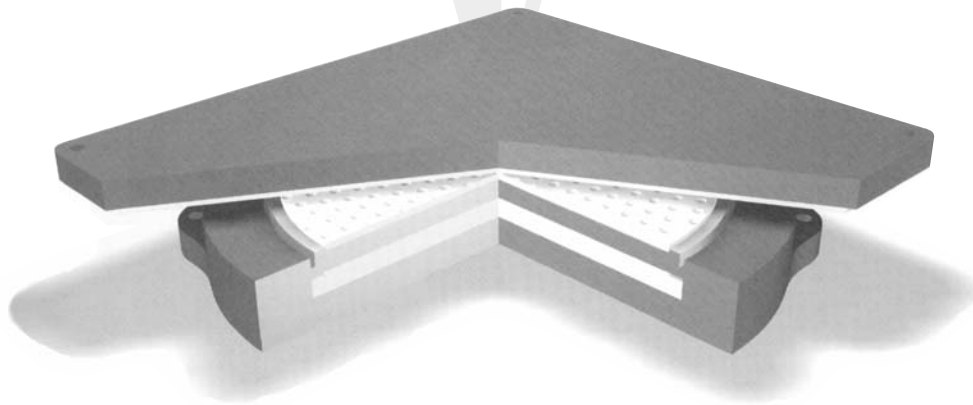


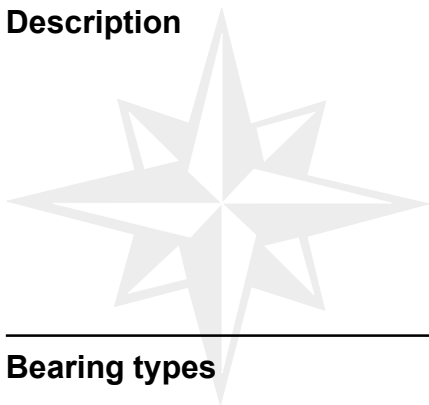
K Series

Fixed and Sliding Pot Bearings



www.ekspan.com

Description



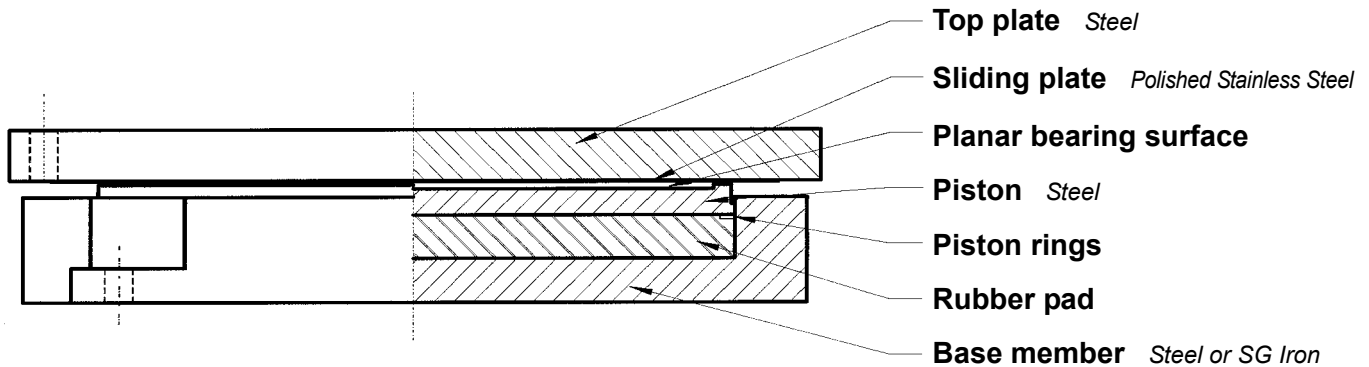
K series 2 & 3 is a range of structural bearings which meets the full requirements of BS5400 Sections 9.1 & 9.2 and those of the British Department of Transport. They are manufactured to international quality standards. The standard range comprises multi-axis rotation bearings in Fixed, Constrained and Free configurations to support loads up to 30.000 kN. Current design practice has demonstrated the need for a range of bearings with higher horizontal load capacity. To accommodate these requirements and the more usual requirements economically, two ranges of fixed and constrained bearings are now offered.

Bearing types

K series bearings are available in five forms -

20 & 30 K	Fixed
21 & 31 K	Free to move in one horizontal direction
22K	Free to move in any horizontal direction

Typical 22K details



Attachment

Fixing holes are provided in the top and base members of the bearings. This enables a variety of fixing methods to be used. Standard fixings are designed to ensure the bearings can be removed as simply as possible. See page 20.

Support and Installation

Important - See pages 21 - 23 for Installation and Maintenance.

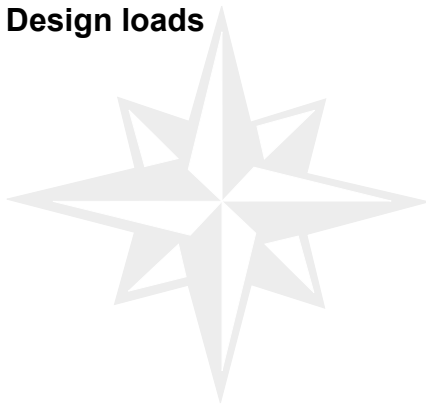
If the bearings are to be installed on a steel spreader plate Ekspan must be notified. The overall height will be reduced by 3mm in these cases.

Concrete stress

Where suitable reinforcement of the concrete 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.

At the **Nominal Rating** capacity tabulated the mean stress approaches 20N/mm².

Design loads



The designation of loadings varies depending on the design code employed. The tabulated load capacities list Nominal rating, at which load the base concrete stress is 20N/mm² maximum. **The working stress / serviceability limit state** maximum loads are determined by the allowable PTFE stresses. The **ultimate limit state** maximum load characteristics are determined by the strength characteristics of the bearing and incorporate the material and partial safety factors γ_m and γ_3 as required by BS5400.

The practice of stating working loads, or nominal loads is inappropriate for limit state designs. The SLS and ULS capacities represent design load effects, i.e. nominal loads to which ALL the appropriate factors have been applied. Factored loads must be provided to ensure correct bearing selection.

Rotation

All the bearings can rotate at least 0.01 radians about any horizontal axis. The maximum for each bearing is shown in the tables.

Movement

The dimensions for the **21K & 31K** (Constrained) and **22K** (Free) bearings are shown in the tables for the following movements -

Longitudinal

21 & 31K 100mm total
22K 100mm total

Transverse

21 & 31K NIL (see pages 14 & 16)
22K 20mm total

Movements in increments of 50mm total can be supplied. The top plate dimensions and the top plate fixing centres should be increased accordingly. **N.B. 21 & 31K bearings should not be used where movement is required at right angles to the constraints.**

The required movements should be specified in the part number as described below.

The clearance between the constraints must not be used to accommodate any structural movement.

Designation of part no.

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

	Type	Maximum Working Load (kN)	Movement		Fixings	
			Longitudinal (mm)	Transverse (mm)	Top	Base
a	20K	5000			S	S
b	31K	5000	100		B	S
c	22K	5000	100	20	N	B

Full part no for
a above is **20K 500/SS**
b above is **31K 500/100/BS**
c above is **22K 500/100/20/NB**

(for suffix letters see page 20)

c denotes a free K series Pot Bearing of -

Working load capacity		5000kN maximum
Movement	Longitudinal	100mm total
	Transverse	20mm total
Fixing method		No fixings in top plate Bolts in base plate

Bearing design loads

Bearings should be selected to suit the appropriate design code.

The maximum vertical and horizontal loads shown in the tables may be taken in combination.

Horizontal loading

The 20K fixed bearing will resist a horizontal force acting in any direction.

In order for the bearing to support the maximum horizontal loads stated in the tables, a minimum concurrent vertical load of 0.33 x the Nominal Vertical rating must be present.

At ULS, the actual load combination may permit the use of a vertical load higher than that shown in the table.

Where higher horizontal load capacities are required, the 30K series or a special bearing may be more appropriate.

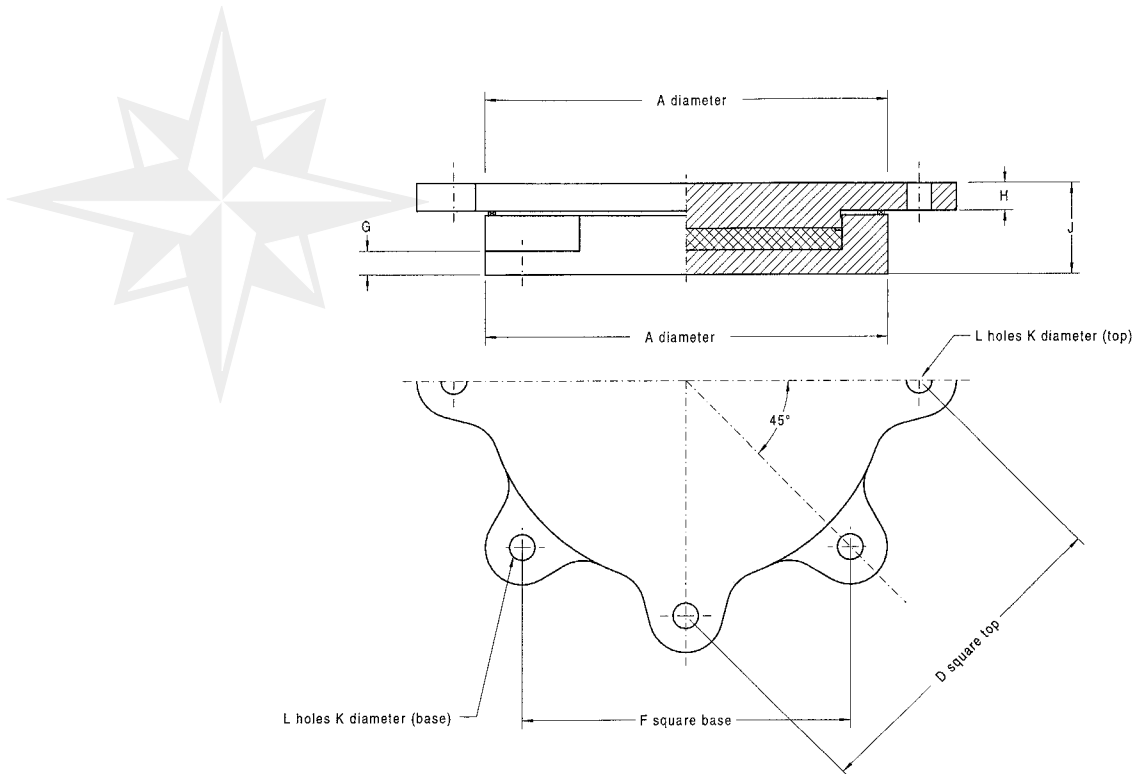
We will be pleased to advise.

Concrete stress

Where suitable reinforcement of the concrete 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.

At the **Nominal Rating** capacity tabulated the mean stress approaches 20N/mm².

Bearing Part no	Nominal Vertical Rating Maximum (kN)	Working/Serviceability Limit State Loads		Ultimate Limit State Loads		Rotation (Radians)
		Vertical	Horizontal	Vertical	Horizontal	
20K0050	500	706	50	917	65	0.025
20K0075	750	1017	75	1322	97	0.021
20K0100	1000	1385	100	1800	130	0.022
20K0130	1300	1734	130	2254	169	0.017
20K0160	1600	2206	160	2867	208	0.014
20K0200	2000	2733	195	3250	253	0.011
20K0250	2500	3421	245	4290	318	0.016
20K0300	3000	4017	290	5292	377	0.013
20K0350	3500	4778	335	6211	435	0.012
20K0400	4000	5410	380	7033	494	0.011
20K0450	4500	6082	420	7906	546	0.014
20K0500	5000	6792	465	8829	604	0.013
20K0550	5500	7389	505	9605	656	0.012
20K0600	6000	8011	545	10414	708	0.011
20K0700	7000	9503	625	12353	812	0.010
20K0800	8000	10751	700	13976	910	0.012
20K0900	9000	12076	775	15698	1007	0.011
20K1000	10000	13478	840	17521	1092	0.010
20K1200	12000	16060	970	20878	1261	0.011
20K1400	14000	18869	1080	24529	1404	0.010
20K1600	16000	21382	1180	27796	1534	0.011
20K1800	18000	24052	1270	31267	1651	0.010
20K2000	20000	26880	1340	34944	1742	0.011
20K2250	22500	30171	1415	39222	1839	0.010
20K2500	25000	33653	1465	43748	1904	0.011
20K3000	30000	40115	1500	52149	1950	0.010



Bearing Part no	Installation Dimensions (mm)								Approx Weight *(kg)
	A	D	F	G	H	J	K	L	
20K0050	190	160	160	20	17	59	14	4	12
20K0075	230	190	180	20	17	59	14	4	17
20K0100	260	210	210	15	15	62	14	4	22
20K0130	290	230	230	15	18	64	14	4	29
20K0160	330	260	260	15	18	70	14	4	39
20K0200	360	280	280	20	17	74	14	4	49
20K0250	400	310	310	20	18	81	14	4	67
20K0300	440	340	330	20	15	82	14	4	80
20K0350	480	360	360	25	20	92	14	4	107
20K0400	510	390	390	25	19	91	14	4	119
20K0450	540	410	410	30	23	105	14	4	156
20K0500	570	430	430	25	22	105	18	4	173
20K0550	600	450	450	30	22	115	18	4	210
20K0600	620	470	470	30	26	117	18	4	227
20K0700	670	500	500	35	24	125	18	4	282
20K0800	720	540	530	40	28	139	18	4	366
20K0900	760	570	560	35	27	138	22	4	398
20K1000	800	600	600	35	27	138	22	4	440
20K1200	880	660	640	45	30	161	22	4	628
20K1400	950	710	700	45	34	166	26	4	746
20K1600	1010	760	740	45	38	180	26	4	919
20K1800	1080	810	790	50	37	189	26	4	1107
20K2000	1130	850	830	50	41	204	32	4	1310
20K2250	1200	900	870	55	41	204	32	4	1463
20K2500	1270	950	910	55	49	222	32	4	1800
20K3000	1390	1030	990	65	49	233	32	4	2238

*Excluding fixings

Bearing design loads

Bearings should be selected to suit the appropriate design code.

The maximum vertical and horizontal loads shown in the tables may be taken in combination.

Horizontal loading

The 30K fixed bearing will resist a horizontal force acting in any direction.

In order for the bearing to support the maximum horizontal loads stated in the tables, a minimum concurrent vertical load of 0.33 x the Nominal Vertical rating must be present.

At ULS, the actual load combination may permit the use of a vertical load higher than that shown in the table.

Where lower horizontal load capacities are required, the 20K series bearing may be more economical.

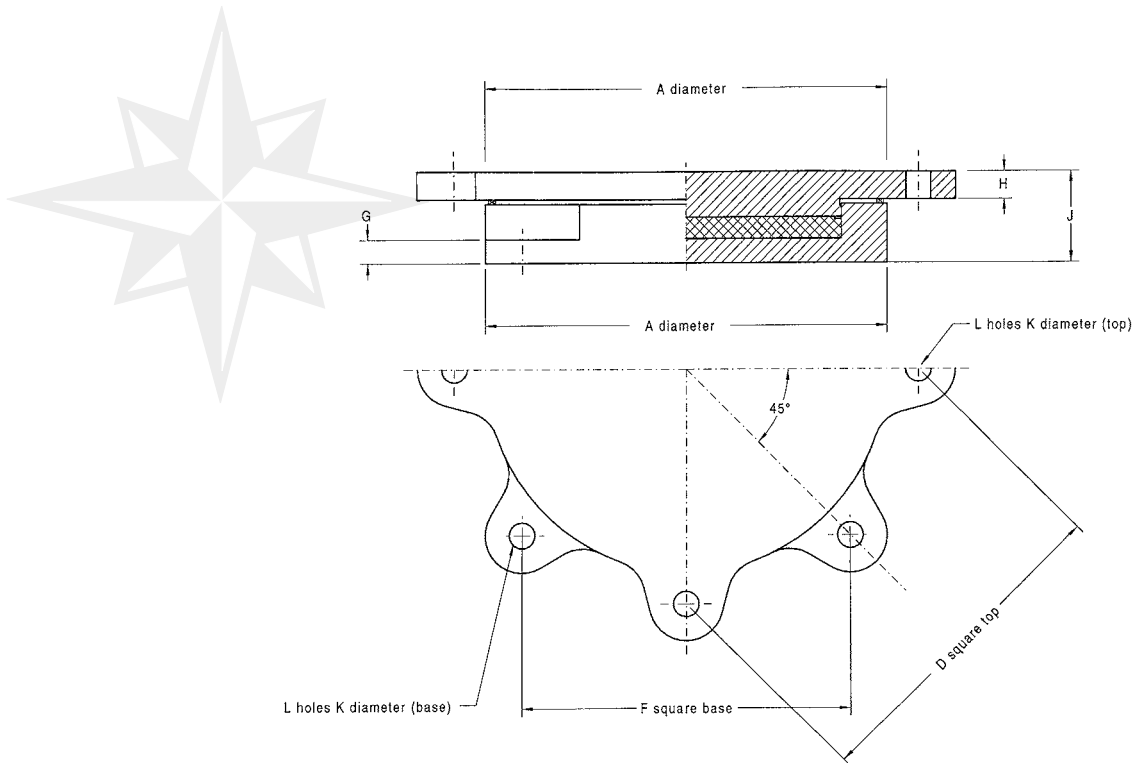
We will be pleased to advise.

Concrete stress

Where suitable reinforcement of the concrete 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.

At the **Nominal Rating** capacity tabulated the mean stress approaches 20N/mm².

Bearing Part no	Nominal Vertical Rating Maximum (kN)	Working/Serviceability Limit State Loads		Ultimate Limit State Loads		Rotation (Radians)
		Vertical	Horizontal	Vertical	Horizontal	
30K0050	500	706	105	917	136	0.025
30K0075	750	1017	150	1322	195	0.021
30K0100	1000	1385	200	1800	260	0.022
30K0130	1300	1734	260	2254	338	0.020
30K0160	1600	2206	315	2867	409	0.021
30K0200	2000	2733	390	3552	507	0.022
30K0250	2500	3421	485	4447	630	0.020
30K0300	3000	4071	575	5292	747	0.021
30K0350	3500	4778	665	6211	864	0.022
30K0400	4000	5410	755	7033	981	0.020
30K0450	4500	6082	840	7906	1092	0.021
30K0500	5000	6792	925	8829	1202	0.013
30K0550	5500	7389	1010	9605	1313	0.012
30K0600	6000	8011	1090	10414	1417	0.011
30K0700	7000	9503	1250	12353	1625	0.010
30K0800	8000	10751	1400	13976	1820	0.012
30K0900	9000	12076	1545	15698	2008	0.011
30K1000	10000	13478	1680	17521	2184	0.010
30K1200	12000	16060	1935	20878	2515	0.011
30K1400	14000	18869	2160	24529	2808	0.010
30K1600	16000	21382	2360	27796	3068	0.011
30K1800	18000	24052	2535	31267	3295	0.010
30K2000	20000	26880	2680	34944	3484	0.011
30K2250	22500	30171	2825	39222	3672	0.010
30K2500	25000	33653	2925	43748	3802	0.011
30K3000	30000	40115	3000	52149	3900	0.010



Bearing Part no	Installation Dimensions (mm)								Approx Weight *(kg)
	A	D	F	G	H	J	K	L	
30K0050	210	170	170	15	16	58	14	4	14
30K0075	240	200	200	25	20	62	18	4	21
30K0100	280	230	230	15	18	65	18	4	28
30K0130	310	260	250	20	26	79	22	4	43
30K0160	350	280	280	20	24	83	22	4	55
30K0200	390	320	320	25	27	96	26	4	81
30K0250	430	350	340	30	26	95	26	4	97
30K0300	470	380	380	25	33	113	32	4	138
30K0350	510	410	410	35	36	121	32	4	175
30K0400	540	430	430	25	35	130	32	4	209
30K0450	580	470	470	35	38	133	38	4	248
30K0500	600	490	490	35	41	134	38	4	268
30K0550	630	510	510	40	41	142	38	4	312
30K0600	650	520	520	40	41	142	38	4	330
30K0700	710	570	570	30	45	156	44	4	430
30K0800	750	600	600	35	44	155	44	4	471
30K0900	800	630	630	45	53	174	44	4	608
30K1000	840	660	660	40	53	174	44	4	664
30K1200	910	730	720	45	51	182	50	4	809
30K1400	980	780	770	55	59	201	50	4	1036
30K1600	1040	820	810	60	57	209	50	4	1206
30K1800	1100	860	860	35	55	218	50	4	1379
30K2000	1160	900	900	35	54	217	50	4	1509
30K2250	1220	950	940	45	53	226	50	4	1736
30K2500	1280	970	970	55	52	235	44	4	1976
30K3000	1390	1040	1040	60	53	247	38	4	2407

*Excluding fixings

Bearing design loads

Bearings should be selected to suit the appropriate design code.

The maximum vertical and horizontal loads shown in the tables may be taken in combination.

Horizontal loading

The 21K guided bearing will resist a horizontal force acting at right angles to the main direction of sliding.

In order for the bearing to support the maximum horizontal loads stated in the tables, a minimum concurrent vertical load of 0.33 x the Nominal Vertical rating must be present.

At ULS, the actual load combination may permit the use of a vertical load higher than that shown in the table.

Where higher horizontal load capacities are required, the 31K series or a special bearing may be more appropriate.

We will be pleased to advise.

Transverse movement

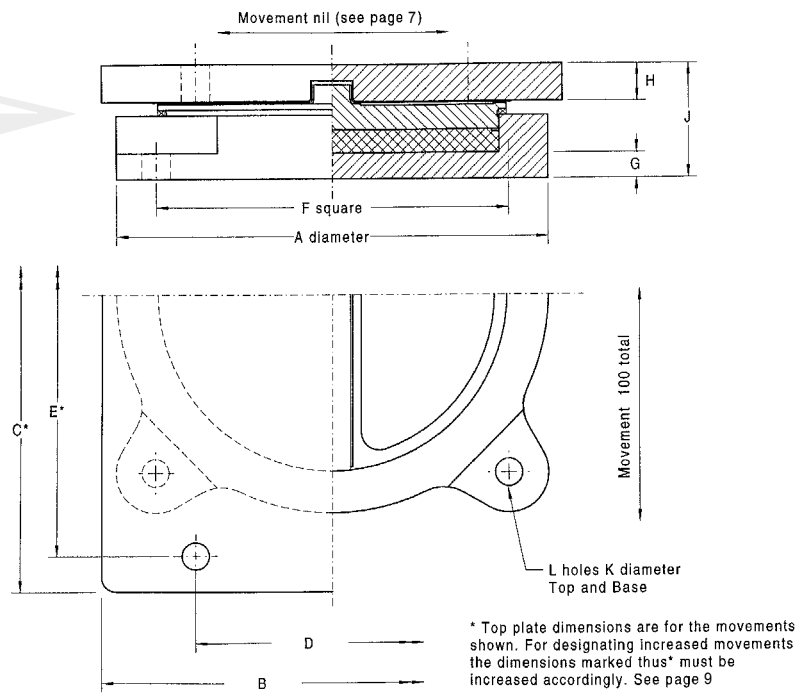
21K Bearings are designed to accommodate in one direction only. Movement transverse to the constraint is nominally zero. In practice the transverse movement is 1mm maximum. Standard 21K bearings should not be used where movement is required at right angles to the constraint. Special bearings can be offered for such requirements.

Concrete stress

Where suitable reinforcement of the concrete 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.

At the **Nominal Rating** capacity tabulated the mean stress approaches 20N/mm².

Bearing Part no	Nominal Vertical Rating Maximum (kN)	Working/Serviceability Limit State Loads Vertical		Limit State Loads Horizontal (kN)	Ultimate Limit State Loads Vertical		Rotation (Radians)
		Permanent (kN)	All (kN)		Vertical (kN)	Horizontal (kN)	
21K0050	500	363	544	50	707	65	0.025
21K0075	750	565	848	75	1102	97	0.021
21K0100	1000	723	1085	100	1410	130	0.022
21K0130	1300	901	1351	130	1756	169	0.017
21K0160	1600	1097	1646	160	2139	208	0.014
21K0200	2000	1359	2039	195	2650	253	0.011
21K0250	2500	1724	2586	245	3361	318	0.016
21K0300	3000	2070	3105	290	4036	377	0.013
21K0350	3500	2426	3640	335	4732	435	0.012
21K0400	4000	2740	4111	380	5344	494	0.011
21K0450	4500	3123	4685	420	6090	546	0.014
21K0500	5000	3478	5218	465	6783	604	0.013
21K0550	5500	3690	5536	505	7196	656	0.012
21K0600	6000	4076	6114	545	7948	708	0.011
21K0700	7000	5122	7683	625	9987	812	0.010
21K0800	8000	5806	8709	700	11321	910	0.012
21K0900	9000	6784	10177	775	13230	1007	0.011
21K1000	10000	7568	11352	840	14757	1092	0.010
21K1200	12000	9075	13586	970	17661	1261	0.011
21K1400	14000	10902	16354	1080	21260	1404	0.010
21K1600	16000	12570	18855	1180	24511	1534	0.011
21K1800	18000	14355	21532	1270	27991	1651	0.010
21K2000	20000	16258	24387	1340	31703	1742	0.011
21K2250	22500	18696	28045	1415	36458	1839	0.010
21K2500	25000	20859	31288	1465	40674	1904	0.011
21K3000	30000	25866	38799	1500	50438	1950	0.010



Bearing Part no	Installation Dimensions (mm)											Approx Weight *(kg)
	A	B	C	D	E	F	G	H	J	K	L	
21K0050	190	240	370	110	330	160	20	32	87	14	4	32
21K0075	230	270	400	130	360	180	20	32	87	14	4	41
21K0100	260	300	420	160	380	210	15	32	94	14	4	51
21K0130	290	330	450	180	410	230	15	32	91	14	4	60
21K0160	330	370	470	210	430	260	15	32	96	14	4	75
21K0200	360	400	500	230	460	280	20	32	101	14	4	90
21K0250	400	440	520	260	480	310	20	32	108	14	4	113
21K0300	440	480	560	280	520	330	20	32	108	14	4	133
21K0350	480	520	590	310	550	360	25	37	117	14	4	172
21K0400	510	550	610	340	570	390	25	37	116	14	4	189
21K0450	540	580	640	360	600	410	30	37	129	14	4	229
21K0500	570	610	680	370	630	430	25	37	129	18	4	256
21K0550	600	640	700	390	650	450	30	37	138	18	4	298
21K0600	620	660	720	410	670	470	30	37	134	18	4	308
21K0700	670	710	770	440	720	500	35	42	148	18	4	397
21K0800	720	760	820	470	770	530	40	42	161	18	4	490
21K0900	760	800	860	490	800	560	35	42	160	22	4	535
21K1000	800	840	900	530	840	600	35	42	159	22	4	588
21K1200	880	920	980	570	920	640	45	47	182	22	4	814
21K1400	950	990	1050	620	980	700	45	47	186	26	4	951
21K1600	1010	1050	1110	660	1040	740	45	47	195	26	4	1118
21K1800	1080	1120	1180	710	1110	790	50	52	209	26	4	1384
21K2000	1130	1170	1230	730	1150	830	50	52	217	32	4	1564
21K2250	1200	1240	1300	770	1220	870	55	52	222	32	4	1774
21K2500	1270	1310	1370	810	1290	910	55	57	236	32	4	2121
21K3000	1390	1430	1490	890	1410	990	65	57	247	32	4	2623

*Excluding fixings

Bearing design loads

Bearings should be selected to suit the appropriate design code. The maximum vertical and horizontal loads shown in the tables may be taken in combination.

Horizontal loading

The 31K guided bearing will resist a horizontal force acting at right angles to the main direction of movement.

In order for the bearing to support the maximum horizontal loads stated in the tables, a minimum concurrent vertical load of 0.33 x the Nominal Vertical rating must be present.

At ULS, the actual load combination may permit the use of a vertical load higher than that shown in the table.

Where lower horizontal load capacities are required, the 21K series may be more economical.

We will be pleased to advise.

Transverse movement

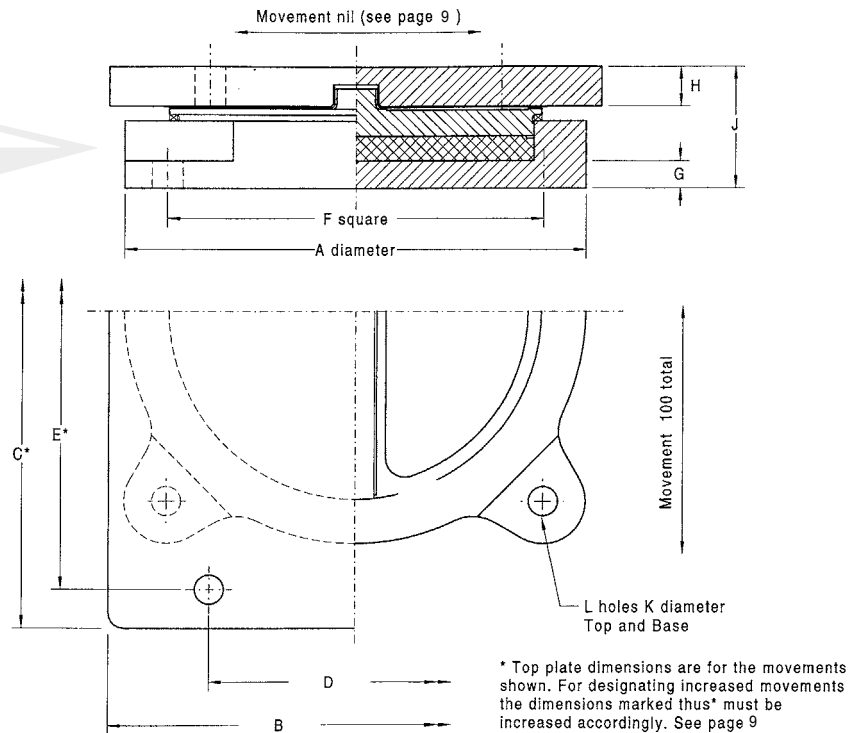
31K Bearings are designed to accommodate in one direction only. Movement transverse to the constraint is nominally zero. In practice the transverse movement is 1mm maximum. Standard 31K bearings should not be used where movement is required at right angles to the constraint. Special bearings can be offered for such requirements.

Concrete stress

Where suitable reinforcement of the concrete 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.

At the **Nominal Rating** capacity tabulated the mean stress approaches 20N/mm².

Bearing Part no	Nominal Vertical Rating Maximum (kN)	Working/Serviceability Limit State Loads Vertical		Limit State Loads Horizontal (kN)	Ultimate Limit State Loads Vertical		Rotation (Radians)
		Permanent (kN)	All (kN)		Vertical (kN)	Horizontal (kN)	
31K0050	500	493	706	105	917	136	0.025
31K0075	750	723	1017	150	1322	195	0.021
31K0100	1000	920	1380	200	1794	260	0.022
31K0130	1300	1140	1710	260	2223	338	0.020
31K0160	1600	1359	2039	315	2650	409	0.021
31K0200	2000	1724	2586	390	3361	507	0.022
31K0250	2500	2029	3044	485	3957	630	0.020
31K0300	3000	2470	3705	575	4816	747	0.021
31K0350	3500	2787	4181	665	5435	864	0.022
31K0400	4000	3123	4685	755	6090	981	0.020
31K0450	4500	3478	5218	840	6783	1092	0.021
31K0500	5000	3690	5536	925	7196	1202	0.013
31K0550	5500	4076	6114	1010	7948	1313	0.012
31K0600	6000	4275	6413	1090	8336	1417	0.011
31K0700	7000	5122	7683	1250	9987	1625	0.010
31K0800	8000	5806	8709	1400	11321	1820	0.012
31K0900	9000	6784	10177	1545	13230	2008	0.011
31K1000	10000	7568	11352	1680	14757	2184	0.010
31K1200	12000	9057	13586	1935	17661	2515	0.011
31K1400	14000	10902	16354	2160	21260	2808	0.010
31K1600	16000	12570	18855	2360	24511	3068	0.011
31K1800	18000	14355	21532	2535	27991	3295	0.010
31K2000	20000	16258	24387	2680	31703	3484	0.011
31K2250	22500	18696	28045	2825	36458	3672	0.010
31K2500	25000	20859	31288	2925	40674	3802	0.011
31K3000	30000	25866	38799	3000	50438	3900	0.010



Bearing Part no	Installation Dimensions (mm)											Approx Weight *(kg)
	A	B	C	D	E	F	G	H	J	K	L	
31K0050	210	260	390	120	350	170	15	32	91	14	4	38
31K0075	240	290	440	140	390	200	25	32	94	18	4	51
31K0100	280	320	460	170	410	230	15	37	101	18	4	67
31K0130	310	350	510	180	450	250	20	37	104	22	4	84
31K0160	350	390	540	210	480	280	20	37	106	22	4	102
31K0200	390	430	590	240	520	320	25	37	118	26	4	135
31K0250	430	470	630	260	560	340	30	42	126	26	4	173
31K0300	470	510	690	280	610	380	25	47	137	32	4	229
31K0350	510	550	720	310	640	410	35	47	144	32	4	272
31K0400	540	580	740	330	660	430	25	47	157	32	4	317
31K0450	580	620	810	360	710	470	35	47	153	38	4	363
31K0500	600	640	820	380	720	490	35	52	158	38	4	404
31K0550	630	670	840	400	740	510	40	57	169	38	4	475
31K0600	650	690	860	410	760	520	40	57	168	38	4	500
31K0700	710	750	920	450	810	570	30	57	175	44	4	604
31K0800	750	790	950	480	840	600	35	57	177	44	4	664
31K0900	800	840	990	510	880	630	45	57	186	44	4	780
31K1000	840	880	1020	540	910	660	40	62	190	44	4	877
31K1200	910	950	1110	580	990	720	45	62	204	50	4	1080
31K1400	980	1020	1160	630	1040	770	55	62	212	50	4	1276
31K1600	1040	1080	1210	670	1090	810	60	67	224	50	4	1517
31K1800	1100	1140	1250	720	1130	860	35	67	233	50	4	1713
31K2000	1160	1200	1290	760	1170	900	35	67	232	50	4	1863
31K2250	1220	1260	1340	800	1220	940	45	67	251	50	4	2178
31K2500	1280	1320	1380	850	1270	970	55	62	257	44	4	2382
31K3000	1390	1430	1490	930	1390	1040	60	62	259	38	4	2804

*Excluding fixings

Bearing design loads

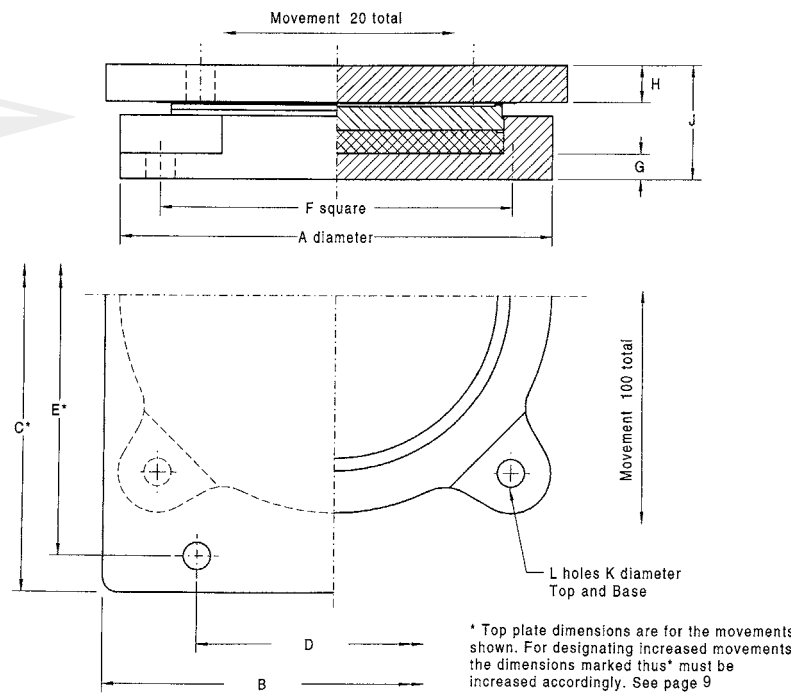
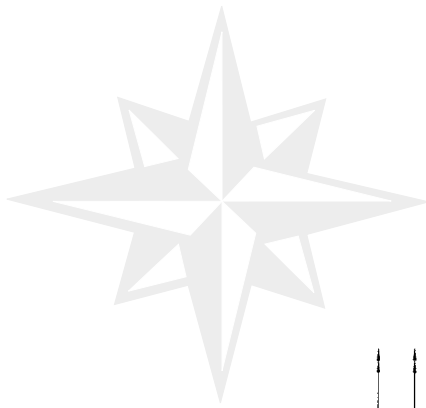
Bearings should be selected to suit the appropriate design code. If in doubt seek our advice.

Concrete stress

Where suitable reinforcement of the concrete 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.

At the **Nominal Rating** capacity tabulated the mean stress approaches 20N/mm².

Bearing Part no	Nominal Vertical Rating Maximum (kN)	Working/Serviceability Limit State Loads		Ultimate Limit State Loads Vertical (kN)	Rotation (Radians)
		Vertical Permanent (kN)	All (kN)		
22K0050	500	339	508	660	0.025
22K0075	750	530	795	1033	0.021
22K0100	1000	763	1144	1487	0.022
22K0130	1300	990	1485	1930	0.020
22K0160	1600	1301	1951	2536	0.021
22K0200	2000	1654	2481	3225	0.022
22K0250	2500	2120	3180	4134	0.020
22K0300	3000	2565	3848	5002	0.021
22K0350	3500	3053	4579	5952	0.022
22K0400	4000	3492	5238	6809	0.020
22K0450	4500	3960	5940	7722	0.021
22K0500	5000	4458	6686	8891	0.020
22K0550	5500	4877	7315	9509	0.020
22K0600	6000	5316	7973	10364	0.020
22K0700	7000	6371	9503	12353	0.020
22K0800	8000	7257	10751	13976	0.021
22K0900	9000	8201	12076	15698	0.020
22K1000	10000	9203	13478	17521	0.020
22K1200	12000	11055	16060	20878	0.021
22K1400	14000	13077	18869	24529	0.020
22K1600	16000	14891	21382	27796	0.020
22K1800	18000	16823	24052	31267	0.020
22K2000	20000	18873	26880	34944	0.020
22K2250	22500	21264	30171	39222	0.020
22K2500	25000	23798	33653	43748	0.020
22K3000	30000	28510	40115	52149	0.020



Bearing Part no	Installation Dimensions (mm)											Approx Weight *(kg)
	A	B	C	D	E	F	G	H	J	K	L	
22K0050	190	240	300	200	260	160	15	22	71	14	4	21
22K0075	230	270	330	230	290	180	20	22	76	14	4	29
22K0100	260	300	360	260	320	210	15	27	85	14	4	41
22K0130	290	330	390	290	350	230	15	27	85	14	4	50
22K0160	330	370	430	330	390	260	15	27	90	14	4	65
22K0200	360	390	460	350	420	280	20	32	99	14	4	84
22K0250	400	430	500	390	460	310	20	32	103	14	4	106
22K0300	440	470	540	430	500	330	20	32	107	14	4	130
22K0350	480	500	580	460	540	360	25	32	112	14	4	156
22K0400	510	530	610	490	570	390	25	37	117	14	4	188
22K0450	540	560	640	520	600	410	30	37	127	14	4	223
22K0500	570	590	670	540	620	430	25	37	126	18	4	246
22K0550	600	620	700	570	650	450	35	37	141	18	4	299
22K0600	620	640	720	590	670	470	30	37	137	18	4	309
22K0700	670	690	770	640	720	500	35	42	152	18	4	401
22K0800	720	740	820	690	770	530	40	42	161	18	4	487
22K0900	760	780	860	720	800	560	35	42	160	22	4	532
22K1000	800	820	900	760	840	600	35	42	160	22	4	585
22K1200	880	900	980	840	920	640	45	47	184	22	4	816
22K1400	950	970	1050	900	980	700	45	47	188	26	4	955
22K1600	1010	1030	1110	960	1040	740	50	52	202	26	4	1168
22K1800	1080	1100	1180	1030	1110	790	55	52	212	26	4	1390
22K2000	1130	1150	1230	1070	1150	830	55	52	226	32	4	1603
22K2250	1200	1220	1300	1140	1220	870	55	52	225	32	4	1782
22K2500	1270	1290	1370	1210	1290	910	60	57	239	32	4	2137
22K3000	1390	1410	1490	1330	1410	990	65	57	253	32	4	2656

*Excluding fixings

Standard K Series fixings

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

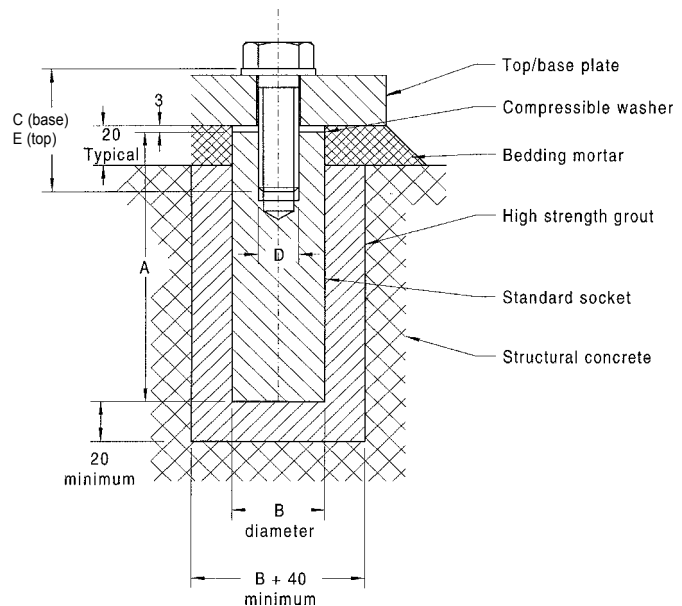
First letter - Top plate fixing
 Second letter - Base plate fixing

- 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

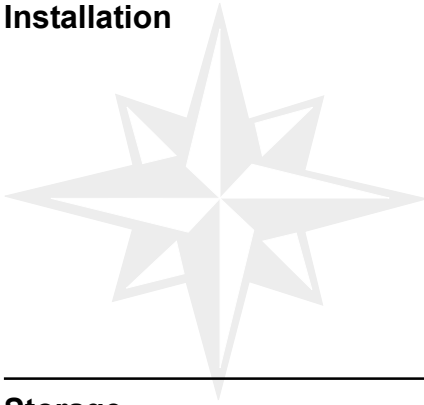
N.B. If standard K series fixings are not used, care should be taken to ensure that bolts can be fitted without dismantling the bearing.

Bolts are Hexagon Head to BS 3692 grade 8.8



Bearing Size	Bearing Type																				
	20K		30K				21K				31K				22K						
	Socket	Bolt	Socket	Bolt	Socket	Bolt	Socket	Bolt	Socket	Bolt	Socket	Bolt	Socket	Bolt	Socket	Bolt					
	B	A	D	C	E	B	A	D	C	E	B	A	D	C	E	B	A	D	C	E	
0050	35	110	12	40	35	35	110	12	35	35	35	110	12	40	50	35	110	12	35	40	35
0075	35	110	12	40	35	40	140	16	50	45	35	110	12	40	50	40	140	16	50	55	35
0100	35	110	12	35	35	40	140	16	40	40	35	110	12	35	50	35	110	12	35	45	35
0130	35	110	12	35	40	50	170	20	50	55	35	110	12	35	50	35	110	12	35	45	35
0160	35	110	12	35	40	50	170	20	50	50	35	110	12	35	50	35	110	12	35	45	35
0200	35	110	12	40	35	55	200	24	60	60	35	110	12	40	50	35	110	12	40	50	35
0250	35	110	12	40	40	55	200	24	65	60	35	110	12	40	50	35	110	12	40	50	35
0300	35	110	12	40	35	70	240	30	65	70	35	110	12	40	50	35	110	12	40	50	35
0350	35	110	12	45	40	70	240	30	75	75	35	110	12	45	55	35	110	12	45	50	35
0400	35	110	12	45	40	70	240	30	65	75	35	110	12	45	55	35	110	12	45	55	35
0450	35	110	12	50	45	80	300	36	80	85	35	110	12	50	55	35	110	12	50	55	35
0500	40	140	16	50	45	80	300	36	80	85	40	140	16	50	60	40	140	16	50	60	40
0550	40	140	16	55	45	80	300	36	85	85	40	140	16	55	60	40	140	16	60	60	40
0600	40	140	16	55	50	80	300	36	85	85	40	140	16	55	60	40	140	16	55	60	40
0700	40	140	16	60	50	105	360	42	85	100	40	140	16	60	65	40	140	16	60	65	40
0800	40	140	16	65	50	105	360	42	90	100	40	140	16	65	65	40	140	16	65	65	40
0900	50	170	20	65	55	105	360	42	100	105	50	170	20	65	70	50	170	20	65	70	50
1000	50	170	20	65	55	105	360	42	95	105	50	170	20	65	70	50	170	20	65	70	50
1200	50	170	20	75	60	120	410	48	105	110	50	170	20	75	75	50	170	20	75	75	50
1400	55	200	24	80	65	120	410	48	115	120	55	200	24	80	80	55	200	24	80	80	55
1600	55	200	24	80	70	120	410	48	120	120	55	200	24	80	80	55	200	24	80	85	55
1800	55	200	24	85	70	120	410	48	95	115	55	200	24	85	85	55	200	24	90	85	55
2000	70	240	30	90	80	120	410	48	95	115	70	240	30	90	90	70	240	30	95	90	70
2250	70	240	30	95	80	120	410	48	105	115	70	240	30	95	90	70	240	30	95	90	70
2500	70	240	30	95	90	105	360	42	110	105	70	240	30	95	95	70	240	30	100	95	70
3000	70	240	30	105	90	80	300	36	105	100	70	240	30	105	95	70	240	30	105	95	70

Installation



CONSIDER THE EFFECTS IF BEARINGS ARE NOT CORRECTLY INSTALLED

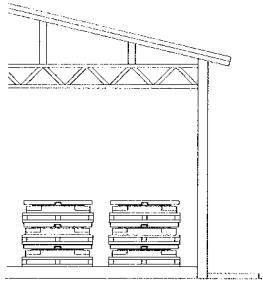
Our structural bearings are manufactured to close tolerances by skilled technicians working in clean conditions. To obtain the requisite performance from bearings it is imperative that they are properly handled at the work site and installed with the same care as when they were assembled in the factory. 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, supervision or training of personnel. A test paper can also be supplied to verify the understanding of installers.

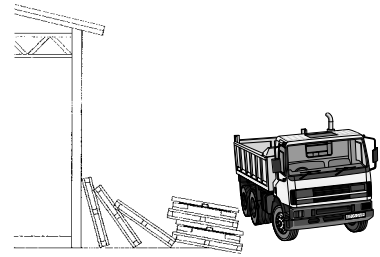
Bearings must be installed with precision to meet the bridge and bearing design criteria.

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

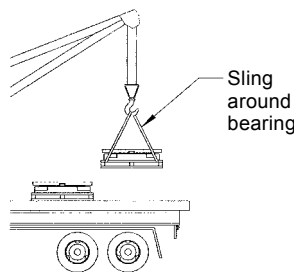


Incorrect

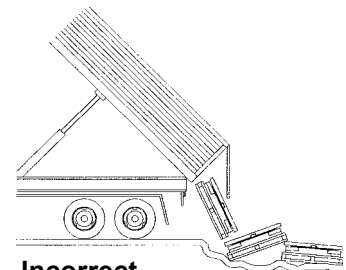
Handling

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



Incorrect

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.

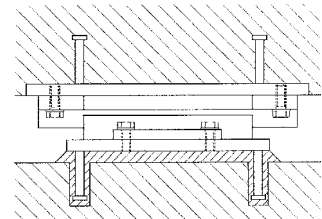
Bedding



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

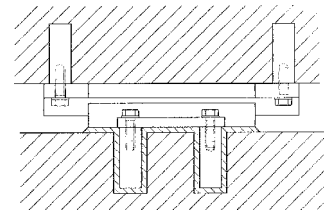


Cast-in-situ structures

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. Bearing top plates of PTFE sliding bearings are especially vulnerable in this respect.

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 when the bearing is properly installed and ready for operation.

Check list for the installation of bearings

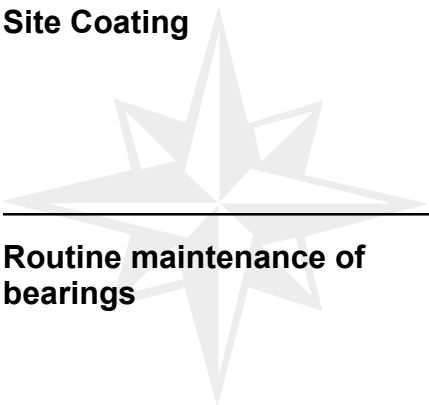
DO-

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.

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.

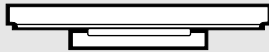
Routine maintenance of bearings

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.
-

Sample Quality Bearing Specification Clauses - K Series Pot Bearings

- 1.01 The bearings should be designed in accordance with BS 5400 part 9 & EN1337 and be constructed from steel grade EN100025 S355 J2G3. *(HIGH QUALITY STEEL GOOD LOADING CAPACITIES)*
- 1.03 The sliding surface of the bearing must be fully welded to the top plate of the bearing. This prevents crevice corrosion de-lamination of the stainless steel ensuring bearing longevity. The stainless steel sliding surface should be mirror polished to a minimum of 8/1 P BS1449/ EN10088-2 or with a reflectivity of 48/55. Paint will be applied to overlap the welded area of the sliding surface so as to protect the area from the risk of corrosion. *(REDUCES CORROSION IN UNLOADED AREAS WHICH IS THE CAUSE OF MOST BEARING FAILURES)*
- 1.04 PTFE bearing surfaces shall be Virgin material with a dimpled surface and lubricated with silicon grease in accordance with EN1337-2. The PTFE shall be retained in the bearing by a machined recess. *(FRICTION IS AT A MINIMUM, LIFE IS EXTENSIVE AND THE PTFE CANNOT "CREEP")*
- 1.05 Guide sliding surfaces should also be fully welded and mirror polished. The wear surface of the guide shall be a mechanically restrained high load resistant material DU(B) in accordance with EN1337-2. *(THE LIFE OF BEARINGS IS EXTENDED WITH USE OF GOOD WEAR MATERIALS)*
- 1.06 Pot bearing pistons are machined with a tightly controlled tolerance between the pot and the piston. *(REDUCE EDGE PRESSURE EFFECTS ON RUBBER)*
- 1.07 The rubber pad in a pot bearing is to have a minimum of 2 brass rings, which should be sized to meet and fit tight to the pot wall. EN1337-5 *(THIS IS KEY TO ENSURE THAT THE RUBBER IS RETAINED IN THE POT - IF NOT THEN THE RUBBER MAY EXTRUDE UNDER LOAD)*
- 1.08 The rubber pad shall meet BS5400 part 9, EN 1337 and be Natural rubber with a hardness of 55 to 65 IRHD. It will be preformed with a recess on the to surface which allows the retaining rings to finish flush with the rubber. *(THIS MEANS THAT WHEN THE BEARING IS LOADED THERE ARE NO AIR GAPS TO CLOSE ENSURING THAT DATUMS ARE MAINTAINED)*
- 1.09 The rubber pad shall fit in the pot without need for deflection. Corners should be moulded in such a way as to ensure that the pad fits to the machined pot base. *(THIS ALSO REDUCES AIR ENTRAPMENT)*
- 1.10 The outer surfaces of the bearing will be blasted to SA 3 and have the contract specified paint system applied.

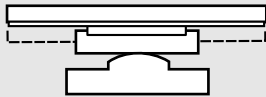
BRIDGE & INDUSTRIAL BEARINGS & JOINTS



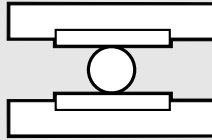
A Series Sliding bearings



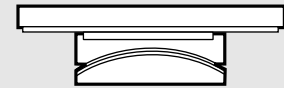
B Series Sliding bearings with elastomer base



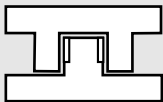
D Series Line rocker bearings



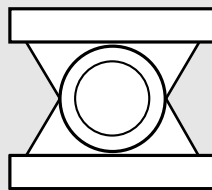
J Series roller bearings



E Series ANTICLASTIC BEARINGS



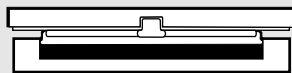
F Series Pin and Guide bearings



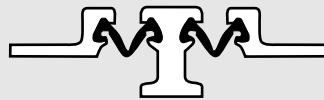
Link bearings



G Series Spherical bearings



K Series pot bearings



Expansion joints

A world wide service offering effective solutions in:-

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

Ekspan warrants that products described in this brochure are free from defects in workmanship and material but unless expressly agreed in writing Ekspan gives no warranty that these products are suitable for any particular purpose or for use under any specific conditions notwithstanding that such purpose would appear to be covered by this publication. Ekspan accepts no liability for any loss, damage or expense whatsoever arising directly or indirectly from the use of their products or recommendations. All business undertaken by Ekspan is subject to their standard conditions of sale, copies of which are available upon request. Ekspan products are subject to continual development and Ekspan reserves the right to make changes in the specification and design of their products without prior notice.

F and K series bearings are available from:

EKSPAN LIMITED

Compass Works, 410 Brightside Lane, Sheffield S9 2SP UK

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

Website: www.ekspan.com

E-mail: enquiry@ekspan.co.uk



Certificate No. 3706