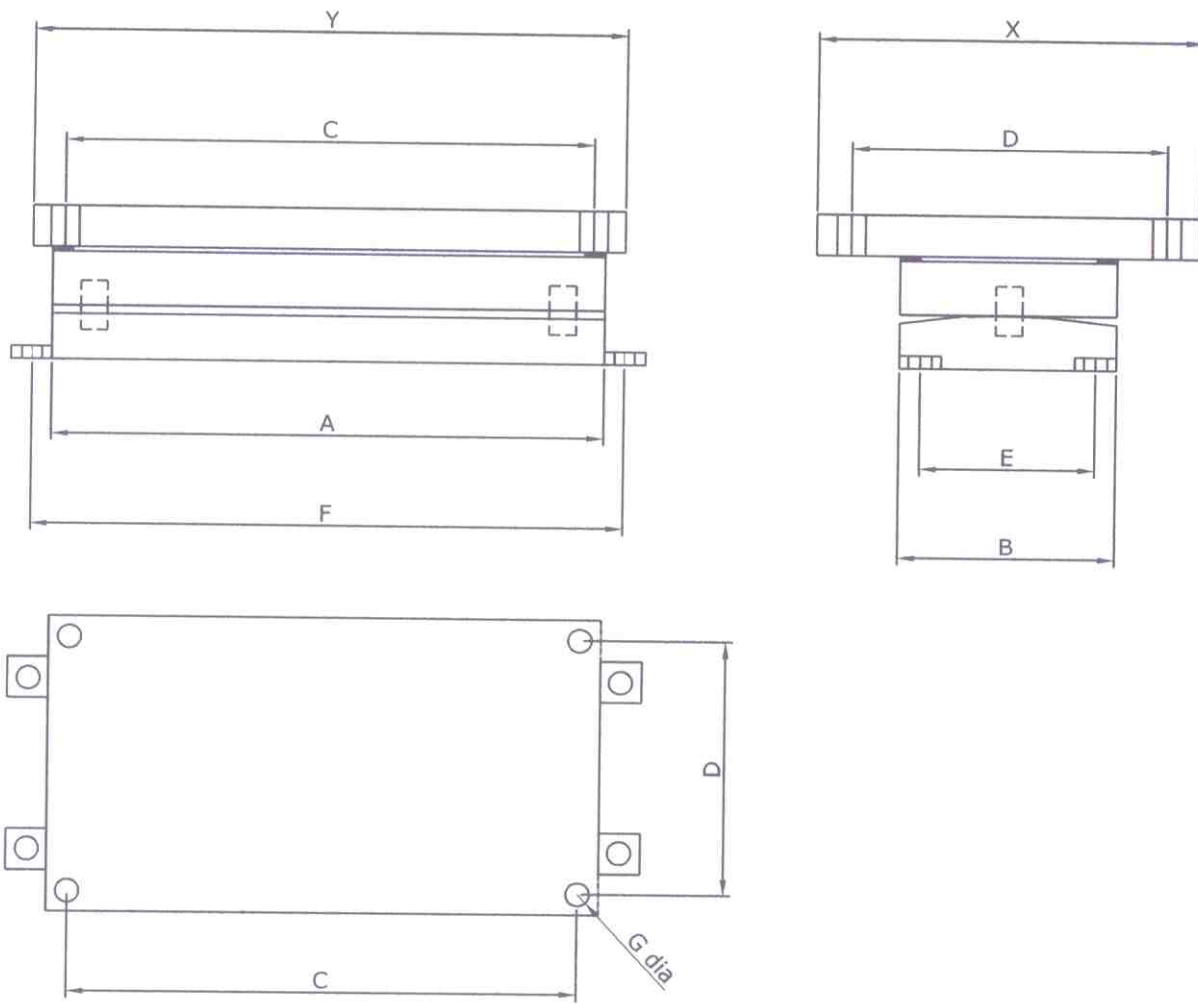
The value of this edge pressure increase is  $\Delta f_c = 2.25 \times 10^{-4} \times W/B$  MPa. Where  $W$  is the vertical load and  $B$  is the base width (from tables P3-5) This value is independent of the rotation angle.

### FRICTION

The coefficient of friction of the sliding surfaces can be assumed to vary between 0.015 to 0.05 depending on a number of operating variables. The most important is specific pressure. The graph below illustrates this relationship. It is safe, however, to assume a C of F of 0.03 under maximum load conditions.



## LINE ROCKER BEARINGS FREE-Type BDA



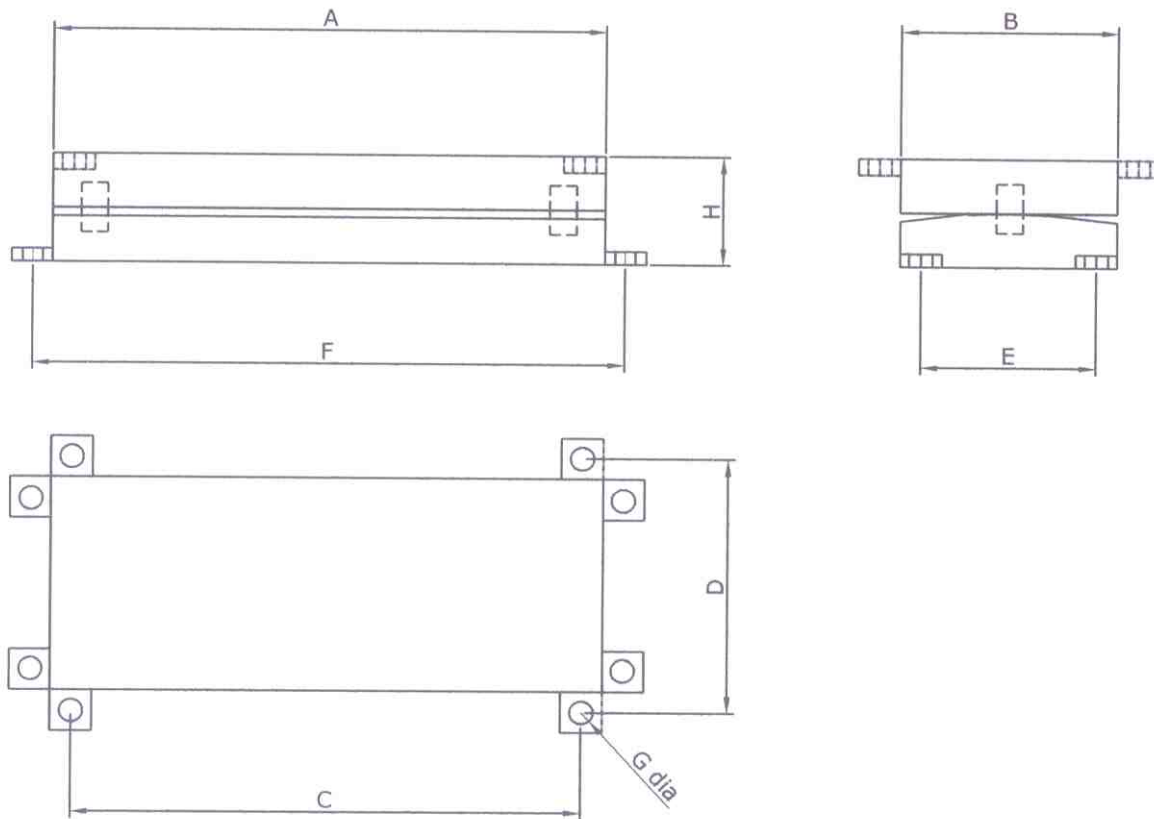
Brg ref.	Vt. Load kN	Hor. load kN	X* mm	Y* mm	A mm	B mm	C* mm	D* mm	E mm	F mm	G mm	H mm	Mass kg
BDA25/15/10/10	250	50	200	210	180	90	160	150	58	213	13	60	9
BDA50/15/10/10	500	70	240	290	260	130	240	190	98	293	13	80	23
BDA75/15/10/10	750	90	270	350	320	160	300	220	128	353	13	95	41
BDA100/15/10/10	1000	110	295	400	370	185	350	245	153	403	13	108	61
BDA125/15/10/10	1250	125	315	440	410	205	390	265	173	443	13	118	81
BDA150/15/10/10	1500	150	335	480	450	225	430	285	193	483	13	128	105
BDA175/15/10/10	1750	175	350	510	480	240	460	300	198	523	17	134	125
BDA200/15/10/10	2000	200	365	540	510	255	490	315	213	553	17	142	148
BDA250/15/10/10	2500	250	400	610	580	290	560	350	248	623	17	160	215
BDA300/15/10/10	3000	300	425	660	630	315	610	375	273	673	17	175	276

## Notes:

Bearings are designed for 15 Mpa concrete pressure, loads may be increased with higher strength concrete.

\* These dimensions are for 10mm movement in all directions and are increased according to additional requirements.

## LINE ROCKER BEARINGS FIXED-Type BDF



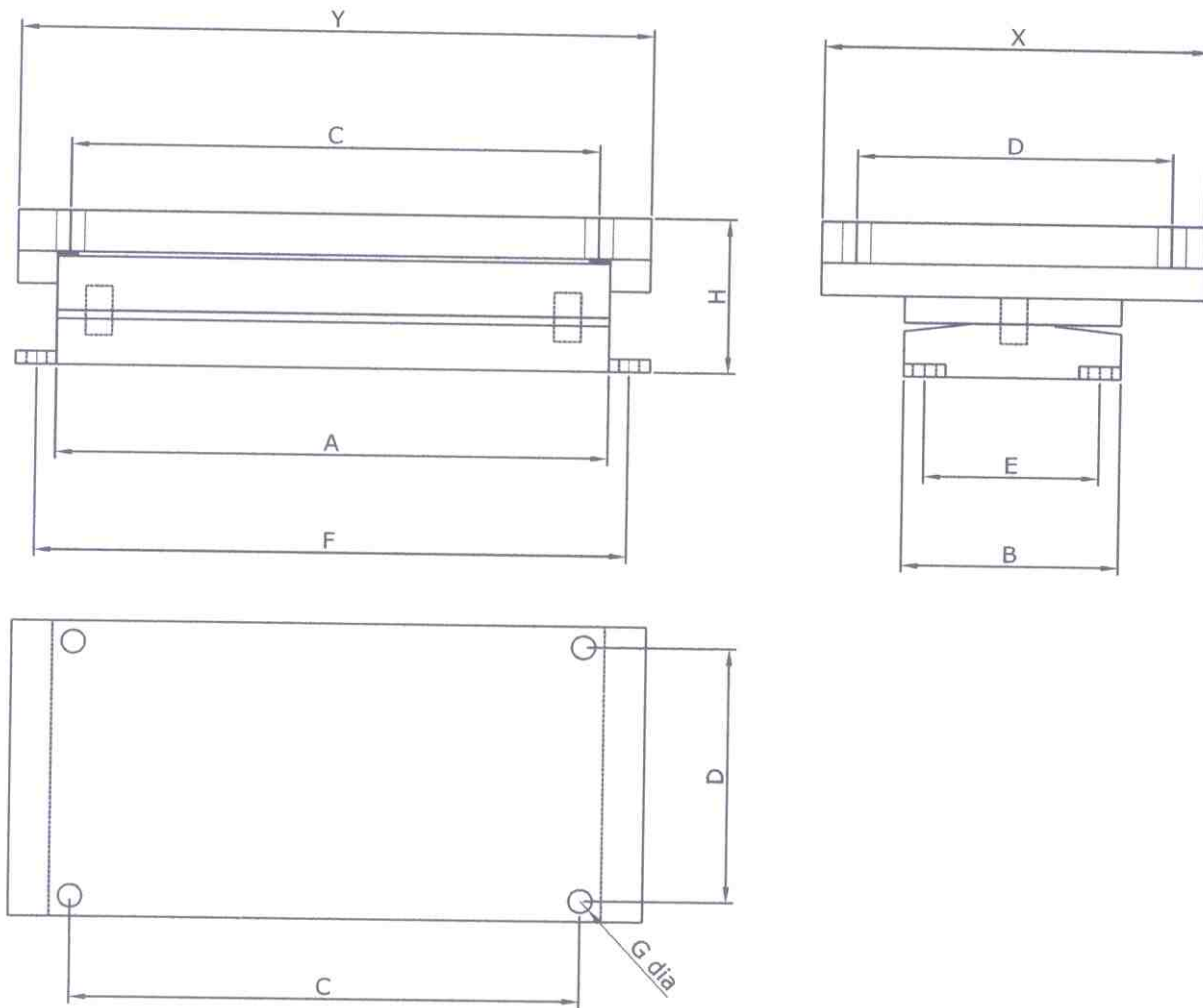
Brg ref.	Vt. Load kN	Hor.load kN	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	Mass kg
BDF25/15	250	50	180	90	148	123	58	213	13	45	6
BDF50/15	500	70	260	130	218	173	88	303	17	65	17
BDF75/15	750	90	320	160	278	203	118	363	17	80	32
BDF100/15	1000	110	370	185	328	228	143	413	17	93	49
BDF125/15	1250	125	410	205	368	248	163	453	17	103	67
BDF150/15	1500	150	450	225	408	268	183	493	17	113	89
BDF175/15	1750	175	480	240	428	293	188	533	21	120	108
BDF200/15	2000	200	510	255	458	308	203	563	21	128	129
BDF250/15	2500	250	580	290	523	348	233	638	23	145	190
BDF300/15	3000	300	630	315	565	380	250	695	26	158	244

## Notes:

Bearings are designed for 15 Mpa concrete pressure, loads may be increased with higher strength concrete.

The horizontal load can only be applied if it is less than 33% of the simultaneous vertical load.

## LINE ROCKER BEARINGS UNIDIRECTIONAL-Type BDU



Brg ref.	Vt. Load kN	Hor. load kN	X* mm	Y mm	A mm	B mm	C mm	D* mm	E mm	F mm	G mm	H mm	Mass kg
BDU25/15/10	250	50	200	240	180	90	190	150	58	213	13	60	10
BDU50/15/10	500	70	240	320	260	130	270	190	98	293	13	80	24
BDU75/15/10	750	90	270	380	320	160	330	220	128	353	13	95	43
BDU100/15/10	1000	110	295	430	370	185	380	245	153	403	13	108	63
BDU125/15/10	1250	125	315	470	410	205	420	265	173	443	13	118	84
BDU150/15/10	1500	150	335	510	450	225	460	285	193	483	13	128	108
BDU175/15/10	1750	175	350	540	480	240	490	300	198	523	17	134	128
BDU200/15/10	2000	200	365	570	510	255	520	315	213	553	17	142	151
BDU250/15/10	2500	250	400	640	580	290	590	350	248	623	17	160	218
BDU300/15/10	3000	300	425	690	630	315	640	375	273	673	17	175	280

Notes:

Bearings are designed for 15 Mpa concrete pressure, loads may be increased with higher strength concrete.

The horizontal load can only be applied if it is less than 33% of the simultaneous vertical load.

\* These dimensions are for 10mm movement in either direction and are increased according to additional requirements.

