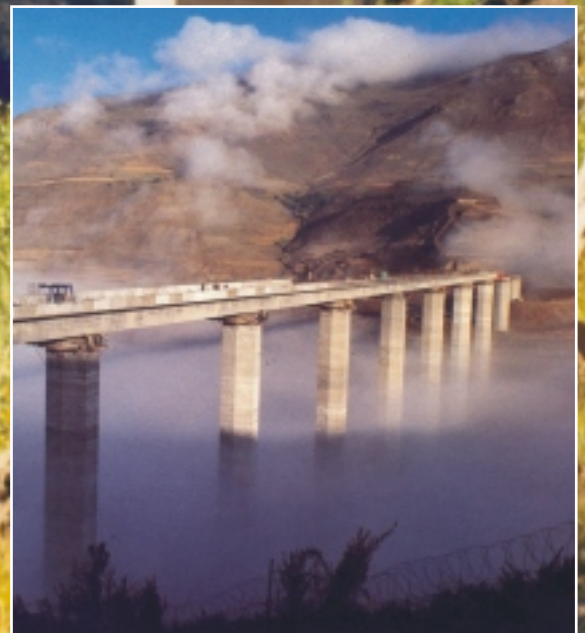


NOVA

NOVA ENGINEERING WORKS (PTY) LTD
STRUCTURAL BEARING CATALOGUE



Nelson Mandela Bridge (Johannesburg – South Africa)



Malibamatso Bridge (Lesotho)

1. Introduction

- 1.1 Objective of this catalogue
- 1.2 Pot Bearing Philosophy
- 1.3 Advantages of Pot Bearings
- 1.4 Pedigree

2. Design and Manufacture

- 2.1 Design
- 2.2 Design Specifications
- 2.3 Standard Designs and Specials
- 2.4 Manufacture

3. Pot Bearing Construction

- 3.1 Material Specifications
- 3.2 Types
- 3.3 Removability and adaptor plates
- 3.4 P.T.F.E. and Sliding Friction
- 3.5 Corrosion Protection
- 3.6 Dust Protection
- 3.7 Piston Seal

4. Specifications of Standard Bearings

- 4.1 Types and Designations
- 4.2 Working and Ultimate Loads
- 4.3 Movements
- 4.4 Rotation
- 4.5 Concrete Stress
- 4.6 Holding Down Bolts

5. Tables of Sizes**6. Standard Bearing Selection**

- 6.1 Vertical Load
- 6.2 Horizontal Load
- 6.3 Holding Down Bolts
- 6.4 Specifying the Bearing

7. Installation

- 7.1 Handling
- 7.2 Storage
- 7.3 Install Level
- 7.4 Install in the Correct Direction
- 7.5 Preset
- 7.6 Layout Diagram
- 7.7 Grouting
- 7.8 Failing Straps
- 7.9 Transport Clamps
- 7.10 Water
- 7.11 Cleaning up

8. The Nova Range

- 8.1 Special Rubber Pot Bearings
- 8.2 Bearings with Changing Functions
- 8.3 Combination Pot Bearings
- 8.4 Line Rocker, S.B. Structural and Mini Sliding Bearings
- 8.5 Nova Tie-Anchor
- 8.6 Elastomeric Bearings
- 8.7 Point Tilt Bearings
- 8.8 Guide Bearings
- 8.9 Pin Bearings
- 8.10 Delta Neoprene Bearing Pads

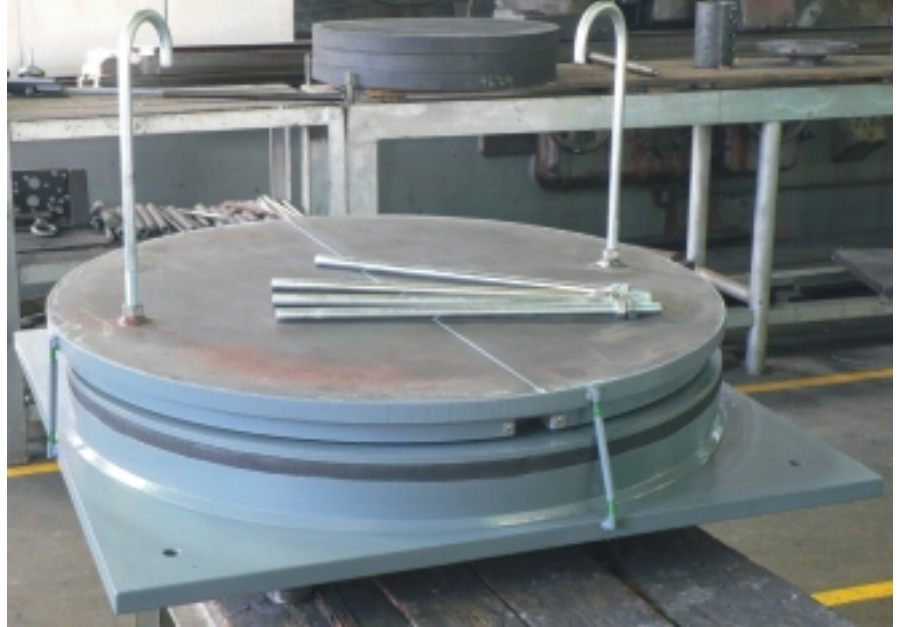
Note: The information given in this catalogue is given in good faith but cannot be taken as a guarantee. We reserve the right to change bearing specifications without notice.

1.1 Objective of this Catalogue

This catalogue gives up-to-date information on NOVA “pot type” structural bearings. It’s objective is to assist the bridge designer, site engineer and building contractor during the design and construction stages of the bridge.

1.2 Pot Bearing Philosophy

NOVA pot bearings, (fixed, unidirectional and multidirectional), have an enclosed rubber pad which, under high pressure, develops fluid-like behaviour. Rotation about any horizontal axis is thus achieved. Sliding bearings have a 'Teflon' (PTFE) to polished stainless steel sliding interface to accommodate translational movements. Thus, pot bearings can accommodate rotations about any horizontal axis and can be designed for any load and any horizontal displacement.



1.3 Advantages of Pot Bearings

- 1) Simplicity.
- 2) Low rotational resistance.
- 3) Low overall height.

1.4 Pedigree

NOVA pot bearings have been used successfully for over forty five years. 'State of the art' equipment and a commitment to quality guarantees a superior product.



2.1 Design

NOVA pot bearings are designed in the Republic of South Africa using modern computer technology. This enables every design to be optimized with respect to loads, movements, rotation, allowable concrete pressure and special dimensional constraints.



2.2 Design Specifications

NOVA pot bearings are designed to meet or exceed SANS 1806, SANS 10326, BS 5400 Part 9 and COLTO specifications in all respects.

2.3 Standard Designs and Specials

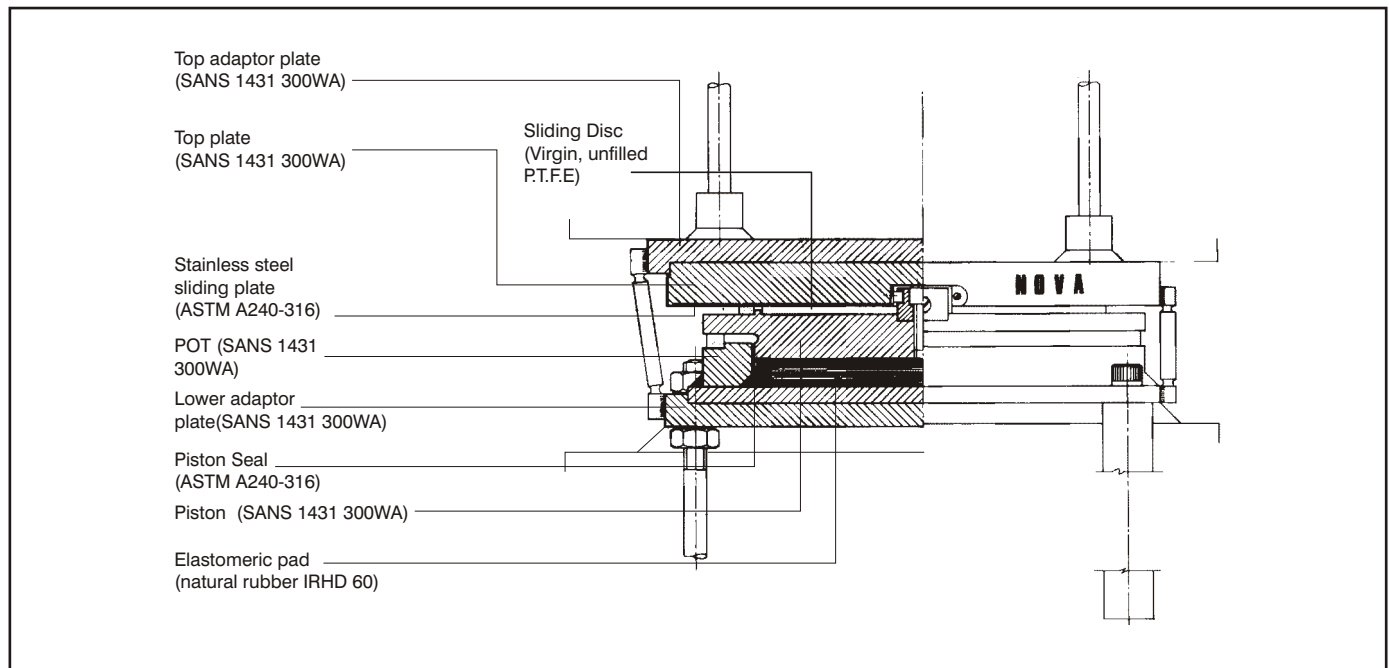
Details of standard NOVA pot bearings are given in this catalogue. Special designs for unusual situations can be prepared if full design data is submitted. Table A.1 of SANS 10326 or Table 9 of BS 5400 Section 9.1 should be used for this purpose.

2.4 Manufacture

All bearings are manufactured on the premises of Nova Engineering Works in Johannesburg South Africa.



3.1 Material Specifications



3.2 Types

- 1) Fixed bearings provide rotational capability only and no translation. They can therefore accommodate horizontal forces in any direction.
- 2) Unidirectional bearings provide rotational capability and translation in one direction only. Horizontal forces can be accommodated perpendicular to the movement axis.
- 3) Multidirectional bearings provide rotational capability and translation in all directions. Horizontal forces are not resisted.

3.3 Removability and Adaptor Plates

It may sometimes become necessary to remove bearings for maintenance purpose, if unexpected movements occur, or if the bearings are incorrectly orientated on installation. The simplest way for bearings to be removed after construction is for them to be fitted with adaptor plates. The bridge need be jacked up by only a few millimeters, after which the bearing cell can be removed. NOVA pot bearings without adaptor plates are also removable, but more effort and time is required.

3.4 P.T.F.E. and Sliding Friction

Pure P.T.F.E. (Teflon) is used as the sliding element in NOVA pot bearings, since it has a

lower coefficient of friction than grades of Teflon reinforced with various additives. NOVA standard bearings are designed for a Teflon disc pressure of 35MPa which gives a coefficient of friction of less than 3%. The sliding surface is lubricated with silicon grease to reduce the higher initial starting values of sliding friction.

3.5 Corrosion Protection

All exposed steel components receive the following treatment:

- 1) Abrasive grit blast to Sa 3.
- 2) Hot zinc metal spray.
- 3) One coat etch primer (minimum thickness 25 micron).
- 4) Two coats vinyl copolymer paint, each coat having a minimum thickness of 75 micron. Unexposed steel surfaces receive steps 1 and 2 above. Other corrosion protection systems can be provided on request.

3.6 Dust Protection

The sliding surfaces are protected from the ingress of dust and grit by foam rubber seals.

3.7 Piston Seal

All NOVA pot bearings incorporate an effective piston seal. An efficient seal is necessary to prevent extrusion of the elastomer into the piston/pot rim gap and also to reduce wear on the elastomeric pad.

4.1 Types and Designations

NOVA pot bearings are available as fixed, unidirectional and multidirectional types, with or without upper and/or lower adaptor plates. This catalogue presents tables of sizes for bearings with (1) BOTH upper and lower adaptors present and (2) NEITHER upper or lower adaptors present. Bearings with only one adaptor plate, either upper or lower, can be supplied.

The designations (Bearing Numbers) used in this catalogue, for various types, is shown below:

FNN-440
 Bearing Type ——— Capacity in kn
 No Lower Adaptor ——— No Upper Adaptor
 Plate Present ——— Plate Present

UAA-10320
 Bearing Type ——— Capacity in kn
 Lower Adaptor ——— Upper Adaptor
 Plate Present ——— Plate Present

MAA-6500
 Bearing Type ——— Capacity in kn
 Lower Adaptor ——— Upper Adaptor
 Plate Present ——— Plate Present

MAN-15000
 Bearing Type ——— Capacity in kn
 Lower Adaptor ——— No Upper Adaptor
 Plate Present ——— Plate Present

4.2 Working and Ultimate Loads

Working load is the serviceability load (SLS) while ultimate load (ULS) is the load that, when applied to a bearing, will result in permanent damage to the bearing.

4.3 Movements

The standard bearings shown in the tables have been designed for the following movements:

Type	Major Axis	Minor Axis
Unidirectional Bearings	$\pm 50\text{mm}$	0mm
Multidirectional Bearings	$\pm 50\text{mm}$	$\pm 25\text{mm}$



Smaller or larger movements can be provided.

4.4 Rotation

Standard bearings have been designed to accommodate a rotation about any horizontal axis of $\pm 0,01$ radians. Larger rotations can be provided by special designs.

4.5 Concrete Stress

The average concrete contact stress on Nova standard bearings approaches 20MPa at the maximum working load. Lower allowable concrete stresses can be accommodated by special designs or by the use of spreader plates.

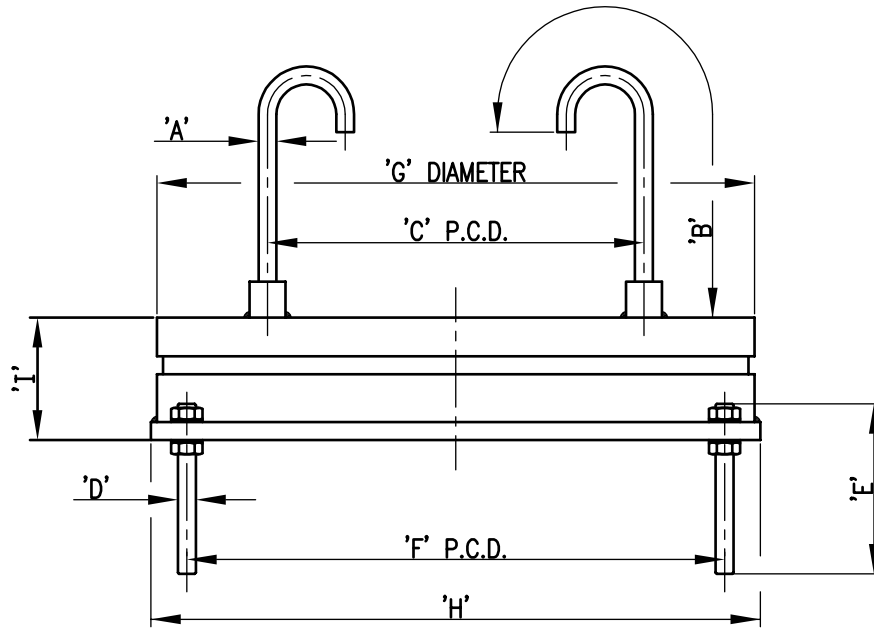
4.6 Holding Down Bolts

Under the action of a horizontal load, the bearing must be adequately clamped to the structure. The holding down bolts, together with the vertical load, provides this force. If the minimum vertical load is less than V-min specified in the tables, the bolt size will have to be increased to ensure that the maximum horizontal load, H-max, can be safely resisted. The standard designs are based on four upper and four lower bolts.



Standard Design Loads and Shipping Mass

BEARING NUMBER	WORKING LOADS (kn)			ULTIMATE LOADS (kn)		MASS (kg)
	Vmax	Hmax	Vmin	Vmax	Hmax	
FNN - 440	440	44	44	733	73	7.6
FNN - 600	600	60	51	1000	100	10.9
FNN - 785	785	78	87	1308	130	14.4
FNN - 1000	1000	100	99	1667	167	21.9
FNN - 1225	1225	122	144	2042	203	27.3
FNN - 1480	1480	148	196	2467	247	33.1
FNN - 1750	1750	175	252	2917	292	41.8
FNN - 2075	2075	207	227	3458	345	57.3
FNN - 2400	2400	240	293	4000	400	67.4
FNN - 2750	2750	275	365	4583	458	83.2
FNN - 3150	3150	315	441	5250	525	102.7
FNN - 3550	3550	355	520	5917	592	118.3
FNN - 4000	4000	400	607	6667	667	143.8
FNN - 4450	4450	445	593	7417	742	167.7
FNN - 4900	4900	490	687	8167	817	189.0
FNN - 5400	5400	540	789	9000	900	223.0
FNN - 5950	5950	595	893	9917	992	239.9
FNN - 6500	6500	650	1005	10833	1083	279.9
FNN - 7100	7100	710	1119	11833	1183	313.2
FNN - 7700	7700	770	1239	12833	1283	348.5
FNN - 8300	8300	830	1365	13833	1383	395.2
FNN - 8950	8950	895	1365	14917	1492	433.0
FNN - 9600	9600	960	1501	16000	1600	499.4
FNN - 10300	10300	1030	1641	17167	1717	538.8
FNN - 11050	11050	1105	1785	18417	1842	572.9
FNN - 11800	11800	1180	1935	19667	1967	653.4
FNN - 12550	12550	1255	2089	20917	2092	720.5
FNN - 13350	13350	1335	2249	22250	2225	805.8
FNN - 14200	14200	1420	2413	23667	2367	860.4
FNN - 15000	15000	1500	2334	25000	2500	937.5
FNN - 15900	15900	1590	2507	26500	2650	1078.2
FNN - 16800	16800	1680	2687	28000	2800	1143.3



Fixed Rubber Pot Bearings without Adaptor Plates

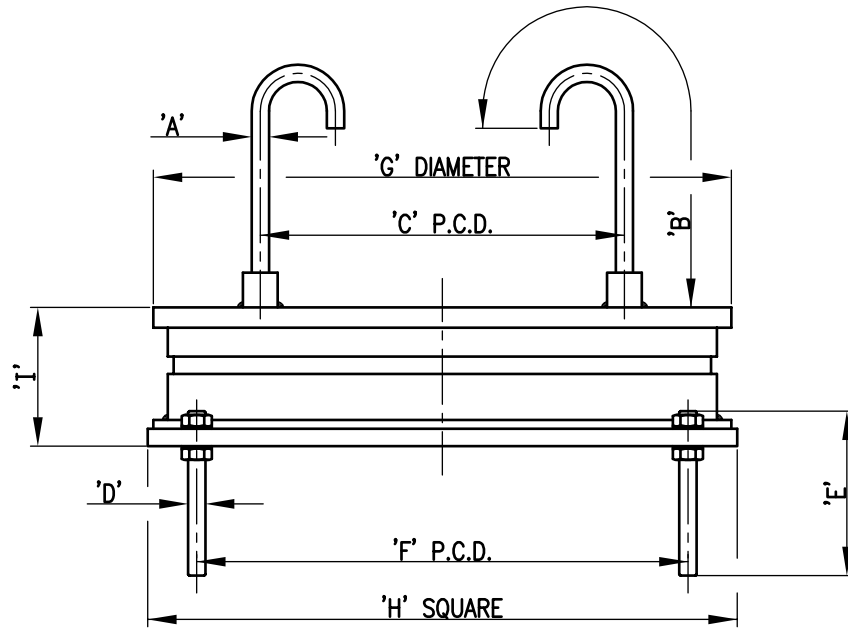
Standard Design Dimensions

BEARING NUMBER	OVERALL DIMENSIONS (mm)			UPPER BOLT DIMENSIONS (mm)			LOWER BOLT DIMENSIONS (mm)		
	G	H	I	A	B	C	D	E	F
FNN - 440	190	186 DIA	37	8	230	150	8	270	221
FNN - 600	217	217 DIA	39	10	285	175	10	330	257
FNN - 785	248	248 DIA	42	10	285	200	10	330	288
FNN - 1000	279	279 DIA	49	12	340	225	12	390	329
FNN - 1225	310	310 DIA	52	12	340	250	12	390	360
FNN - 1480	341	341 DIA	54	12	340	275	12	390	391
FNN - 1750	372	372 DIA	58	12	340	300	12	390	422
FNN - 2075	403	403 DIA	64	16	455	325	16	505	468
FNN - 2400	434	434 DIA	67	16	455	350	16	505	499
FNN - 2750	465	465 DIA	73	16	455	375	16	505	530
FNN - 3150	496	496 DIA	80	16	455	400	16	505	561
FNN - 3550	527	527 DIA	83	16	455	425	16	505	592
FNN - 4000	558	558 DIA	90	16	455	450	16	505	623
FNN - 4450	589	589 DIA	92	20	570	475	20	625	669
FNN - 4900	620	620 DIA	95	20	570	500	20	625	700
FNN - 5400	651	651 DIA	102	20	570	525	20	625	731
FNN - 5950	686	710 SQ	101	20	570	550	20	625	857
FNN - 6500	717	743 SQ	108	20	570	575	20	625	897
FNN - 7100	745	771 SQ	112	20	570	600	20	625	931
FNN - 7700	782	810 SQ	114	20	570	625	20	625	978
FNN - 8300	813	841 SQ	121	20	570	650	20	625	1015
FNN - 8950	841	871 SQ	122	24	685	675	24	740	1051
FNN - 9600	878	908 SQ	129	24	685	700	24	740	1096
FNN - 10300	909	941 SQ	131	24	685	725	24	740	1136
FNN - 11050	937	969 SQ	132	24	685	750	24	740	1170
FNN - 11800	974	1006 SQ	139	24	685	775	24	740	1214
FNN - 12550	1005	1039 SQ	145	24	685	800	24	740	1254
FNN - 13350	1039	1073 SQ	151	24	685	825	24	740	1295
FNN - 14200	1070	1106 SQ	153	24	685	850	24	740	1335
FNN - 15000	1101	1137 SQ	155	30	855	875	30	910	1372
FNN - 15900	1135	1173 SQ	166	30	855	900	30	910	1416
FNN - 16800	1166	1204 SQ	168	30	855	925	30	910	1453



Standard Design Loads and Shipping Mass

BEARING NUMBER	WORKING LOADS (kn)			ULTIMATE LOADS (kn)		MASS (kg)
	Vmax	Hmax	Vmin	Vmax	Hmax	
FAA - 440	440	44	44	733	73	12.3
FAA - 600	600	60	51	1000	100	17.1
FAA - 785	785	78	87	1308	130	22.3
FAA - 1000	1000	100	99	1667	167	31.6
FAA - 1225	1225	122	144	2042	203	39.1
FAA - 1480	1480	148	196	2467	247	47.1
FAA - 1750	1750	175	252	2917	292	66.1
FAA - 2075	2075	207	227	3458	345	82.4
FAA - 2400	2400	240	293	4000	400	96.1
FAA - 2750	2750	275	365	4583	458	113.2
FAA - 3150	3150	315	441	5250	525	143.5
FAA - 3550	3550	355	520	5917	592	172.5
FAA - 4000	4000	400	607	6667	667	194.5
FAA - 4450	4450	445	593	7417	742	223.6
FAA - 4900	4900	490	687	8167	817	273.8
FAA - 5400	5400	540	789	9000	900	313.1
FAA - 5950	5950	595	893	9917	992	362.3
FAA - 6500	6500	650	1005	10833	1083	397.2
FAA - 7100	7100	710	1119	11833	1183	427.9
FAA - 7700	7700	770	1239	12833	1283	492.9
FAA - 8300	8300	830	1365	13833	1383	529.9
FAA - 8950	8950	895	1365	14917	1492	643.6
FAA - 9600	9600	960	1501	16000	1600	721.9
FAA - 10300	10300	1030	1641	17167	1717	776.5
FAA - 11050	11050	1105	1785	18417	1842	818.6
FAA - 11800	11800	1180	1935	19667	1967	917.0
FAA - 12550	12550	1255	2089	20917	2092	973.3
FAA - 13350	13350	1335	2249	22250	2225	1108.1
FAA - 14200	14200	1420	2413	23667	2367	1180.2
FAA - 15000	15000	1500	2334	25000	2500	1320.4
FAA - 15900	15900	1590	2507	26500	2650	1438.5
FAA - 16800	16800	1680	2687	28000	2800	1563.3



Fixed Rubber Pot Bearings with Adaptor Plates

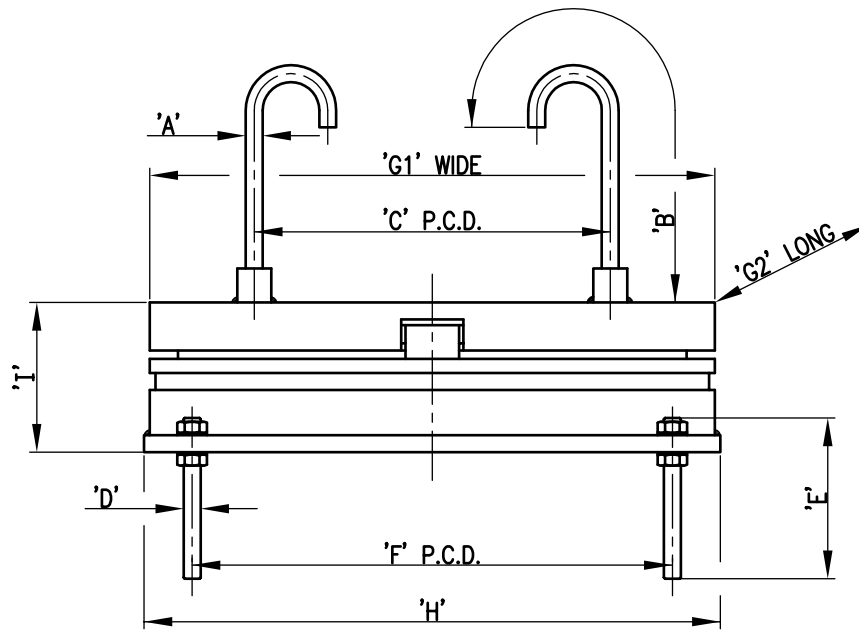
Standard Design Dimensions

BEARING NUMBER	OVERALL DIMENSIONS (mm)			UPPER BOLT DIMENSIONS (mm)			LOWER BOLT DIMENSIONS (mm)		
	G	H	I	A	B	C	D	E	F
FAA - 440	206	207	50	8	230	150	8	275	240
FAA - 600	237	238	52	10	275	175	10	325	277
FAA - 785	268	269	55	10	275	200	10	325	315
FAA - 1000	299	300	62	12	330	225	12	380	352
FAA - 1225	330	331	65	12	330	250	12	380	390
FAA - 1480	361	362	67	12	330	275	12	380	427
FAA - 1750	392	393	78	12	330	300	12	380	464
FAA - 2075	423	424	81	16	440	325	16	495	502
FAA - 2400	454	455	84	16	440	350	16	495	539
FAA - 2750	485	486	88	16	440	375	16	495	577
FAA - 3150	520	521	97	16	440	400	16	495	617
FAA - 3550	551	552	105	16	440	425	16	495	654
FAA - 4000	582	583	107	16	440	450	16	495	692
FAA - 4450	613	614	109	20	570	475	20	630	729
FAA - 4900	652	653	118	20	570	500	20	630	772
FAA - 5400	683	684	124	20	570	525	20	630	810
FAA - 5950	718	743	129	20	570	550	20	630	881
FAA - 6500	749	776	131	20	570	575	20	630	921
FAA - 7100	777	804	132	20	570	600	20	630	954
FAA - 7700	814	843	139	20	570	625	20	630	1002
FAA - 8300	845	874	141	20	570	650	20	630	1039
FAA - 8950	881	912	153	24	685	675	24	750	1081
FAA - 9600	918	949	159	24	685	700	24	750	1125
FAA - 10300	949	982	161	24	685	725	24	750	1165
FAA - 11050	977	1010	161	24	685	750	24	750	1199
FAA - 11800	1014	1047	168	24	685	775	24	750	1244
FAA - 12550	1045	1080	170	24	685	800	24	750	1284
FAA - 13350	1079	1114	180	24	685	825	24	750	1325
FAA - 14200	1110	1147	182	24	685	850	24	750	1364
FAA - 15000	1145	1182	188	30	855	875	30	925	1405
FAA - 15900	1179	1218	193	30	855	900	30	925	1448
FAA - 16800	1210	1249	200	30	855	925	30	925	1486



Standard Design Loads and Shipping Mass

BEARING NUMBER	WORKING LOADS (kn)			ULTIMATE LOADS (kn)		MASS (kg)
	Vmax	Hmax	Vmin	Vmax	Hmax	
UNN - 440	440	44	44	733	73	22.0
UNN - 600	600	60	51	1000	100	27.1
UNN - 785	785	78	87	1308	130	32.5
UNN - 1000	1000	100	99	1667	167	43.7
UNN - 1225	1225	122	144	2042	203	51.3
UNN - 1480	1480	148	196	2467	247	71.3
UNN - 1750	1750	175	252	2917	292	83.8
UNN - 2075	2075	207	227	3458	345	102.4
UNN - 2400	2400	240	293	4000	400	117.7
UNN - 2750	2750	275	365	4583	458	137.3
UNN - 3150	3150	315	441	5250	525	161.3
UNN - 3550	3550	355	520	5917	592	190.6
UNN - 4000	4000	400	607	6667	667	230.1
UNN - 4450	4450	445	593	7417	742	260.9
UNN - 4900	4900	490	687	8167	817	291.5
UNN - 5400	5400	540	789	9000	900	334.9
UNN - 5950	5950	595	893	9917	992	402.8
UNN - 6500	6500	650	1005	10833	1083	437.7
UNN - 7100	7100	710	1119	11833	1183	483.5
UNN - 7700	7700	770	1239	12833	1283	530.3
UNN - 8300	8300	830	1365	13833	1383	617.7
UNN - 8950	8950	895	1365	14917	1492	638.9
UNN - 9600	9600	960	1501	16000	1600	728.8
UNN - 10300	10300	1030	1641	17167	1717	750.0
UNN - 11050	11050	1105	1785	18417	1842	914.1
UNN - 11800	11800	1180	1935	19667	1967	984.1
UNN - 12550	12550	1255	2089	20917	2092	1099.1
UNN - 13350	13350	1335	2249	22250	2225	1169.4
UNN - 14200	14200	1420	2413	23667	2367	1240.4
UNN - 15000	15000	1500	2334	25000	2500	1338.6
UNN - 15900	15900	1590	2507	26500	2650	1473.3
UNN - 16800	16800	1680	2687	28000	2800	1656.7



Unidirectional Rubber Pot Bearings without Adaptor Plates

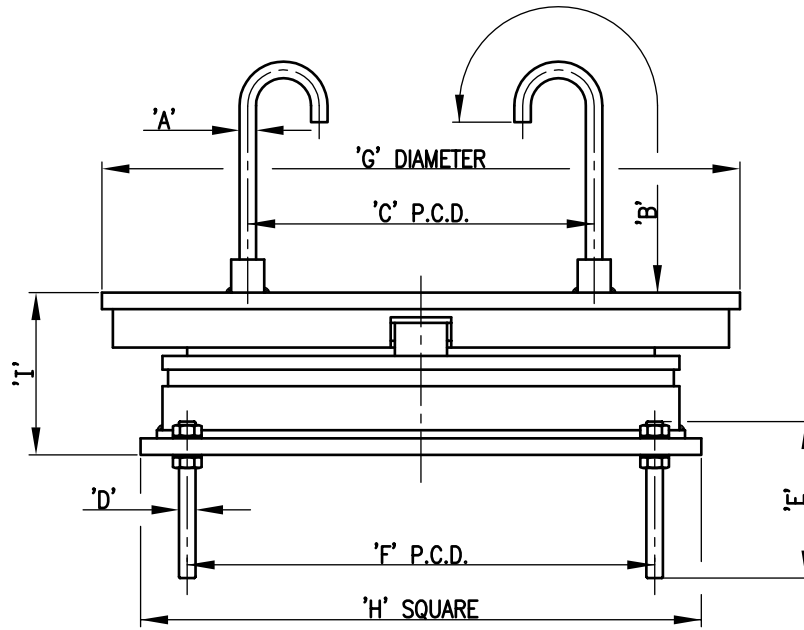
Standard Design Dimensions

BEARING NUMBER	OVERALL DIMENSIONS (mm)				UPPER BOLT DIMENSIONS (mm)			LOWER BOLT DIMENSIONS (mm)		
	G1	G2	H	I	A	B	C	D	E	F
UNN - 440	226	326	186 DIA	64	8	230	150	8	270	221
UNN - 600	246	346	217 DIA	66	10	285	175	10	330	257
UNN - 785	266	366	248 DIA	69	10	285	200	10	330	288
UNN - 1000	296	396	279 DIA	76	12	340	225	12	390	329
UNN - 1225	316	416	310 DIA	79	12	340	250	12	390	360
UNN - 1480	354	454	341 DIA	88	12	340	275	12	390	391
UNN - 1750	374	474	372 DIA	92	12	340	300	12	390	422
UNN - 2075	404	504	403 DIA	95	16	455	325	16	505	468
UNN - 2400	436	524	434 DIA	98	16	455	350	16	505	499
UNN - 2750	466	554	465 DIA	102	16	455	375	16	505	530
UNN - 3150	498	578	496 DIA	107	16	455	400	16	505	561
UNN - 3550	528	598	527 DIA	115	16	455	425	16	505	592
UNN - 4000	560	638	558 DIA	122	16	455	450	16	505	623
UNN - 4450	590	658	589 DIA	124	20	570	475	20	625	669
UNN - 4900	622	688	620 DIA	127	20	570	500	20	625	700
UNN - 5400	652	718	651 DIA	134	20	570	525	20	625	731
UNN - 5950	688	758	710 SQ	142	20	570	550	20	625	857
UNN - 6500	718	778	743 SQ	144	20	570	575	20	625	897
UNN - 7100	746	808	771 SQ	148	20	570	600	20	625	931
UNN - 7700	784	828	810 SQ	150	20	570	625	20	625	978
UNN - 8300	814	858	841 SQ	162	20	570	650	20	625	1015
UNN - 8950	842	878	871 SQ	158	24	685	675	24	740	1051
UNN - 9600	880	908	908 SQ	165	24	685	700	24	740	1096
UNN - 10300	910	938	941 SQ	162	24	685	725	24	740	1136
UNN - 11050	938	988	969 SQ	178	24	685	750	24	740	1170
UNN - 11800	976	1008	1006 SQ	180	24	685	775	24	740	1214
UNN - 12550	1006	1036	1039 SQ	191	24	685	800	24	740	1254
UNN - 13350	1040	1056	1073 SQ	192	24	685	825	24	740	1295
UNN - 14200	1072	1076	1106 SQ	194	24	685	850	24	740	1335
UNN - 15000	1102	1106	1137 SQ	196	30	855	875	30	910	1372
UNN - 15900	1136	1136	1173 SQ	202	30	855	900	30	910	1416
UNN - 16800	1168	1168	1204 SQ	214	30	855	925	30	910	1453



Standard Design Loads and Shipping Mass

BEARING NUMBER	WORKING LOADS (kn)			ULTIMATE LOADS (kn)		MASS (kg)
	Vmax	Hmax	Vmin	Vmax	Hmax	
UAA - 440	440	44	44	733	73	34.1
UAA - 600	600	60	51	1000	100	40.9
UAA - 785	785	78	87	1308	130	48.1
UAA - 1000	1000	100	99	1667	167	61.6
UAA - 1225	1225	122	144	2042	203	71.3
UAA - 1480	1480	148	196	2467	247	87.2
UAA - 1750	1750	175	252	2917	292	117.7
UAA - 2075	2075	207	227	3458	345	140.1
UAA - 2400	2400	240	293	4000	400	157.5
UAA - 2750	2750	275	365	4583	458	194.3
UAA - 3150	3150	315	441	5250	525	232.2
UAA - 3550	3550	355	520	5917	592	286.1
UAA - 4000	4000	400	607	6667	667	313.9
UAA - 4450	4450	445	593	7417	742	349.0
UAA - 4900	4900	490	687	8167	817	411.3
UAA - 5400	5400	540	789	9000	900	460.4
UAA - 5950	5950	595	893	9917	992	520.7
UAA - 6500	6500	650	1005	10833	1083	561.5
UAA - 7100	7100	710	1119	11833	1183	605.1
UAA - 7700	7700	770	1239	12833	1283	656.2
UAA - 8300	8300	830	1365	13833	1383	718.1
UAA - 8950	8950	895	1365	14917	1492	876.5
UAA - 9600	9600	960	1501	16000	1600	936.6
UAA - 10300	10300	1030	1641	17167	1717	1013.5
UAA - 11050	11050	1105	1785	18417	1842	1137.2
UAA - 11800	11800	1180	1935	19667	1967	1213.1
UAA - 12550	12550	1255	2089	20917	2092	1317.7
UAA - 13350	13350	1335	2249	22250	2225	1431.8
UAA - 14200	14200	1420	2413	23667	2367	1510.7
UAA - 15000	15000	1500	2334	25000	2500	1668.6
UAA - 15900	15900	1590	2507	26500	2650	1804.8
UAA - 16800	16800	1680	2687	28000	2800	1949.8



Unidirectional Rubber Pot Bearings with Adaptor Plates

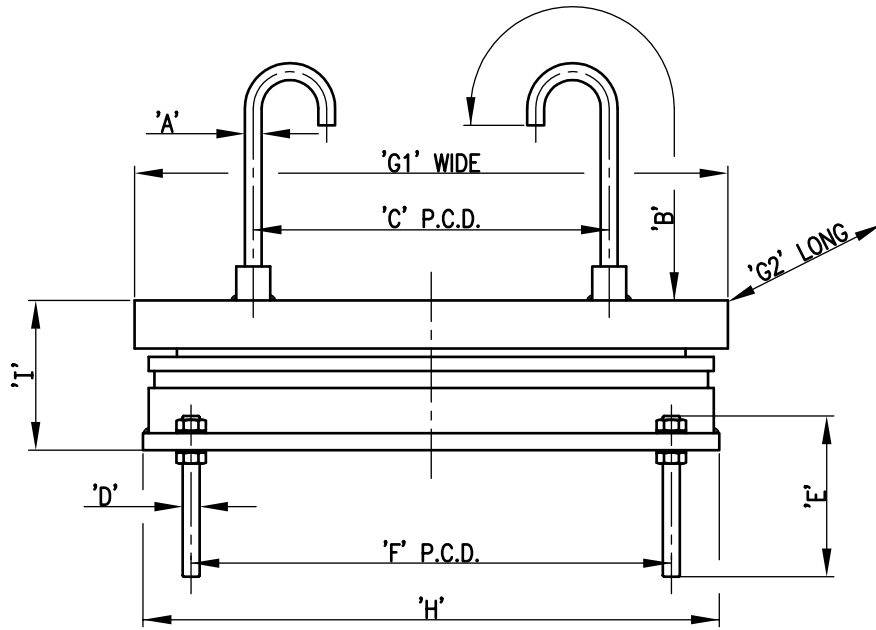
Standard Design Dimensions

BEARING NUMBER	OVERALL DIMENSIONS (mm)			UPPER BOLT DIMENSIONS (mm)			LOWER BOLT DIMENSIONS (mm)		
	G	H	I	A	B	C	D	E	F
UAA - 440	340	207	82	8	230	150	8	275	240
UAA - 600	360	238	84	10	285	175	10	330	277
UAA - 785	380	269	87	10	285	200	10	330	315
UAA - 1000	410	300	94	12	340	225	12	390	352
UAA - 1225	430	331	97	12	340	250	12	390	390
UAA - 1480	464	362	101	12	340	275	12	390	427
UAA - 1750	496	393	115	12	340	300	12	390	464
UAA - 2075	526	424	118	16	440	325	16	495	502
UAA - 2400	546	455	121	16	440	350	16	495	539
UAA - 2750	586	486	130	16	440	375	16	495	577
UAA - 3150	612	521	139	16	440	400	16	495	617
UAA - 3550	652	552	152	16	440	425	16	495	654
UAA - 4000	672	583	154	16	440	450	16	495	692
UAA - 4450	692	614	156	20	555	475	20	615	729
UAA - 4900	728	653	165	20	555	500	20	615	772
UAA - 5400	756	684	171	20	555	525	20	615	810
UAA - 5950	786	743	175	20	555	550	20	615	881
UAA - 6500	806	776	177	20	555	575	20	615	921
UAA - 7100	836	804	178	20	555	600	20	615	954
UAA - 7700	856	843	180	20	555	625	20	615	1002
UAA - 8300	876	874	187	20	555	650	20	615	1039
UAA - 8950	922	912	204	24	665	675	24	730	1081
UAA - 9600	942	949	205	24	665	700	24	730	1125
UAA - 10300	982	982	207	24	665	725	24	730	1165
UAA - 11050	1020	1010	217	24	665	750	24	730	1199
UAA - 11800	1040	1047	219	24	665	775	24	730	1244
UAA - 12550	1070	1080	226	24	665	800	24	730	1284
UAA - 13350	1094	1114	231	24	665	825	24	730	1325
UAA - 14200	1114	1147	233	24	665	850	24	730	1364
UAA - 15000	1148	1182	239	30	830	875	30	900	1405
UAA - 15900	1179	1218	244	30	830	900	30	900	1448
UAA - 16800	1210	1249	251	30	830	925	30	900	1486



Standard Design Loads and Shipping Mass

BEARING NUMBER	WORKING LOADS (kn)			ULTIMATE LOADS (kn)	MASS (kg)
	Vmax	Hmax	Vmin	Vmax	
MNN - 440	440	0	0	733	15.3
MNN - 600	600	0	0	1000	19.7
MNN - 785	785	0	0	1308	30.5
MNN - 1000	1000	0	0	1667	38.2
MNN - 1225	1225	0	0	2042	48.4
MNN - 1480	1480	0	0	2467	65.0
MNN - 1750	1750	0	6	2917	77.2
MNN - 2075	2075	0	25	3458	79.7
MNN - 2400	2400	0	45	4000	86.1
MNN - 2750	2750	0	66	4583	115.6
MNN - 3150	3150	0	89	5250	128.6
MNN - 3550	3550	0	25	5917	151.5
MNN - 4000	4000	0	51	6667	170.2
MNN - 4450	4450	0	78	7417	203.9
MNN - 4900	4900	0	107	8167	227.5
MNN - 5400	5400	0	137	9000	271.3
MNN - 5950	5950	0	63	9917	287.8
MNN - 6500	6500	0	96	10833	334.9
MNN - 7100	7100	0	132	11833	393.8
MNN - 7700	7700	0	167	12833	452.3
MNN - 8300	8300	0	205	13833	488.1
MNN - 8950	8950	0	244	14917	534.3
MNN - 9600	9600	0	284	16000	576.7
MNN - 10300	10300	0	326	17167	671.2
MNN - 11050	11050	0	370	18417	712.7
MNN - 11800	11800	0	415	19667	817.2
MNN - 12550	12550	0	461	20917	820.7
MNN - 13350	13350	0	509	22250	910.6
MNN - 14200	14200	0	558	23667	971.4
MNN - 15000	15000	0	479	25000	1088.4
MNN - 15900	15900	0	532	26500	1167.5
MNN - 16800	16800	0	585	28000	1287.7



Multidirectional Rubber Pot Bearings without Adaptor Plates

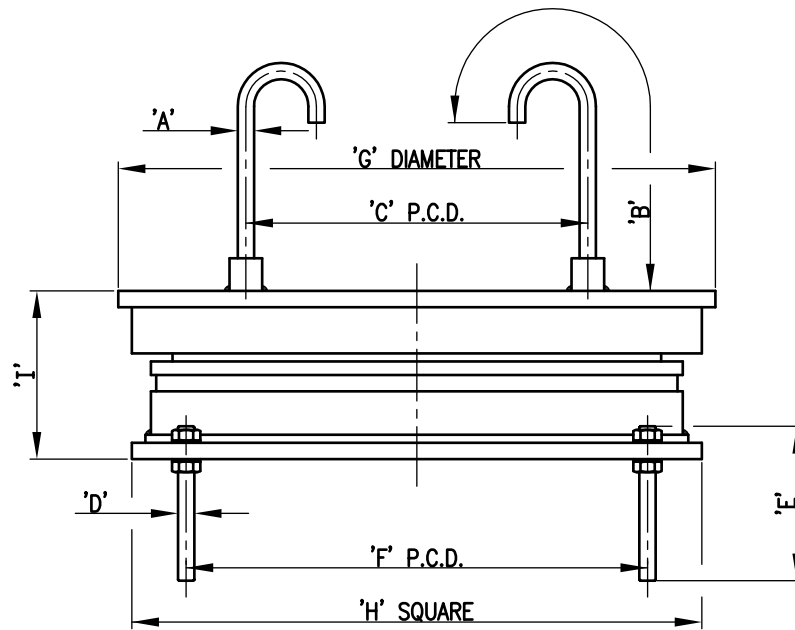
Standard Design Dimensions

BEARING NUMBER	OVERALL DIMENSIONS (mm)				UPPER BOLT DIMENSIONS (mm)			LOWER BOLT DIMENSIONS (mm)		
	G1	G2	H	I	A	B	C	D	E	F
MNN - 440	244	294	186 DIA	48	8	230	150	8	270	221
MNN - 600	275	325	217 DIA	51	8	230	175	8	270	252
MNN - 785	306	356	248 DIA	60	10	285	200	10	330	288
MNN - 1000	337	387	279 DIA	64	10	285	225	10	330	319
MNN - 1225	368	418	310 DIA	68	12	340	250	12	390	360
MNN - 1480	399	449	341 DIA	76	12	340	275	12	390	391
MNN - 1750	430	480	372 DIA	79	12	340	300	12	390	422
MNN - 2075	423	473	365 DIA	83	12	340	325	12	390	415
MNN - 2400	450	500	392 DIA	83	12	340	350	12	390	442
MNN - 2750	479	529	421 DIA	94	12	340	375	12	390	471
MNN - 3150	506	556	448 DIA	96	12	340	400	12	390	498
MNN - 3550	535	585	477 DIA	100	16	455	425	16	505	542
MNN - 4000	562	612	504 DIA	103	16	455	450	16	505	569
MNN - 4450	591	641	533 DIA	110	16	455	475	16	505	598
MNN - 4900	618	668	560 DIA	114	16	455	500	16	505	625
MNN - 5400	647	697	589 DIA	122	16	455	525	16	505	654
MNN - 5950	674	724	616 DIA	121	20	570	550	20	625	696
MNN - 6500	703	753	645 DIA	128	20	570	575	20	625	725
MNN - 7100	766	816	724 SQ	126	20	570	600	20	625	874
MNN - 7700	795	845	753 SQ	133	20	570	625	20	625	909
MNN - 8300	824	874	784 SQ	135	20	570	650	20	625	946
MNN - 8950	855	905	815 SQ	138	20	570	675	20	625	984
MNN - 9600	884	934	844 SQ	141	20	570	700	20	625	1019
MNN - 10300	913	963	873 SQ	152	20	570	725	20	625	1054
MNN - 11050	940	990	902 SQ	153	20	570	750	20	625	1089
MNN - 11800	973	1023	935 SQ	162	20	570	775	20	625	1129
MNN - 12550	1002	1052	964 SQ	158	20	570	800	20	625	1164
MNN - 13350	1029	1079	993 SQ	164	20	570	825	20	625	1199
MNN - 14200	1058	1108	1022 SQ	167	20	570	850	20	625	1234
MNN - 15000	1087	1137	1051 SQ	174	24	685	875	24	735	1269
MNN - 15900	1118	1168	1082 SQ	177	24	685	900	24	735	1306
MNN - 16800	1147	1197	1113 SQ	184	24	685	925	24	735	1343



Standard Design Loads and Shipping Mass

BEARING NUMBER	WORKING LOADS (kn)			ULTIMATE LOADS (kn)	MASS (kg)
	Vmax	Hmax	Vmin	Vmax	
MAA - 440	440	0	5	733	21.0
MAA - 600	600	0	0	1000	27.2
MAA - 785	785	0	13	1308	34.3
MAA - 1000	1000	0	25	1667	42.7
MAA - 1225	1225	0	30	2042	52.7
MAA - 1480	1480	0	40	2467	69.6
MAA - 1750	1750	0	57	2917	92.9
MAA - 2075	2075	0	75	3458	87.0
MAA - 2400	2400	0	95	4000	100.2
MAA - 2750	2750	0	116	4583	124.1
MAA - 3150	3150	0	139	5250	144.0
MAA - 3550	3550	0	120	5917	177.7
MAA - 4000	4000	0	145	6667	198.9
MAA - 4450	4450	0	173	7417	225.5
MAA - 4900	4900	0	201	8167	267.7
MAA - 5400	5400	0	231	9000	300.2
MAA - 5950	5950	0	210	9917	326.3
MAA - 6500	6500	0	243	10833	373.5
MAA - 7100	7100	0	278	11833	394.5
MAA - 7700	7700	0	314	12833	494.4
MAA - 8300	8300	0	351	13833	510.2
MAA - 8950	8950	0	391	14917	583.3
MAA - 9600	9600	0	431	16000	624.6
MAA - 10300	10300	0	473	17167	697.5
MAA - 11050	11050	0	517	18417	734.6
MAA - 11800	11800	0	562	19667	801.4
MAA - 12550	12550	0	543	20917	964.2
MAA - 13350	13350	0	591	22250	1054.1
MAA - 14200	14200	0	640	23667	1121.9
MAA - 15000	15000	0	691	25000	1187.7
MAA - 15900	15900	0	743	26500	1237.8
MAA - 16800	16800	0	797	28000	1352.4



Multidirectional Rubber Pot Bearings with Adaptor Plates

Standard Design Dimensions

BEARING NUMBER	OVERALL DIMENSIONS (mm)			UPPER BOLT DIMENSIONS (mm)			LOWER BOLT DIMENSIONS (mm)		
	G	H	I	A	B	C	D	E	F
MAA - 440	309	207	61	8	230	150	8	275	240
MAA - 600	340	238	64	8	230	175	8	275	277
MAA - 785	371	269	68	10	285	200	8	275	315
MAA - 1000	402	300	72	10	285	225	8	275	352
MAA - 1225	433	331	76	12	340	250	8	275	390
MAA - 1480	464	362	84	12	340	275	10	330	427
MAA - 1750	503	393	94	12	340	300	10	330	464
MAA - 2075	496	386	93	12	340	325	10	330	456
MAA - 2400	523	413	96	12	340	350	12	395	488
MAA - 2750	552	442	104	12	340	375	12	395	523
MAA - 3150	585	473	108	12	340	400	12	395	559
MAA - 3550	614	502	117	16	455	425	16	515	594
MAA - 4000	641	529	120	16	455	450	16	515	627
MAA - 4450	670	558	124	16	455	475	16	515	662
MAA - 4900	703	593	132	16	455	500	16	515	700
MAA - 5400	732	622	136	16	455	525	16	515	735
MAA - 5950	759	649	138	20	570	550	16	515	767
MAA - 6500	788	678	145	20	570	575	16	515	802
MAA - 7100	839	745	134	20	570	600	16	515	889
MAA - 7700	874	778	151	20	570	625	16	515	927
MAA - 8300	903	809	148	20	570	650	16	515	964
MAA - 8950	934	840	156	20	570	675	16	515	1002
MAA - 9600	963	869	158	20	570	700	16	515	1037
MAA - 10300	992	898	165	20	570	725	16	515	1072
MAA - 11050	1019	927	165	20	570	750	16	515	1107
MAA - 11800	1052	960	169	20	570	775	16	515	1147
MAA - 12550	1093	1005	183	24	685	800	20	635	1193
MAA - 13350	1120	1034	189	24	685	825	20	635	1228
MAA - 14200	1149	1063	192	24	685	850	20	635	1263
MAA - 15000	1178	1092	194	24	685	875	20	635	1298
MAA - 15900	1203	1115	195	24	685	900	20	635	1330
MAA - 16800	1232	1146	202	24	685	925	20	635	1367

When selecting a bearing from the tables, please take note of the following:

6.1 Vertical Load

Once the maximum vertical load is known, the smallest bearing capable of supporting this load should be selected for three reasons:

- 1) Economy, since larger bearings are more expensive.
- 2) Minimum coefficient of friction, since this increases with a reduction in 'Teflon' disc pressure.
- 3) Minimum rotational stiffness, since this is a function of rubber pad diameter raised to the power of four.

6.2 Horizontal Load

NOVA standard fixed and unidirectional bearings are designed for a maximum horizontal load equal to 10% of the maximum vertical load. If extra horizontal capacity is required, the designer should inform NOVA rather than choose a larger bearing. See section 2.3 on special bearings.

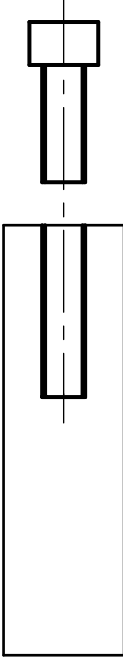
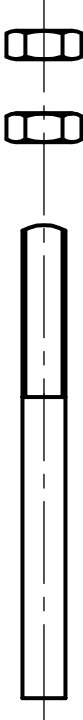
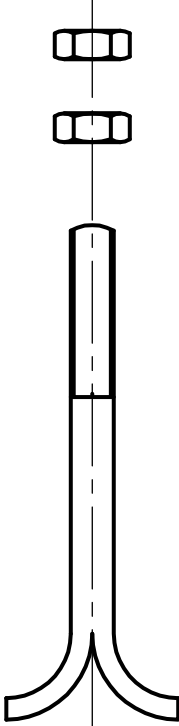
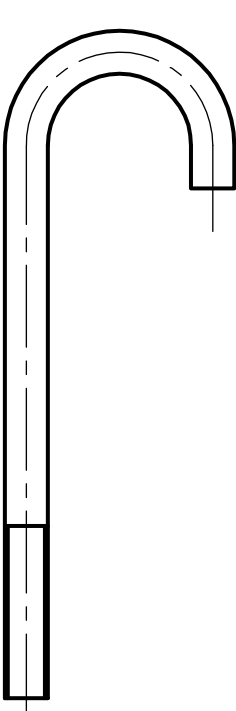
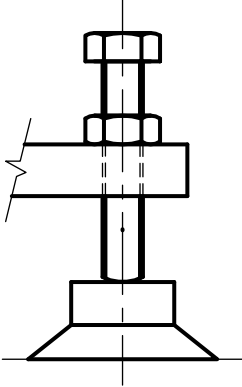
6.3 Holding Down Bolts

Five types of holding down bolts are available. These are shown below. All standard bearings use Type 4 upper and Type 2 lower bolts.

6.4 Specifying the Bearing

When selecting a standard bearing, the following information should be specified:

- 1) Bearing number (See section 4.1).
- 2) A bearing label or reference number from which the contractor can identify its position on the structure.
- 3) Preset and skew setting requirements.

				
TYPE 1 SQUARE TOOTH BOLT	TYPE 2 ROUND BAR BOLT	TYPE 3 FISH TAIL BOLT	TYPE 4 HOOK BOLT	TYPE 5 LEVELLING SCREW

Holding Down Bolt Types

The following points should be noted during installation of the bearings:

7.1 Handling

NOVA Bridge Bearings are precision machinery and require careful handling. Always hoist and lower using the upper hook bolts or lifting lugs and adequate slings. Do not drop or jar. Do not damage the foam seals.

7.2 Storage

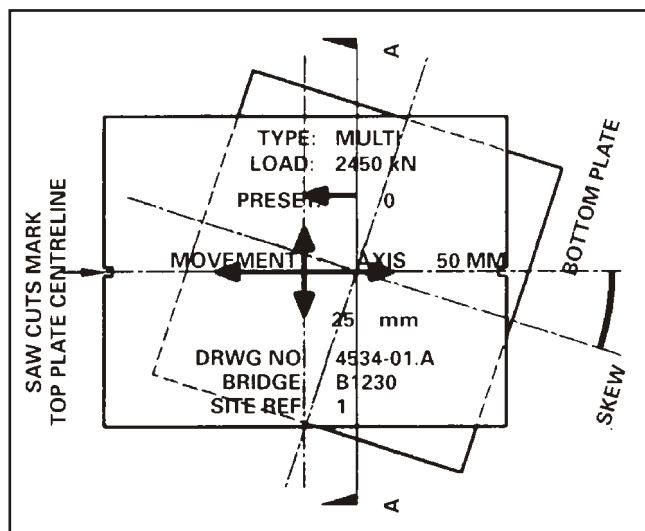
Store under cover in a clean dry place.

7.3 Install Level

The bearings must be installed level, tolerance 1/2000 max. Check level on both axes with ordinary carpenters level by reversal method. Leveling plates, if provided, should be bedded down level on dabs of epoxy about 24 hours before installing the bearing. If leveling screws are not provided, the bearings should be placed and adjusted on wedges.

7.4 Install in Correct Direction

The bearing must be installed so that the double-headed arrow is parallel to the correct movement axis. Orientation is of special importance when there is preset on the bearing. Sawcuts on the top plate mark the major axis of the bearing and are used to aid alignment.



7.5 Preset

The amount of preset (if any) is marked on the bearing. The small arrow indicates the direction in which the top plate has been set relative to the bottom plate. THE AMOUNT AND DIRECTION OF THE PRESET MUST BE CHECKED ON SITE BY THE SUPERVISING ENGINEER BEFORE FINALLY GROUTING DOWN THE BEARING. NOTE THAT 180° ERRORS ARE VERY SERIOUS AND EASY TO MAKE. ALWAYS CHECK THE ORIENTATION AGAIN!!!!

7.6 Layout Diagram

As an aid to orientation and placement of bearings on site, NOVA provides a "Layout Diagram" as part of the set of bearing drawings for each contract. In addition, NOVA technical staff are able to provide assistance if requested to do so.

7.7 Grouting

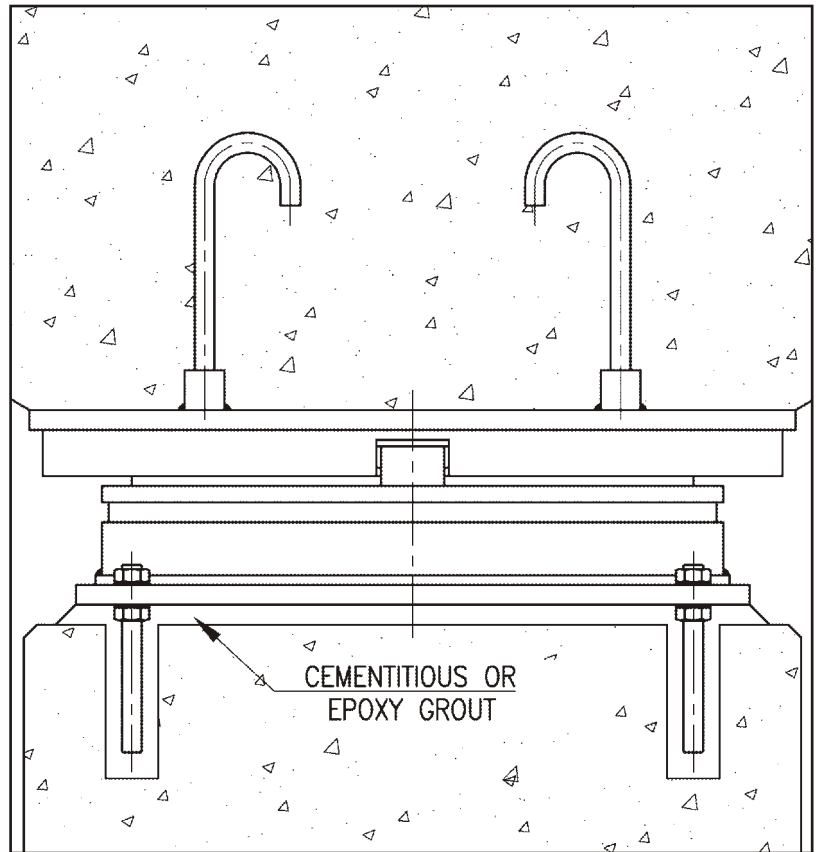
It is important to ensure that the grout is placed so that no voids are left between the bearing and the concrete. If epoxy grout is used the manufacturers instructions must be sought and rigidly adhered to. The bearing plates in contact with grout must be cleaned with trichloroethylene or epoxy surface preparation solvent, unless specified otherwise on the bearing drawing.

7.8 Failing Straps (Green straps)

Bearings required for installation in inaccessible positions are provided with failing straps, welded to the outer bearing plates, which are designed to fail when the bearing is mobilised. Such failing straps need not be removed.

7.9 Transport Clamps (Red Straps)

Bearings which are likely to undergo severe shocks during transport are provided with transport clamps. These are extra straps welded or bolted to the bearing. All red-painted straps MUST be removed after the bearing has been set provided there is no possibility of the bearing becoming jarred or upset. It is best to cut welded straps by means of a bolt-cutter. If an oxyacetylene torch is used to burn off the clamps, it must not be allowed to cause damage to the foam seals.



Typical installation of a NOVA pot bearing with Adaptor Plates

7.10 Water

The positions at which bearings are installed must be kept properly drained. Bearings are not designed to withstand total submersion.

7.11 Cleaning Up

After installation any epoxy or dirt on exposed stainless steel sliding surfaces must be removed. The external surfaces of the bearing should be wiped clean. Take care not to damage exposed sliding surfaces; removal of epoxy should be done with a hardwood spatula.

In addition to the standard bearings shown in the tables, the following can be provided:

8.1 Special Rubber Pot Bearings

If the specifications used for NOVA standard bearings are not suitable for a particular application, special bearings can be supplied. See Section 2.3



8.2 Bearings with Changing Functions

Bearings can be supplied, which after installation, can be changed from fixed to unidirectional, fixed to multidirectional, multidirectional to unidirectional etc, etc. With the NOVA system this is a simple operation.

8.3 Combination Pot Bearings

These have been developed specially for use on incrementally launched bridges. The permanent bearing is provided with a polished top surface over which the bridge



deck slides during construction. Once the bridge is in its final position, the temporary sliding surface is removed and the bearing is permanently secured to the deck. With the NOVA system this is a simple sequence of operations.

NOVA Combination Bearings therefore avoid the initial construction of a concrete temporary bearing, its subsequent demolition and removal, and the difficult task of installing the permanent bearing in a restricted space, usually at great heights, once the bridge deck has been pushed into its final position.



8.4 Line Rocker, S.B. Structural and Mini Sliding Bearings

NOVA
NOVA ENGINEERING WORKS (PTY) LTD

PO Box 4000
Cleveland 2003
Cape Town 7701
Tel: (021) 423-2000
Fax: (021) 423-4380
Rep. No. 07094726/97



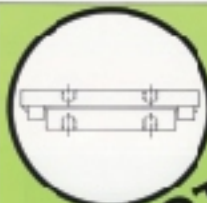
NOVA Line Rocker Bearings —
Developed Specifically for Pre-Cast Span Bridges
Available in Two Variations, **NOVA-J** for Lower Loads and
NOVA-J for Larger Loads



- Generous rocking capability solves problems of hogged beams.
- Zero transverse rotation provides stable seating for slender beams — reduces shoring requirements.
- P.T.F.E. on polished stainless steel achieves low sliding friction.
- Right-hand path reduces vertical deformation under all loading conditions.
- Designed and manufactured in South Africa.

NOVA
NOVA ENGINEERING WORKS (PTY) LTD

PO Box 4000
Cleveland 2003
Cape Town 7701
Tel: (021) 423-2000
Fax: (021) 423-4380
Rep. No. 07094726/97



STRUCTURAL BEARINGS

TYPES
• MSB
• USB

NOVA
NOVA ENGINEERING WORKS (PTY) LTD

PO Box 4000
Cleveland 2003
Cape Town 7701
Tel: (021) 423-2000
Fax: (021) 423-4380
Rep. No. 07094726/97



NOVA-J Mini Sliding Bearing

- Developed specifically for all types of girders.
- Conveyor girders
- Out girders
- Pipe girders
- Compact, lightweight and easy to install.
- P.T.F.E. on polished stainless steel achieves low sliding friction.
- Standard vertical load capacity — 120 kN; standard movement — 100 mm. Specials are available.
- Designed and manufactured in South Africa.

8.5 Nova Tie-Anchor

NOVA
NOVA ENGINEERING WORKS (PTY) LTD

PO Box 4000
Cleveland 2003
Cape Town 7701
Tel: (021) 423-2000
Fax: (021) 423-4380
Rep. No. 07094726/97



WHY BE CAUGHT IN THE MIDDLE?
MOOOOO!

THEY'LL NEVER GO AHEAD TO HOLD A NEW BRIDGE DOWN

ONLY DOWNSTAIRS A ROAD OF BULLS

THEY CAN'T HAVE HEARD OF NOVA — IT'S ANCHORS!

NOVA TIE-ANCHOR

TO ELIMINATE UPLIFT IN BRIDGE DECKS
The Nova Tie-Anchor has been used successfully to control uplift caused by:

- the tendency of a bridge deck to float when it is overtopped during flooding.
- live loads acting on bridge decks of specific geometry, for example docks with short jack spaces.

FEATURES OF THE TIE-ANCHOR ARE:

- It is supplied completely assembled in one piece, ready for installation.
- It has excellent corrosion protection.
- It can be preset if required.
- It can be released to allow the bridge deck to be jacked up if required.
- The tension member can be tightened to allow for deck settlement.



8.6 Elastomeric Bearings

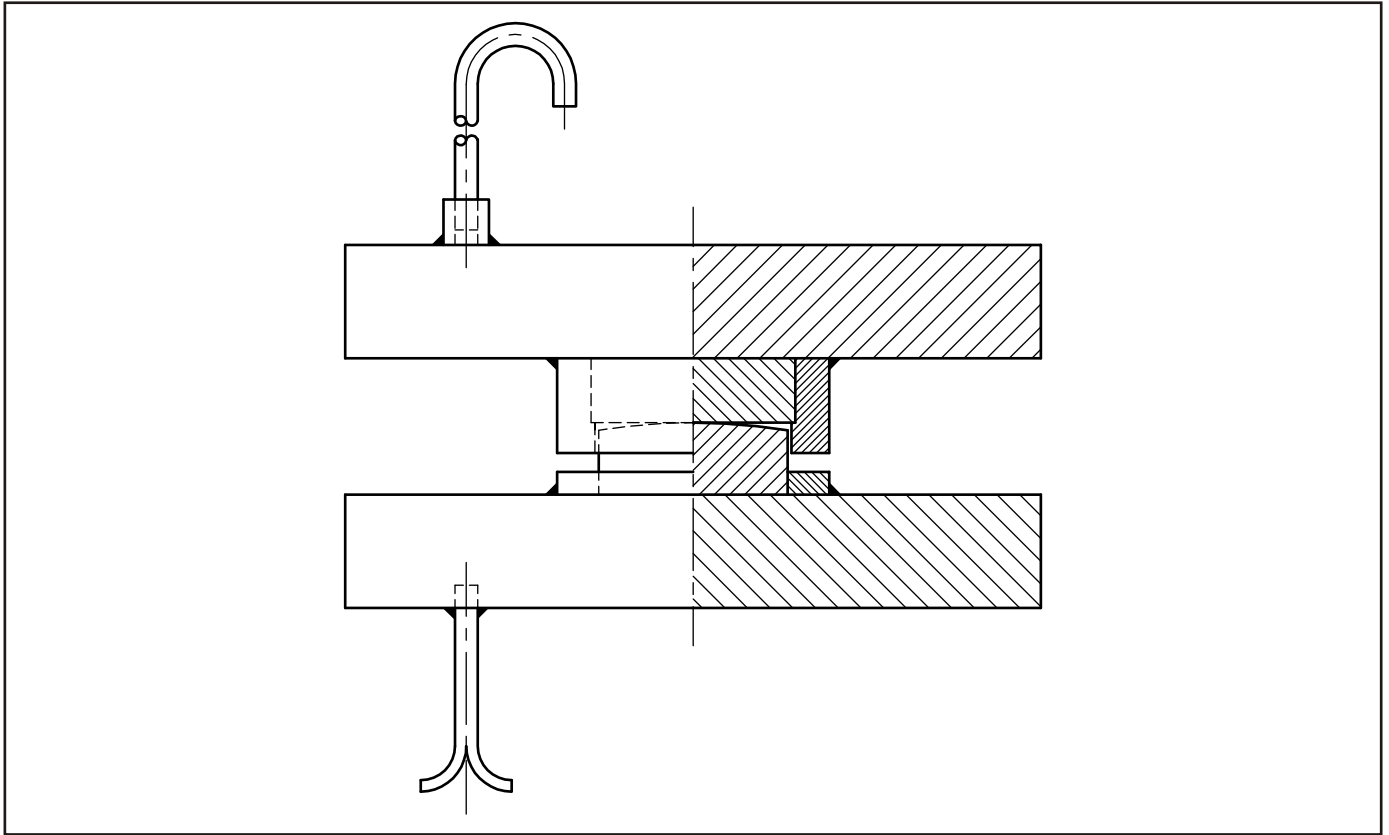
NOVA
Elastomeric Bridge Bearings



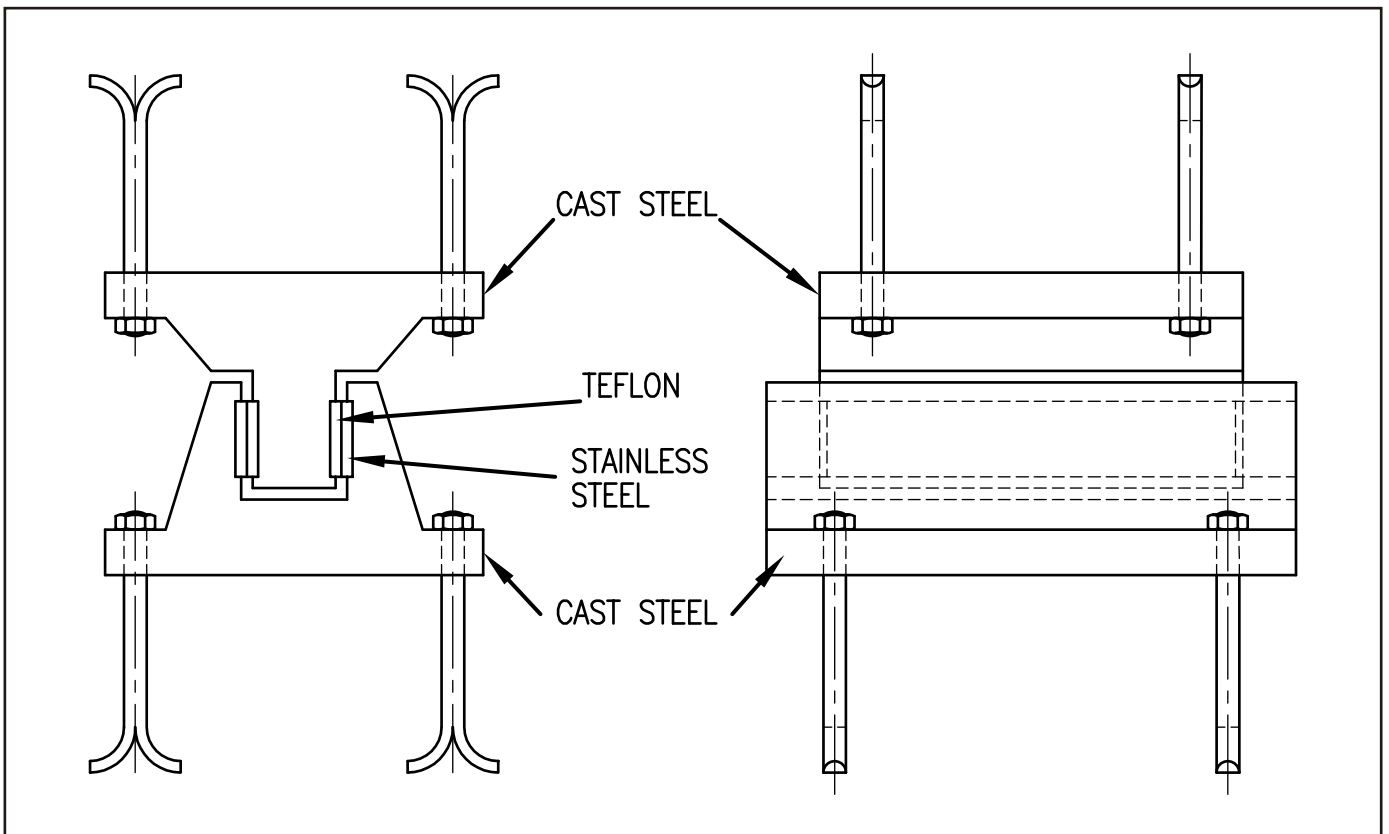
NOVA
NOVA ENGINEERING WORKS (PTY) LTD

(Literature on the above is available)

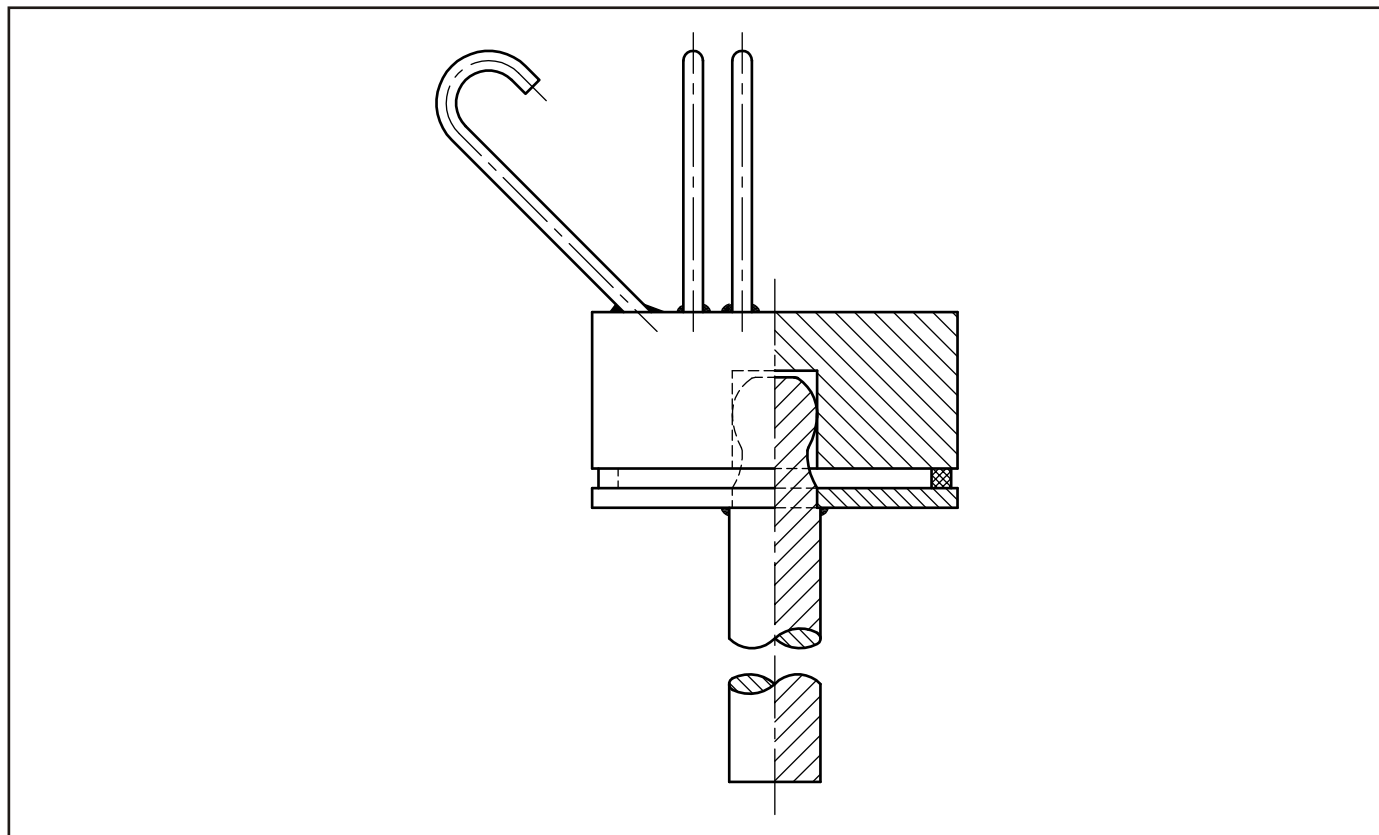
8.7 Point Tilt Bearings



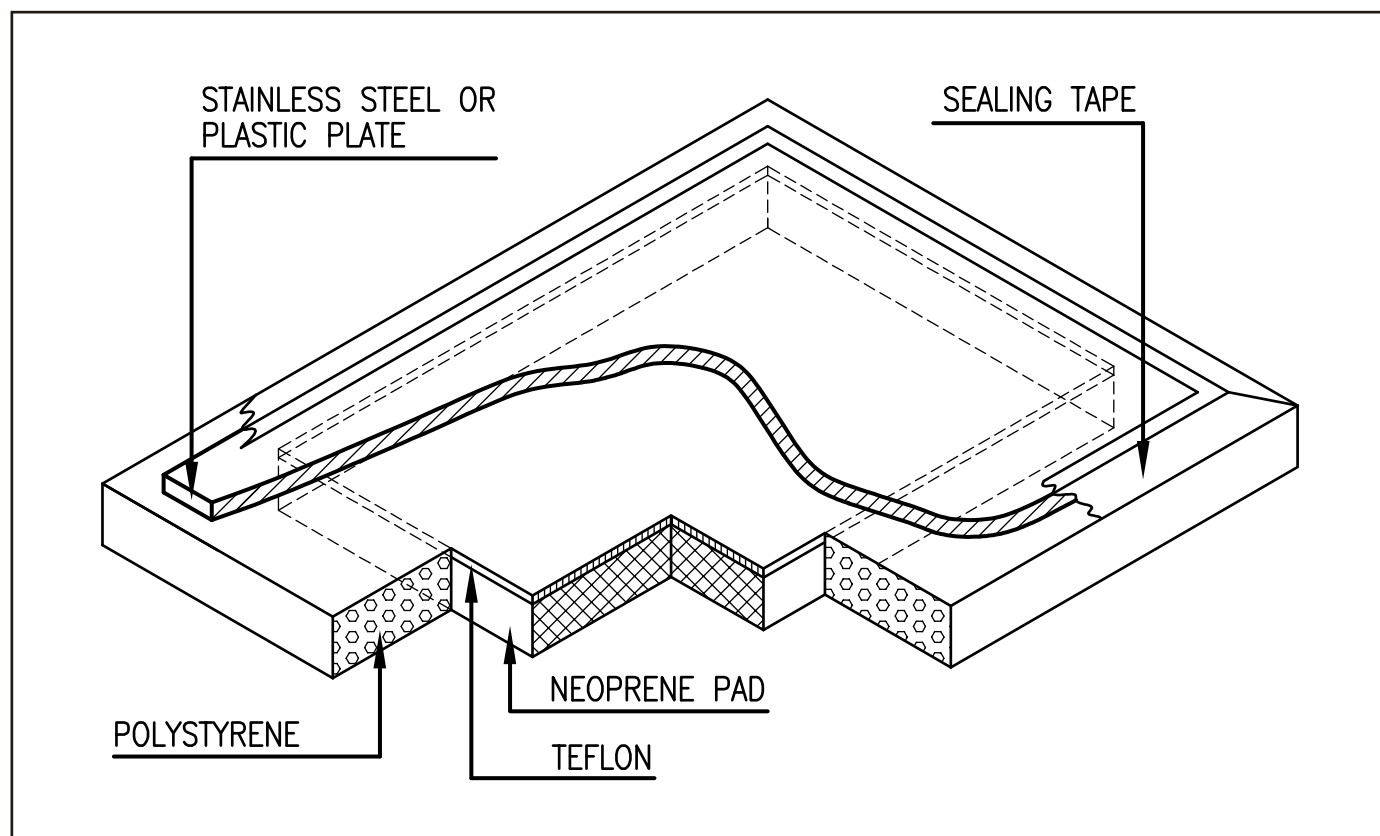
8.8 Guide Bearings



8.9 Pin Bearings



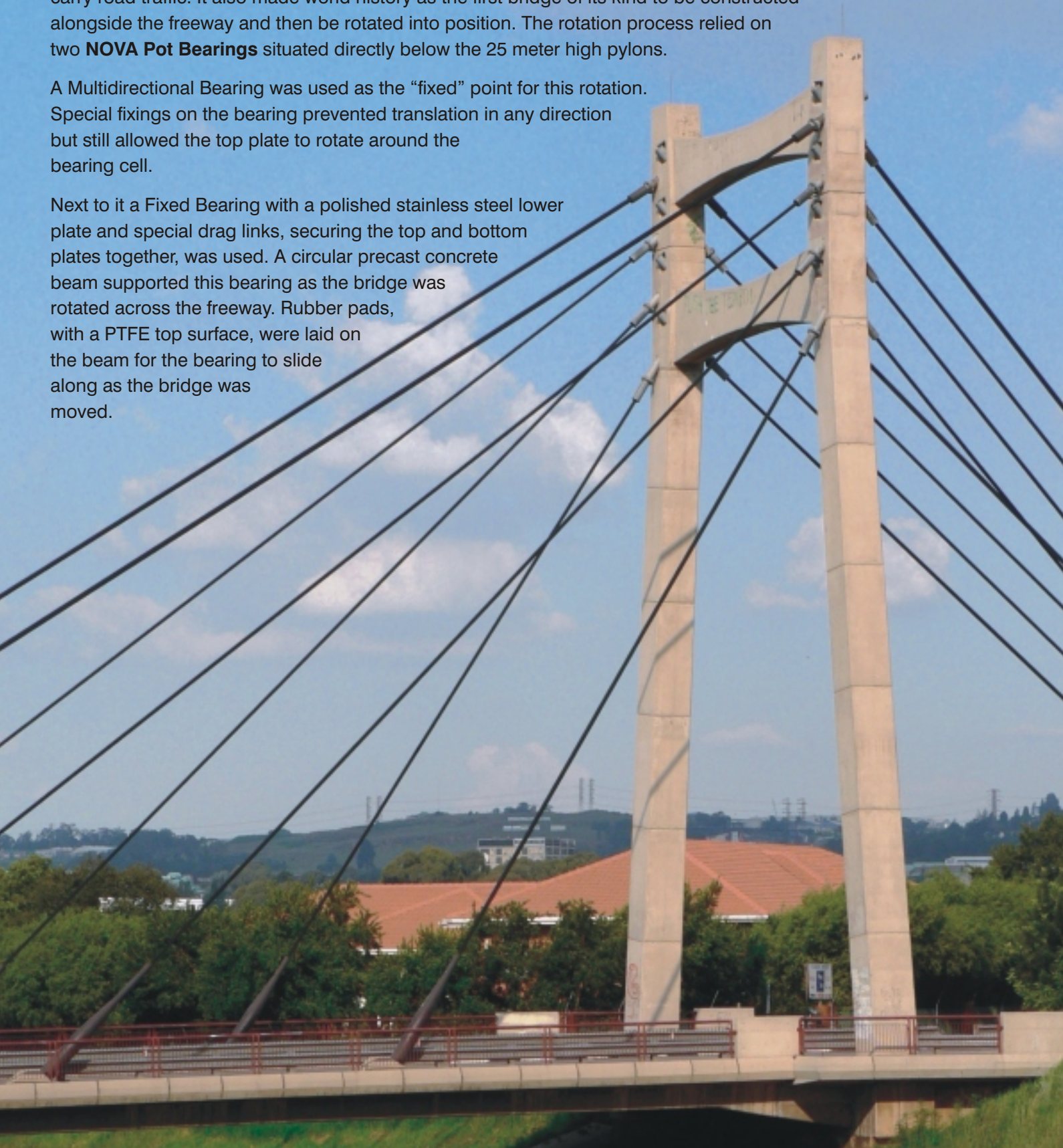
8.10 Delta Neoprene Bearing Pads



Harper Road Bridge in Bedfordview made history as the first cable stayed bridge in South Africa to carry road traffic. It also made world history as the first bridge of its kind to be constructed alongside the freeway and then be rotated into position. The rotation process relied on two **NOVA Pot Bearings** situated directly below the 25 meter high pylons.

A Multidirectional Bearing was used as the “fixed” point for this rotation. Special fixings on the bearing prevented translation in any direction but still allowed the top plate to rotate around the bearing cell.

Next to it a Fixed Bearing with a polished stainless steel lower plate and special drag links, securing the top and bottom plates together, was used. A circular precast concrete beam supported this bearing as the bridge was rotated across the freeway. Rubber pads, with a PTFE top surface, were laid on the beam for the bearing to slide along as the bridge was moved.





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