GRANOR
RUBBER & ENGINEERING
BUILT ON MOVEMENT

GRANOR®
ELASTOMERIC LAMINATED BEARINGS

THE GRANOR® ELASTOMERIC LAMINATED BEARING RANGE

FREEDOM INSTEAD OF RESTRAINT

Elastomeric Laminated Bearings (“ELB’s”) are made from high purity elastomers which encapsulate layered internal steel reinforcing plates. Designed for use in bridge and building construction – under pre-cast concrete beams, steel beam supports and other support points. They are an effective means of giving long expansive structures freedom to move independent of the supports. Structural movement is generated by many different effects including thermal expansion/contraction, long term concrete creep and shrinkage, post tensioning effects, braking loads, wind loads, foundation settlement, and others. Without freed up support conditions these structures would build up considerable internal stresses leading to major safety issues such as structural cracking and concrete cancer.

Manufactured from high quality natural rubber, elastomeric bearings have been shown via numerous case studies to be an extremely reliable maintenance free bearing option. One such example is work undertaken by Stevenson in 1985 involving testing of old “India Rubber” (Natural Rubber) bearing pads removed from the old Flinders Street Rail Viaduct in Melbourne. The viaduct was originally completed in 1889 so these pads had been in service for close to 100 years. The tests indicated that the parent material close to the surface of the bearing pads and representing the substantive volume of the bearing pads provided physicals and attributes very close to those tested and recorded at time of installation some 100 years prior. Over the nearly 100 years oxidation had occurred only within 5mm of the pads exposed rubber surfaces. Keeping in mind that technology in compounding of rubber has greatly improved since these pads were installed it can be safely stated that current day elastomeric bearings can be given a predictable design life expectancy of at least 100 years.

SYSTEM COMPONENTS

Design, manufacture and subsequent National Association of Testing Authorities (ILAC) MRA certified testing of Granor Elastomeric Bearings is to recognised Australian and international standards.. Granor supplies bearings in accordance with Australian Standard AS5100.4 from natural rubber (other standards include: BS5400, EN1337, AASHTO). State authority regulations are catered for including RMS B281, TMR MRTS81, MRWA spec 860, VicRoads 652, etc. Granor's standard practice is to fully load test every single laminated bearing we supply (whether required to by specification or not).

Granor has a full design capability and can custom design non-standard sized laminated bearings for unique project requirements. Current maximum elastomeric laminated bearing size capabilities are: 2000 x 2000 x 440 millimeters. Current maximum testing capabilities are: 50,000kN vertical and 5,000kN shear. As the supplier with the longest continuous supply record of laminated bearings in Australia, Granor is proud to support the bridge and heavy construction sectors with its more than 40 years of proven quality supply history.

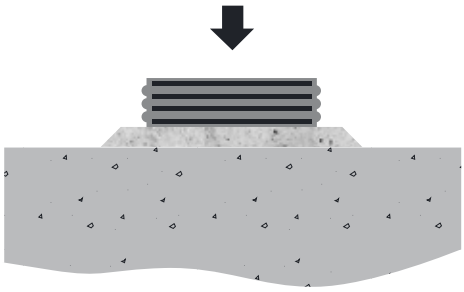
LONG LIFE WITH ZERO MAINTENANCE

PRODUCT FEATURES

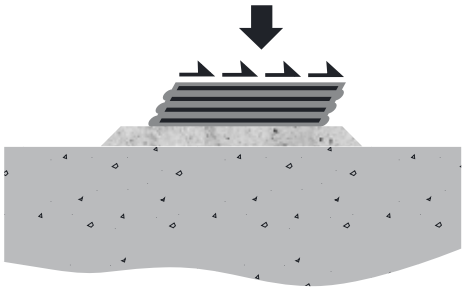
SUPPLIED BY GRANOR FOR MORE THAN 50 YEARS

- Frees up support conditions allowing movement
- Reduces shear / moment reactions in piers and abutments
- Extremely durable proven technology
- Zero maintenance
- Economical

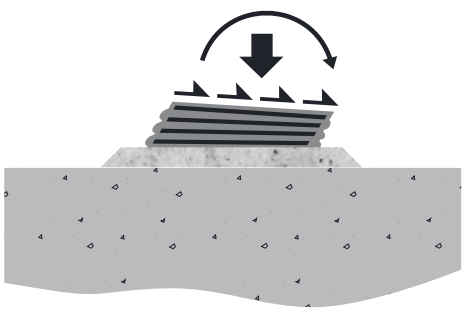
UNDER COMPRESSION



UNDER COMPRESSION & SHEAR



UNDER COMPRESSION, SHEAR & ROTATION



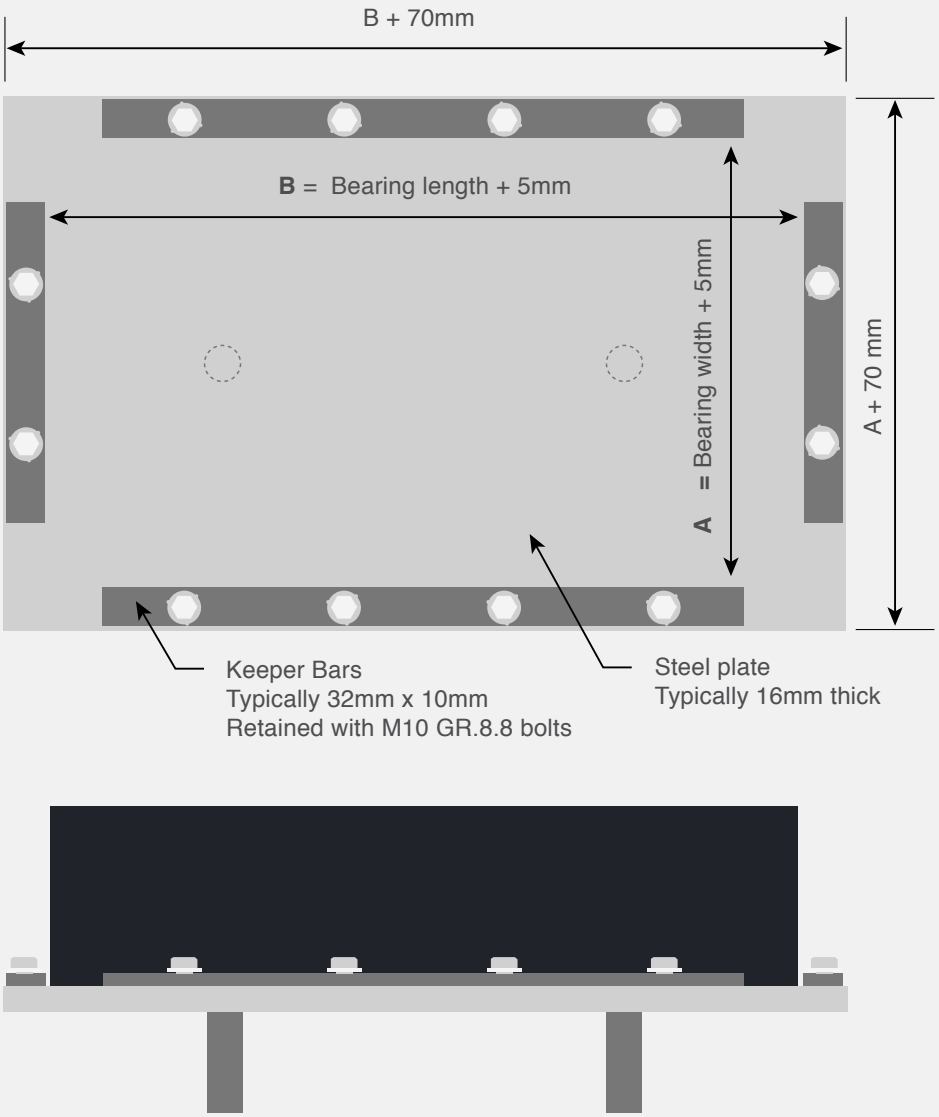
INSTALLATION

Whilst elastomeric laminated bearings have extremely good design life it is always good design practice to detail installation in a way that facilitates possible removal for inspection / replacement of the bearings.

Options for installation vary greatly depending on the material for contact surfaces, i.e. concrete, steel, or a combination of both.

The following basic design guidelines should be considered:

- Flatness of contact surfaces should be within +/- 1mm over the required area. Where there is any out of parallelism due to construction tolerances this should be considered in the context of the total available rotation capacity of the bearing.
- The texture of the contact surface should be kept at a high coefficient of friction. Where concrete mortar pads are used specify a rough “wood float” finish. Where steel retainer plates are used bolted on flat keeper bars should be specified around the perimeter of the bearing.
- If the minimum load case stress on the ELB’s is greater than 3MPa then the friction generated by wood float finish mortar pads is considered sufficient to prevent the bearings from gradually “walking” out of position under light load. If the minimum load case stress is less than 3MPa then steel retainer plates with flat keeper bars are recommended. However always consult with relevant state authority for preferred details in the applicable region.
- Note that it is recommended that adhesives, including epoxies, not be used to restrain bearings from “walking” out of position under light load. The reason for this is that if the adhesive should fail then the resulting surface will typically have a very smooth low friction surface which may be worse than if no adhesive had been used.
- Edge clearance – support area should always be larger than the ELB. A distance of approx. 25mm around the bearing should be adopted as minimum.
- Supporting mortar pads under the bearings should be of a high quality cementitious grout or epoxy mortar and should be of at least 40MPa compressive strength. Mortar pads should be as flat and level as possible. Thick mortar pads may require reinforcing.
- Bearings can be supplied with blind holes if necessary for mechanical restraint with steel “stub” dowels. Note however that the use of steel stub dowels to achieve positive retention makes removal of the bearings more difficult and is therefore to be discouraged unless required for project specific reasons (for example some seismic designs).

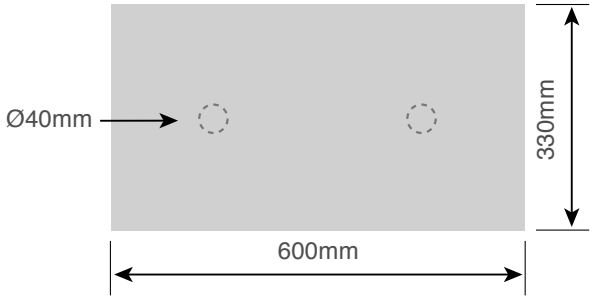


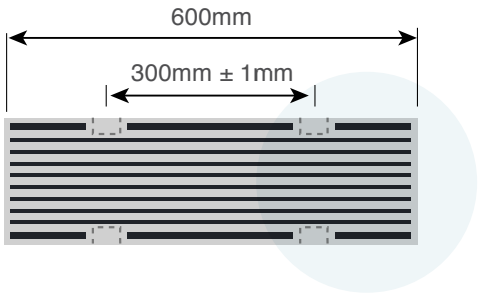
KEEPER PLATE DETAIL – TYPICAL

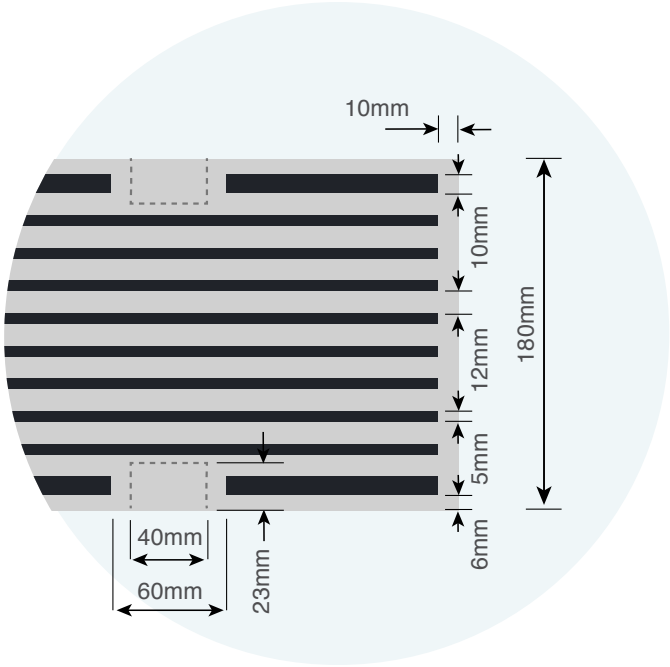
The use of a Keeper Plate (or 'Retainer' Plate) achieves retention of the bearing and permits easy removability of the bearing with minimum jacking of the structure by removal of a "keeper bar". The Keeper Plate can be welded to the structure, or more commonly, retained by suitable counter-sunk fixings through the 16mm plate, into cast in ferrules.

STUB DOWELS – TYPICAL

Stub Dowels – either direct through the mortar pad, or from a cast in steel plate, will positively locate the bearing and prevent “walking out”. However, it makes the bearing difficult to remove.







MULTIPLE STUB DOWELS – TYPICAL

In some special applications (eg seismic areas) positive retention to both top and bottom faces is required. This arrangement uses Stub Dowels in both top & bottom and includes the addition of thicker than standard outer steel plates. The supply with various hole diameters and numbers of holes is possible.

SPECIFICATIONS

Notes

1. Rated shear deflection may be based on the limit of 20% reduction in net loaded area, rather than the 50% of rubber free to shear.
2. If through hole(s) are required in a bearing, then typically load capacity reduces in the order of 25% of rated load, at zero shear. More holes and / or larger diameter will further reduce load bearing capacity.
3. Manufacturing tolerance does not apply to compressive stiffness, but results are typically within a mean of +/-20%.
4. Performance testing is generally specified in accordance with Appendix D of the AS.5100.4
5. Dimensions provided are subject to standard manufacturing tolerances.

SPECIFICATIONS

RECTANGULAR SERIES A–D

GRANOR Part number	Overall height mm	Calculated Compressive stiffness at zero shear kN/mm	Mean shear stiffness kN/mm	Calculated rotational stiffness kNm/rad	Shear deflection capacity mm
SERIES A – 230 × 150					
GAA-02	35	307	1.19	147	10.0
GAA-04	57	189	0.74	90	16.0
GAA-06	79	136	0.54	65	22.0
GAA-08	101	107	0.43	51	27.6
GAB-01	27	229	1.40	108	8.5
GAB-02	41	133	0.92	62	13.0
GAB-04	69	72	0.54	34	22.0
GAB-06	97	50	0.38	23	27.6
SERIES B – 230 × 200					
GBA-02	35	580	1.59	605	10.0
GBA-04	57	357	0.99	371	16.0
GBA-06	79	258	0.72	268	22.0
GBA-09	112	182	0.51	189	31.0
GBB-01	27	440	1.87	441	8.5
GBB-02	41	257	1.22	255	13.0
GBB-04	69	140	0.72	138	22.0
GBB-06	97	96	0.51	95	31.0
GBB-08	125	73	0.40	72	37.6
SERIES C – 350 × 170					
GCA-02	35	775	2.05	464	10.0
GCA-04	57	477	1.28	285	16.0
GCA-06	79	344	0.93	205	22.0
GCA-09	112	243	0.66	145	31.0
GCB-02	41	344	1.58	196	13.0
GCB-04	69	187	0.93	106	22.0
GCB-06	97	129	0.66	73	31.0
SERIES D – 350 × 280					
GDB-02	45	755	2.25	1 430	15.0
GDB-04	73	464	1.41	877	24.0
GDB-06	101	335	1.02	633	33.0
GDB-08	129	262	0.81	495	42.0
GDB-10	157	215	0.66	406	51.0
GDC-02	51	433	1.88	794	18.0
GDC-04	85	243	1.13	442	30.0
GDC-06	119	168	0.81	307	42.0
GDC-08	153	129	0.63	235	52.0
GDD-02	57	257	1.61	466	21.0
GDD-04	97	137	0.94	248	36.0
GDD-06	137	94	0.66	169	51.0

AS5100.4 – 2004

Rated load at ZERO rotation		Rated load at MAX rotation		AS Part No.	Mass kg
At max. shear kN	At zero shear kN	At max. shear kN	At zero shear kN		
360	451	204	253	010602R-5	5
343	420	197	251	010604R-5	8
257	306	190	250	010606R-5	11
192	240	185	240	010608R-5	14
246	312	158	196	010901R-5	3
237	312	148	187	010902R-5	5
171	204	137	181	010904R-5	8
116	145	116	145	010906R-5	12
597	615	311	381	020602R-5	6
576	615	303	378	020604R-5	11
556	615	296	376	020606R-5	15
402	481	287	375	020609R-5	21
405	504	246	301	020901R-5	5
394	504	231	287	020902R-5	7
374	452	217	277	020904R-5	11
268	321	207	273	020906R-5	16
199	248	199	248	020908R-5	21
801	801	457	564	030602R-5	8
786	801	443	559	030604R-5	14
681	791	431	557	030606R-5	18
451	562	413	556	030609R-5	27
539	700	336	422	030902R-5	9
454	528	313	408	030904R-5	15
301	374	297	374	030906R-5	21
1 194	1 287	639	785	040902R	15
1 151	1 287	622	779	040904R	25
1 097	1 256	606	776	040906R	34
828	987	592	774	040908R	44
653	813	577	773	040910R	54
890	1 138	522	647	041202R	16
846	1 036	492	628	041204R	26
621	740	472	620	041206R	37
461	576	459	576	041208R	48
709	917	430	538	041502R	17
595	691	399	518	041504R	28
392	488	378	488	041506R	40

SPECIFICATIONS

RECTANGULAR SERIES E – G

GRANOR Part number	Overall height mm	Calculated Compressive stiffness at zero shear kN/mm	Mean shear stiffness kN/mm	Calculated rotational stiffness kNm/rad	Shear deflection capacity mm
SERIES E – 480 × 250					
GEB-02	45	953	2.76	1 216	15.0
GEB-04	73	586	1.73	746	24.0
GEB-06	101	423	1.25	538	33.0
GEB-08	129	331	0.99	421	42.0
GEC-02	51	548	2.30	676	18.0
GEC-04	85	307	1.38	377	30.0
GEC-06	119	213	0.99	261	42.0
GED-02	57	326	1.97	398	21.0
GED-04	97	174	1.15	212	36.0
GED-06	137	119	0.81	144	46.0
SERIES F – 480 × 300					
GFB-03	59	1 115	2.55	2 308	19.5
GFB-05	87	755	1.74	1 561	28.5
GFB-07	115	571	1.32	1 179	37.5
GFB-09	143	459	1.07	947	46.5
GFC-02	51	855	2.76	1 689	18.0
GFC-04	85	480	1.66	942	30.0
GFC-06	119	334	1.18	653	42.0
GFC-08	153	256	0.92	500	54.0
GFD-02	57	514	2.37	991	21.0
GFD-04	97	275	1.38	527	36.0
GFD-06	137	188	0.97	359	51.0
SERIES G – 480 × 380					
GGB-04	73	1 484	2.62	5 860	24.0
GGB-06	101	1 072	1.91	4 228	33.0
GGB-08	129	840	1.50	3 307	42.0
GGB-10	157	690	1.23	2 715	51.0
GGC-03	68	1 040	2.62	3 836	24.0
GGC-05	102	667	1.75	2 448	36.0
GGC-07	136	491	1.31	1 797	48.0
GGC-10	187	352	0.95	1 285	66.0
GGD-03	77	616	2.21	2 185	28.5
GGD-05	117	385	1.45	1 357	43.5
GGD-07	157	279	1.08	984	58.5
GGD-09	197	220	0.86	772	72.0

AS5100.4 – 2004

Rated load at ZERO rotation		Rated load at MAX rotation		AS Part No.	Mass kg
At max. shear kN	At zero shear kN	At max. shear kN	At zero shear kN		
1 539	1 587	862	1 065	050902R	18
1 475	1 587	836	1 057	050904R	30
1 237	1 445	812	1 054	050906R	42
928	1 135	789	1 052	050908R	54
1 145	1 478	700	875	051202R	20
1 036	1 192	658	850	051204R	32
696	851	626	840	051206R	45
909	1 190	575	726	051502R	21
670	795	531	701	051504R	35
449	561	449	561	051506R	49
1 932	1 932	1 135	1 403	060903R	29
1 932	1 932	1 108	1 396	060905R	44
1 852	1 932	1 084	1 393	060907R	58
1 438	1 725	1 060	1 391	060909R	73
1 601	1 932	946	1 171	061202R	24
1 528	1 932	896	1 138	061204R	39
1 217	1 432	861	1 124	061206R	55
899	1 114	830	1 114	061208R	71
1 273	1 638	782	976	061502R	25
1 165	1 337	730	942	061504R	42
772	944	693	928	061506R	59
2 484	2 484	1 570	1 933	070904R	47
2 484	2 484	1 544	1 927	070906R	65
2 484	2 484	1 520	1 923	070908R	84
2 484	2 484	1 496	1 921	070910R	102
2 377	2 484	1 310	1 618	071203R	40
2 292	2 484	1 262	1 589	071205R	60
2 083	2 404	1 226	1 575	071207R	80
1 428	1 748	1 178	1 564	071210R	110
1 883	2 434	1 086	1 355	071503R	43
1 798	2 122	1 036	1 325	071505R	64
1 321	1 578	998	1 311	071507R	86
1 005	1 256	970	1 256	071509R	108

SPECIFICATIONS

RECTANGULAR SERIES H–K

GRANOR Part number	Overall height mm	Calculated Compressive stiffness at zero shear kN/mm	Mean shear stiffness kN/mm	Calculated rotational stiffness kNm/rad	Shear deflection capacity mm
SERIES H – 600 × 330					
GHB-05	87	1 293	2.40	3 291	28.5
GHB-07	115	978	1.82	2 486	37.5
GHB-09	143	786	1.47	1 998	46.5
GHB-11	171	657	1.23	1 669	55.5
GHC-03	68	1 074	2.85	2 559	24.0
GHC-05	102	689	1.90	1 632	36.0
GHC-07	136	507	1.42	1 198	48.0
GHC-09	170	401	1.14	947	60.0
GHD-02	57	909	3.25	2 097	21.0
GHD-04	97	488	1.90	1 116	36.0
GHD-06	137	333	1.34	761	51.0
GHD-08	177	253	1.03	577	62.0
SERIES J – 600 × 450					
GJC-03	68	2 117	3.88	11 527	24.0
GJC-05	102	1 363	2.59	7 363	36.0
GJC-07	136	1 005	1.94	5 409	48.0
GJC-09	170	796	1.55	4 275	60.0
GJC-11	204	659	1.29	3 534	72.0
GJD-03	77	1 287	3.27	6 606	28.5
GJD-05	117	806	2.14	4 106	43.5
GJD-07	157	586	1.59	2 979	58.5
GJD-09	197	461	1.27	2 337	73.5
GJD-11	237	380	1.05	1 923	86.0
GJE-03	86	822	2.82	4 072	33.0
GJE-05	132	506	1.83	2 497	51.0
GJE-07	178	366	1.35	1 800	69.0
GJE-09	224	286	1.07	1 408	86.0
SERIES K – 600 × 600					
GKD-04	97	1 730	3.45	19 417	36.0
GKD-06	137	1 187	2.44	13 225	51.0
GKD-08	177	904	1.88	10 061	66.0
GKD-10	217	729	1.53	8 108	81.0
GKD-13	277	566	1.20	6 279	103.5
GKE-04	109	1 113	2.96	11 953	42.0
GKE-06	155	756	2.07	8 085	60.0
GKE-08	201	572	1.59	6 109	78.0
GKE-10	247	460	1.29	4 909	96.0
GKE-12	293	385	1.09	4 103	114.0

AS5100.4 – 2004

Rated load at ZERO rotation		Rated load at MAX rotation		AS Part No.	Mass kg
At max. shear kN	At zero shear kN	At max. shear kN	At zero shear kN		
2 697	2 697	1 766	2 210	080905R	61
2 697	2 697	1 732	2 204	080907R	81
2 630	2 697	1 699	2 201	080909R	101
2 128	2 592	1 665	2 199	080911R	121
2 552	2 697	1 476	1 839	081203R	44
2 445	2 697	1 417	1 807	081205R	65
1 900	2 248	1 369	1 792	081207R	87
1 450	1 799	1 326	1 783	081209R	109
2 071	2 644	1 263	1 568	081502R	34
1 963	2 398	1 183	1 514	081504R	58
1 414	1 693	1 129	1 493	081506R	82
1 046	1 308	1 046	1 308	081508R	105
3 741	3 741	2 339	2 869	091203R	60
3 741	3 741	2 265	2 821	091205R	90
3 741	3 741	2 211	2 797	091207R	120
3 639	3 741	2 163	2 783	091209R	150
2 935	3 525	2 118	2 774	091211R	180
3 504	3 741	1 968	2 432	091503R	64
3 373	3 741	1 888	2 382	091505R	96
2 998	3 470	1 829	2 358	091507R	128
2 290	2 762	1 777	2 344	091509R	161
1 835	2 294	1 744	2 294	091511R	193
2 897	3 734	1 676	2 088	091803R	67
2 765	3 317	1 599	2 043	091805R	102
2 059	2 452	1 540	2 022	091807R	137
1 556	1 945	1 492	1 945	091809R	172
5 046	5 046	2 803	3 444	101504R	107
5 046	5 046	2 725	3 394	101506R	151
5 046	5 046	2 666	3 367	101508R	194
4 608	5 046	2 614	3 351	101510R	237
3 443	4 191	2 542	3 335	101513R	303
4 597	5 046	2 415	2 987	101804R	114
4 443	5 046	2 338	2 943	101806R	160
4 011	4 635	2 278	2 919	101808R	207
3 142	3 766	2 224	2 905	101810R	254
2 548	3 171	2 172	2 895	101812R	300

SPECIFICATIONS

CIRCULAR SERIES N – R

GRANOR Part number	Overall height mm	Calculated Compressive stiffness at zero shear kN/mm	Mean shear stiffness kN/mm	Calculated rotational stiffness kNm/rad	Shear deflection capacity mm
SERIES N 240Ø Circular					
GNA-02	35	641	1.56	815	10.0
GNA-04	57	394	0.98	500	16.0
GNA-06	79	285	0.71	361	22.0
GNA-08	101	223	0.56	282	28.0
GNA-10	123	183	0.46	232	34.0
GNB-02	41	286	1.20	345	13.0
GNB-04	69	156	0.71	187	22.0
GNB-06	97	107	0.50	128	31.0
GNB-08	125	82	0.39	98	35.8
GNB-10	153	66	0.32	79	35.8
GNC-02	47	141	0.98	166	16.0
GNC-04	81	73	0.56	86	28.0
GNC-06	115	50	0.39	58	35.8
GNC-08	149	37	0.30	44	35.8
SERIES Q 330Ø Circular					
GQB-03	59	564	1.51	1 370	19.5
GQB-05	87	382	1.04	926	28.5
GQB-07	115	289	0.79	699	37.5
GQB-10	157	211	0.58	512	50.0
GQC-02	51	426	1.64	1 001	18.0
GQC-04	85	239	0.98	558	30.0
GQC-06	119	166	0.70	387	42.0
GQC-08	153	127	0.55	296	50.0
GQD-02	57	254	1.41	586	21.0
QQD-04	97	136	0.82	312	36.0
GQD-06	137	93	0.58	213	50.0
SERIES R 400Ø Circular					
GRB-04	73	860	1.81	3 108	24.0
GRB-07	115	545	1.16	1 968	37.5
GRB-10	157	399	0.85	1 440	51.0
GRC-02	51	822	2.41	2 833	18.0
GRC-04	85	462	1.45	1 581	30.0
GRC-06	119	321	1.03	1 096	42.0
GRC-08	153	246	0.80	839	54.0
GRC-09	170	221	0.72	751	59.7
GRD-02	57	497	2.06	1 662	21.0
GRD-04	97	226	1.20	885	36.0
GRD-06	137	182	0.85	603	51.0
GRD-08	177	138	0.66	457	59.7
GRE-02	63	315	1.81	1 039	24.0
GRE-04	109	164	1.03	540	42.0
GRE-06	155	111	0.72	365	59.7

AS5100.4 – 2004

Rated load at ZERO rotation		Rated load at MAX rotation		AS Part No.	Mass kg
At max. shear kN	At zero shear kN	At max. shear kN	At zero shear kN		
612	612	314	384	110602C-5	6
612	612	306	380	110604C-5	11
612	612	299	379	110606C-5	15
597	612	293	378	110608C-5	19
485	598	287	377	110610C-5	23
441	565	238	294	110902C-5	7
417	565	222	283	110904C-5	11
362	437	212	278	110906C-5	16
271	339	211	276	110908C-5	20
221	277	216	275	110910C-5	25
328	428	183	229	111202C-5	7
303	363	168	220	111204C-5	12
203	254	164	216	111206C-5	17
156	196	156	196	111208C-5	22
1 181	1 191	567	701	120903C-5	20
1 135	1 191	553	697	120905C-5	27
1 089	1 191	541	695	120907C-5	35
805	1 006	525	694	120910C-5	49
896	1 149	476	589	121202C-5	14
850	1 149	448	569	121204C-5	24
762	916	429	561	121206C-5	33
570	713	423	557	121208C-5	43
712	925	394	492	121502C-5	15
665	855	365	471	121504C-5	25
483	604	348	464	121506C-5	36
1 701	1 701	924	1 142	130904C	32
1 701	1 701	898	1 136	130907C	51
1 701	1 701	874	1 134	130910C	70
1 543	1 701	795	976	131202C	21
1 477	1 701	753	944	131204C	34
1 411	1 701	726	931	131206C	48
1 190	1 453	703	924	131208C	62
1 046	1 308	693	922	131209C	69
1 227	1 571	663	820	131502C	22
1 161	1 571	619	787	131504C	37
1 021	1 231	590	774	131506C	52
761	951	585	767	131508C	67
1 017	1 316	562	700	131802C	23
950	1 246	520	670	131804C	39
698	872	492	659	131806C	55

SPECIFICATIONS

CIRCULAR SERIES S – U

GRANOR Part number	Overall height mm	Calculated Compressive stiffness at zero shear kN/mm	Mean shear stiffness kN/mm	Calculated rotational stiffness kNm/rad	Shear deflection capacity mm
SERIES S 480Ø Circular					
GSD-04	85	921	2.08	4 804	30.0
GSD-06	119	641	1.49	3 334	42.0
GSD-08	153	492	1.16	2 553	54.0
GSD-10	187	399	0.95	2 068	66.0
GSE-03	77	704	2.19	3 526	28.5
GSE-05	117	450	1.44	2 191	43.5
GSE-07	157	320	1.07	1 590	58.5
GSE-09	197	251	0.85	1 247	72.3
GSF-02	63	646	2.60	3 173	24.0
GSF-04	109	338	1.49	1 651	42.0
GSF-06	155	229	1.04	1 116	60.0
GSF-08	201	173	0.80	842	72.3
SERIES T 530Ø Circular					
GTC-03	68	1 689	3.17	11 190	24.0
GTC-06	119	923	1.81	6 058	42.0
GTC-09	170	635	1.27	4 153	60.0
GTC-12	221	484	0.98	3 160	78.0
GTD-03	77	1 024	2.67	6 432	28.5
GTD-05	117	641	1.75	4 000	43.5
GTD-07	157	466	1.30	2 902	58.5
GTD-09	197	367	1.04	2 278	73.5
GTD-11	237	302	0.86	1 874	80.1
GTE-02	63	947	3.17	5 797	24.0
GTE-04	109	497	1.81	3 018	42.0
GTE-06	155	337	1.27	2 040	60.0
GTE-08	201	255	0.98	1 541	78.0
SERIES U 590Ø Circular					
GUC-03	68	2 471	3.93	21 195	24.0
GUC-06	119	1 354	2.25	11 490	42.0
GUC-09	170	932	1.57	7 881	60.0
GUC-12	221	711	1.21	5 997	78.0
GUD-03	77	1 524	3.31	12 268	28.5
GUD-05	117	956	2.17	7 636	43.5
GUD-07	157	696	1.61	5 543	58.5
GUD-09	197	547	1.28	4 350	73.5
GUE-02	63	1 424	3.93	11 088	24.0
GUE-04	109	749	2.25	5 779	42.0
GUE-06	155	509	1.57	3 908	60.0
GUE-08	201	385	1.21	2 952	78.0
GUE-10	247	310	0.98	2 372	89.5

AS5100.4 – 2004

Rated load at ZERO rotation		Rated load at MAX rotation		AS Part No.	Mass kg
At max. shear kN	At zero shear kN	At max. shear kN	At zero shear kN		
2 493	2 493	1 297	1 608	141204C	50
2 493	2 493	1 258	1 587	141206C	70
2 472	2 493	1 226	1 575	141208C	90
2 087	2 493	1 196	1 568	141210C	110
2 148	2 493	1 109	1 376	141503C	43
2 051	2 493	1 058	1 343	141505C	64
1 931	2 304	1 021	1 327	141507C	86
1 467	1 834	993	1 318	141509C	108
1 821	2 321	981	1 211	141802C	33
1 724	2 321	915	1 161	141804C	57
1 561	1 872	874	1 142	141806C	80
1 152	1 440	859	1 132	141808C	103
3 064	3 064	1 761	2 157	151203C	53
3 064	3 064	1 680	2 105	151206C	86
3 064	3 064	1 625	2 084	151209C	123
2 628	3 064	1 575	2 074	151212C	160
2 947	3 064	1 489	1 838	151503C	52
2 828	3 064	1 426	1 795	151505C	79
2 709	3 064	1 380	1 775	151507C	105
2 263	2 771	1 341	1 763	151509C	132
1 841	2 301	1 345	1 755	151511C	158
2 493	3 064	1 322	1 625	151802C	41
2 374	3 064	1 238	1 558	151804C	69
2 255	2 829	1 186	1 533	151806C	98
1 752	2 176	1 144	1 520	151808C	131
3 828	3 828	2 382	2 906	161203C	61
3 828	3 828	2 282	2 837	161206C	107
3 828	3 828	2 215	2 811	161209C	153
3 828	3 828	2 156	2 797	161212C	199
3 828	3 828	2 037	2 503	161503C	65
3 828	3 828	1 957	2 445	161505C	98
3 828	3 828	1 900	2 418	161507C	131
3 614	3 828	1 852	2 402	161509C	164
3 497	3 828	1 817	2 225	161802C	51
3 349	3 828	1 708	2 135	161804C	86
3 200	3 828	1 644	2 101	161806C	122
2 804	3 395	1 591	2 083	161808C	157
2 207	2 759	1 577	2 072	161810C	193

SPECIFICATIONS

CIRCULAR SERIES V–Y

GRANOR Part number	Overall height mm	Calculated Compressive stiffness at zero shear kN/mm	Mean shear stiffness kN/mm	Calculated rotational stiffness kNm/rad	Shear deflection capacity mm
SERIES V 650Ø Circular					
GVD-03	77	2 164	4.02	21 874	28.5
GVD-05	117	1 360	2.63	13 626	43.5
GVD-07	157	991	1.96	9 895	58.5
GVD-09	197	780	1.56	7 768	73.5
GVD-11	237	643	1.29	6 394	88.5
GVE-03	86	1 411	3.47	13 604	33.0
GVE-05	132	872	2.24	8 354	51.0
GVE-07	178	631	1.66	6 028	69.0
GVE-09	224	494	1.32	4 715	87.0
SERIES W 750Ø Circular					
GWE-03	92	2 152	4.23	28 822	36.0
GWE-05	138	1 384	2.82	18 413	54.0
GWE-07	184	1 020	2.12	13 528	72.0
GWE-09	230	808	1.69	10 691	90.0
GWE-11	276	668	1.41	8 838	108.0
GWF-03	101	1 527	3.76	19 729	40.5
GWF-05	153	962	2.48	12 352	61.5
GWF-07	205	702	1.85	8 990	82.5
GWF-09	257	553	1.47	7 067	103.5
SERIES X 810Ø Circular					
GXE-03	92	2 831	4.94	45 446	36.0
GXE-05	138	1 823	3.29	29 052	54.0
GXE-07	184	1 345	2.47	21 350	72.0
GXE-09	230	1 065	1.98	16 876	90.0
GXE-11	276	882	1.65	13 593	108.0
GXF-03	101	2 024	4.39	31 206	40.5
GXF-05	153	1 277	2.89	19 548	61.5
GXF-07	205	933	2.15	14 231	82.5
GXF-09	257	735	1.72	11 188	103.5
SERIES Y 880Ø Circular					
GYE-04	115	2 965	4.66	57 712	45.0
GYE-07	184	1 800	2.91	34 786	72.0
GYE-10	253	1 292	2.12	24 896	99.0
GYE-12	299	1 088	1.79	20 930	117.0
GYF-03	101	2 729	5.18	50 991	40.5
GYF-05	153	1 724	3.41	31 965	61.5
GYF-07	205	1 260	2.54	23 279	82.5
GYF-09	257	993	2.03	18 305	103.5
GYF-11	309	819	1.69	15 082	124.5

AS5100.4 – 2004

Rated load at ZERO rotation		Rated load at MAX rotation		AS Part No.	Mass kg
At max. shear kN	At zero shear kN	At max. shear kN	At zero shear kN		
4 676	4 676	2 688	3 290	171503C	79
4 676	4 676	2 589	3 216	171505C	119
4 676	4 676	2 521	3 181	171507C	159
4 676	4 676	2 464	3 161	171509C	199
4 401	4 676	2 412	3 147	171511C	240
4 650	4 676	2 329	2 867	171803C	83
4 469	4 676	2 231	2 799	171805C	127
4 287	4 676	2 162	2 768	171807C	170
3 744	4 543	2 103	2 750	171809C	213
6 278	6 278	3 482	4 273	181803C	115
6 278	6 278	3 362	4 191	181805C	173
6 278	6 278	3 276	4 151	181807C	231
6 278	6 278	3 201	4 128	181809C	289
5 354	6 278	3 131	4 112	181811C	346
6 175	6 278	3 103	3 829	182103C	121
5 932	6 278	2 975	3 741	182105C	183
5 688	6 278	2 882	3 700	182107C	245
4 835	5 901	2 802	3 676	182109C	306
7 353	7 353	4 327	5 293	191803C	135
7 353	7 353	4 186	5 193	191805C	202
7 353	7 353	4 086	5 145	191807C	270
7 353	7 353	4 001	5 116	191809C	337
7 353	7 353	3 922	5 097	191811C	405
7 353	7 353	3 876	4 766	192103C	142
7 353	7 353	3 724	4 659	192105C	214
7 294	7 353	3 616	4 608	192107C	286
6 743	7 353	3 524	4 578	192109C	358
8 713	8 713	5 350	6 566	201804C	199
8 713	8 713	5 162	6 458	201807C	319
8 713	8 713	5 019	6 411	201810C	439
8 713	8 713	4 931	6 391	201812C	518
8 713	8 713	4 907	6 014	202103C	168
8 713	8 713	4 726	5 881	202105C	253
8 713	8 713	4 600	5 818	202107C	338
8 713	8 713	4 494	5 782	202109C	423
7 707	8 713	4 395	5 758	202111C	509


MRFB
PIER
3/3/12
60·6
PANOR

GRANOR® ELASTOMERIC LAMINATED BEARINGS

DURABLE, PROVEN TECHNOLOGY

GRANOR.COM.AU

GRANOR RUBBER & ENGINEERING
8 REID STREET,
BAYSWATER, VICTORIA 3153
AUSTRALIA

EMAIL. **INFO@GRANOR.COM.AU**
TELEPHONE. **+61 3 9762 9699**

GRANOR.COM.AU
V2022-11