



STRUCTURAL BEARINGS — EN 1337-3

ELASTOMERIC LAMINATED BEARINGS



1.0 STRUCTURAL BEARING

ELASTOMERIC BEARINGS

Structural bearings (Elastomeric bearings) are made from high purity elastomers (natural rubber or chloroprene rubber blend) with layered internal steel reinforcing plates. The reinforcing plates provided the vertical stiffness to carry vertical loading from superstructure.

These bearings are often used in bridge and building construction; located beneath precast concrete beam, steel beam support or under column in building. They provide an effective means to allow particularly long span structure to slightly move in relation to the support. 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 structural deterioration over time.

Manufactured from high quality natural rubber, elastomeric bearings have been shown via numerous case studies to be an extremely reliable and maintenance free bearing.

Vertical stiffness is important in elastomeric bearing selection to ensure the vertical deflection is within controlled value specified by client or structural engineers. Deflection is usually estimated to a certain accuracy through calculation under permanent load. Meanwhile, the additional deformation from live loads is generally negligible for most cases.

2.0 PRODUCT FEATURES

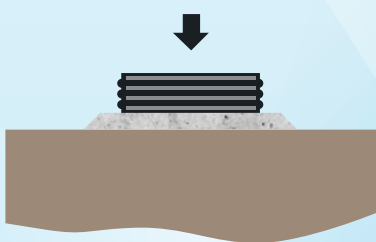
Unless specified, the elastomeric bearings contained within this catalogue are designed in accordance to EN1337-3.

Steel components are of S275JR with all necessary certificates upon request. Different grade of steel is possible upon request when special requirements are to be met on project basis. Main component of the elastomeric bearing is the natural rubber compound (NR) in fully compliance to EN1337-3. Alternatively, we also provide chloroprene rubber (CR) if needed.

Generally, all steel plates are protected from corrosion according to EN1337-9. Coating system defined in ISO12944-5: 2007 is generally used most of the time which includes:

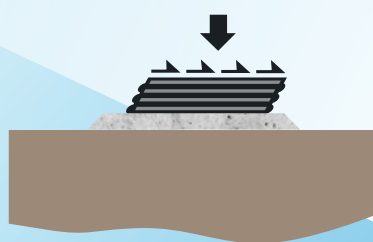
- 60 microns air sprayed zinc coating on SA2.5 grid-blasted surface
- 110 microns intermediate epoxy resin basis coating(s)
- 100 microns top epoxy coating

UNDER COMPRESSION



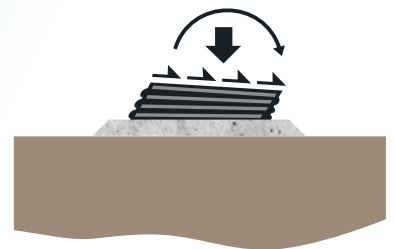
- ✓ Zero maintenance
- ✓ Economical
- ✓ Easy to install

UNDER COMPRESSION & SHEAR



- ✓ Frees up support allowing movement
- ✓ Reduces shear / moment reactions in piers and abutments
- ✓ Extremely durable proven technology

UNDER COMPRESSION, SHEAR & ROTATION



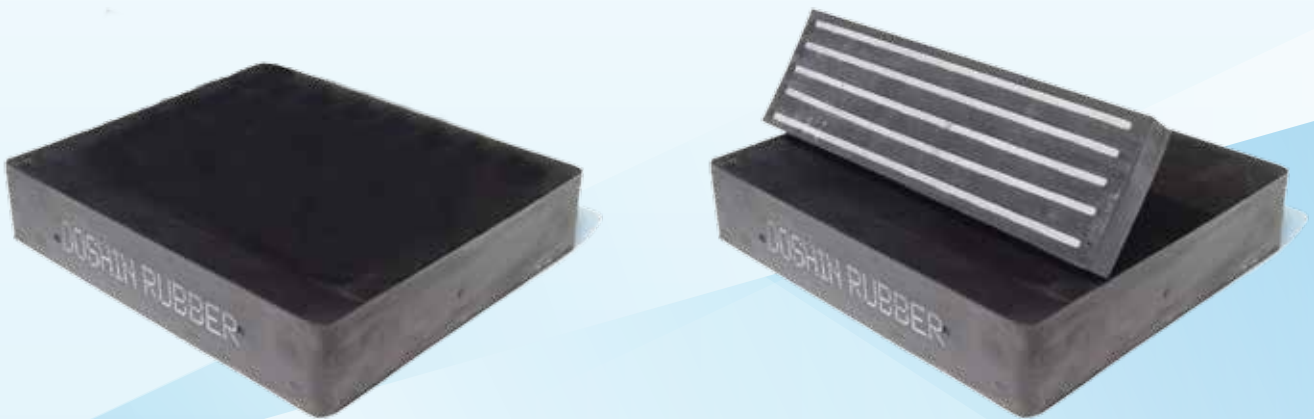
3.0 TYPES OF ELASTOMERIC BEARING

Type B refers to rubber bearing reinforced with steel plates, fully covered by rubber cover with a minimum of two internal reinforcing plates. The design of this type of elastomeric bearing needs to take into account the friction force which is dependent on the permanent load.

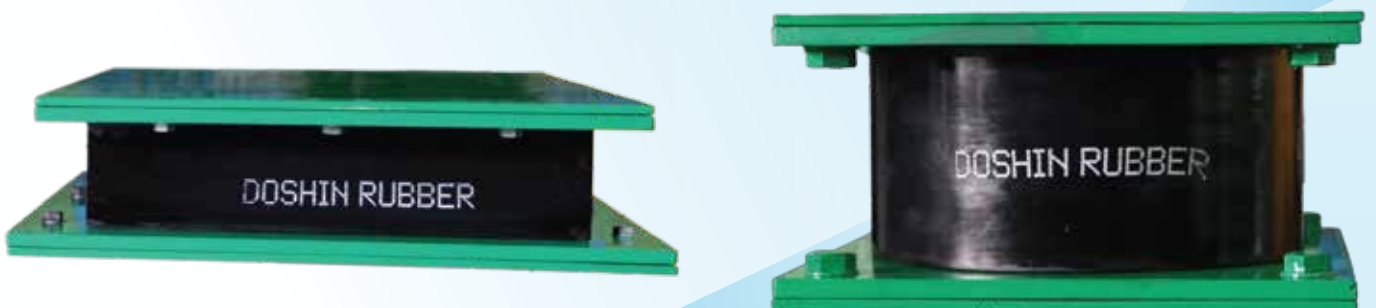
Type C refers to rubber bearing reinforced with steel plates, with both bearing surfaces are made of steel plates (termed as endplates) instead of rubber. Usually, proper fixing and anchorage are required to secure the bearing into position.

To avoid slipping for Type B elastomeric bearing, the minimum pressure to be adopted is 3 MPa.

Type B



Type C



4.0 SPECIFICATION ACCORDING EN1337-3

4.1 BEARING SPECIFICATION

At a nominal temperature of $23\text{ °C} \pm 2\text{ °C}$ the value G_g of the conventional shear modulus complies with the value given hereafter:

$$G_g = 0.9\text{ MPa}$$

The values of shear modulus G_g obtained by test shall comply with the following tolerances:

$$G_g = 0.9\text{ MPa} \pm 0.15\text{ MPa}$$

and the bearing surfaces are free from bonding defects, voids, cracks or faults.

4.2 SPECIFICATION

Dimension	EN 1337-3
L (Length), mm	- 2 / +4
Ø (Diameter), mm	- 2 / +4
W (Width), mm	- 2 / +4
t (total mean thickness), mm	
t ≤ 100	± 2
100 < t ≤ 150	± 3
150 < t	± 4

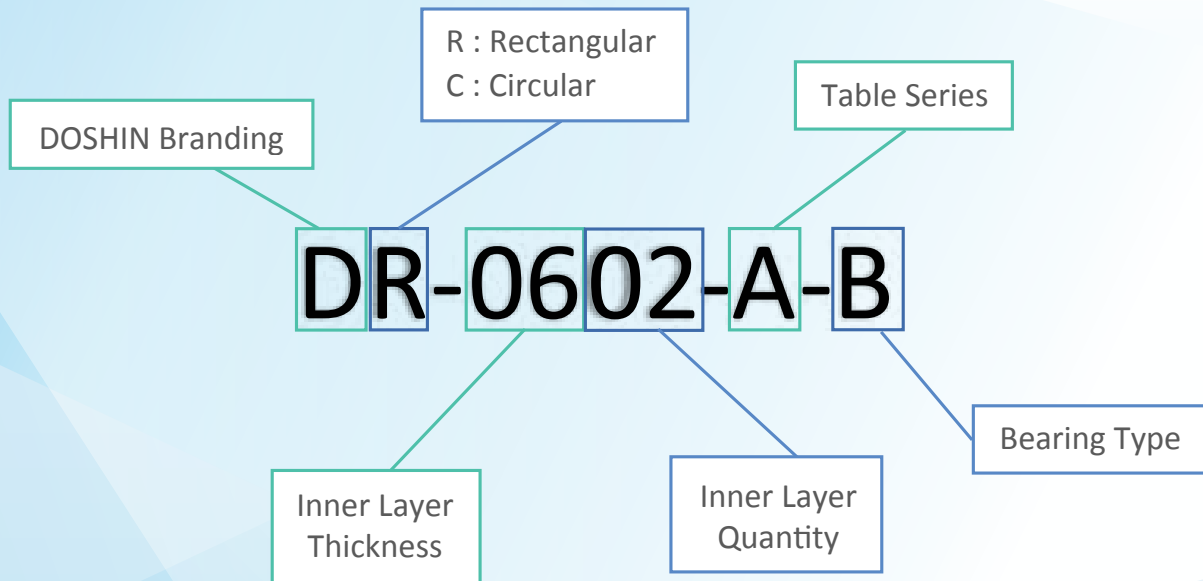
4.3 MATERIAL SPECIFICATION

Property	Requirements		Test Methods
	NR	CR	
Shear Modulus (MPa)	0.9 ^a	0.9 ^a	
Tensile Strength (MPa) Moulded Test Piece	≥ 16	≥ 16	ISO 37 type 2
Minimum Elongation at break (%) Moulded Test Piece	425	425	
Minimum Tear Resistance (kN/m) NR	≥ 8	≥ 10	ISO 34-1 Trouser (Method A)
Compression Set (%) 24 h ; 70 °C	≤ 30	≤ 15	ISO 815 Ø 29 x 12.5 mm
Accelerated Heat Ageing (Maximum change from unaged value)	(NR 7 d , 70 °C)	(CR 3 d , 100 °C)	ISO 48 ISO 188
- Hardness (IRHD)	-5 +10	± 5	
- Tensile Strength (%)	(NR 7 d , 70 °C) ± 15	(CR 3 d , 100 °C) ± 15	
- Elongation at break (%)	(NR 7 d , 70 °C) ± 25	(CR 3 d , 100 °C) ± 25	
Ozone Resistance - Elongation (30% - 96 h ; 40 °C ± 2°C)	(25 pphm) No cracks	(100 pphm) No cracks	ISO 1431 - 1

^a Refer EN1337-3 Clause 4.3.1.1

5.0 BEARINGS

5.1 LEGEND FOR PART NUMBER.



5.2 TABLES FOR RECTANGULAR BEARING (TYPE B)

RECTANGULAR SERIES A - 230 x 150 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DR-0602-A-B	32	430	1.82	11.9	17	453.0	32.0	4.25
DR-0603-A-B	43	301	1.35	16.1	23	453.0	32.0	5.69
DR-0604-A-B	54	232	1.07	20.3	29	453.0	32.0	7.12
DR-0605-A-B	65	188	0.88	24.5	35	453.0	32.0	8.55
DR-0606-A-B	76	158	0.75	28.7	41	453.0	32.0	9.98
DR-0607-A-B	87	137	0.66	32.9	47	453.0	32.0	11.41
DR-0608-A-B	98	120	0.58	37.1	53	453.0	32.0	12.84
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0901-A-B	24	285	2.21	9.8	14	302.0	180.0	2.94
DR-0902-A-B	38	149	1.35	16.1	23	302.0	180.0	4.48
DR-0903-A-B	52	101	0.97	22.4	32	302.0	180.0	6.02
DR-0904-A-B	66	76	0.75	28.7	41	302.0	180.0	7.57
DR-0905-A-B	80	61	0.62	35.0	50	302.0	180.0	9.11
DR-0906-A-B	94	51	0.52	41.3	59	302.0	180.0	10.65

RECTANGULAR

SERIES B - 230 x 200 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DR-0602-B-B	32	795	2.43	11.9	17	738	495	5.76
DR-0603-B-B	43	558	1.80	16.1	23	738	495	7.70
DR-0604-B-B	54	430	1.42	20.3	29	738	495	9.63
DR-0605-B-B	65	350	1.18	24.5	35	738	495	11.57
DR-0606-B-B	76	295	1.00	28.7	41	738	495	13.51
DR-0607-B-B	87	254	0.88	32.9	47	738	495	15.45
DR-0608-B-B	98	224	0.78	37.1	53	738	495	17.38
DR-0609-B-B	109	200	0.70	41.3	59	738	495	19.32
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0901-B-B	24	539	2.95	9.8	14	492	270	3.97
DR-0902-B-B	38	284	1.80	16.1	23	492	270	6.06
DR-0903-B-B	52	193	1.29	22.4	32	492	270	8.15
DR-0904-B-B	66	146	1.00	28.7	41	492	270	10.24
DR-0905-B-B	80	117	0.82	35.0	50	492	270	12.32
DR-0906-B-B	94	98	0.70	41.3	59	492	270	14.41
DR-0907-B-B	108	84	0.60	47.6	68	492	270	16.50

RECTANGULAR

SERIES C - 350 x 170 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DR-0602-C-B	32	1152	3.15	11.9	17	1026	900	7.49
DR-0603-C-B	43	810	2.32	16.1	23	1026	900	10.01
DR-0604-C-B	54	625	1.84	20.3	29	1026	900	12.53
DR-0605-C-B	65	508	1.53	24.5	35	1026	900	15.05
DR-0606-C-B	76	428	1.30	28.7	41	1026	900	17.57
DR-0607-C-B	87	370	1.13	32.9	47	1026	900	20.08
DR-0608-C-B	98	326	1.01	37.1	53	1026	900	22.60
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-C-B	38	417	2.32	16.1	23	684	590	7.88
DR-0903-C-B	52	283	1.67	22.4	32	684	590	10.59
DR-0904-C-B	66	214	1.30	28.7	41	684	590	13.31
DR-0905-C-B	80	172	1.07	35.0	50	684	590	16.02
DR-0906-C-B	94	144	0.90	41.3	59	684	590	18.73

RECTANGULAR

SERIES D - 350 x 280 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-D-B	38	1138	3.83	16.1	23	1485	890	12.76
DR-0903-D-B	52	776	2.75	22.4	32	1485	890	17.16
DR-0904-D-B	66	589	2.15	28.7	41	1485	890	21.55
DR-0905-D-B	80	474	1.76	35.0	50	1485	890	25.95
DR-0906-D-B	94	397	1.49	41.3	59	1485	890	30.34
DR-0907-D-B	108	341	1.29	47.6	68	1485	890	34.74
DR-0908-D-B	122	299	1.14	53.9	77	1485	890	39.13
DR-0909-D-B	136	267	1.02	60.2	86	1485	890	43.53
DR-0910-D-B	150	240	0.92	66.5	95	1485	890	47.92
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1202-D-B	44	528	3.04	20.3	29	1114	610	13.40
DR-1203-D-B	61	356	2.15	28.7	41	1114	610	18.12
DR-1204-D-B	78	268	1.66	37.1	53	1114	610	22.83
DR-1205-D-B	95	215	1.35	45.5	65	1114	610	27.55
DR-1206-D-B	112	179	1.14	53.9	77	1114	610	32.27
DR-1207-D-B	129	154	0.99	62.3	89	1114	610	36.98
DR-1208-D-B	146	135	0.87	70.7	101	1114	610	41.70
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1502-D-B	50	282	2.52	24.5	35	891	530	14.04
DR-1503-D-B	70	189	1.76	35	50	891	530	19.08
DR-1504-D-B	90	142	1.35	45.5	65	891	530	24.11
DR-1505-D-B	110	114	1.10	56	80	891	530	29.15
DR-1506-D-B	130	95	0.92	66.5	95	891	530	34.19

RECTANGULAR

SERIES E - 480 x 250 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-E-B	38	1534	4.69	16.1	23	1931	1700	15.70
DR-0903-E-B	52	1047	3.37	22.4	32	1931	1700	21.11
DR-0904-E-B	66	795	2.63	28.7	41	1931	1700	26.51
DR-0905-E-B	80	640	2.16	35	50	1931	1700	31.92
DR-0906-E-B	94	536	1.83	41.3	59	1931	1700	37.33
DR-0907-E-B	108	461	1.58	47.6	68	1931	1700	42.74
DR-0908-E-B	122	404	1.40	53.9	77	1931	1700	48.14
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1202-E-B	44	717	3.72	20.3	29	1448	1300	16.48
DR-1203-E-B	61	483	2.63	28.7	41	1448	1300	22.28
DR-1204-E-B	78	364	2.03	37.1	53	1448	1300	28.08
DR-1205-E-B	95	292	1.66	45.5	65	1448	1300	33.88
DR-1206-E-B	112	244	1.40	53.9	77	1448	1300	39.68
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1502-E-B	50	384	3.08	24.5	35	1158	850	17.27
DR-1503-E-B	70	257	2.16	35	50	1158	850	23.46
DR-1504-E-B	90	194	1.66	45.5	65	1158	850	29.65
DR-1505-E-B	110	155	1.35	56	80	1158	850	35.85

RECTANGULAR

SERIES F - 480 x 300 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9mm								
DR-0903-F-B	52	1571	4.05	22.4	32	2668	2400	25.58
DR-0904-F-B	66	1194	3.16	28.7	41	2668	2400	32.13
DR-0905-F-B	80	963	2.59	35	50	2668	2400	38.68
DR-0906-F-B	94	806	2.19	41.3	59	2668	2400	45.23
DR-0907-F-B	108	694	1.90	47.6	68	2668	2400	51.78
DR-0908-F-B	122	609	1.68	53.9	77	2668	2400	58.33
DR-0909-F-B	136	542	1.50	60.2	86	2668	2400	64.88
INTERNAL RUBBER LAYER THICKNESS - 12mm								
DR-1202-F-B	44	1094	4.46	20.3	29	2001	1600	19.97
DR-1203-F-B	61	738	3.16	28.7	41	2001	1600	26.99
DR-1204-F-B	78	557	2.44	37.1	53	2001	1600	34.01
DR-1205-F-B	95	447	1.99	45.5	65	2001	1600	41.03
DR-1206-F-B	112	373	1.68	53.9	77	2001	1600	48.05
DR-1207-F-B	129	321	1.45	62.3	89	2001	1600	55.08
DR-1208-F-B	146	281	1.28	70.7	101	2001	1600	62.10
INTERNAL RUBBER LAYER THICKNESS - 15mm								
DR-1502-F-B	50	592	3.70	24.5	35	1601	1300	20.91
DR-1503-F-B	70	397	2.59	35	50	1601	1300	28.40
DR-1504-F-B	90	299	1.99	45.5	65	1601	1300	35.89
DR-1505-F-B	110	239	1.62	56	80	1601	1300	43.39
DR-1506-F-B	130	200	1.36	66.5	95	1601	1300	50.88

RECTANGULAR

SERIES G - 480 x 380 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9mm								
DR-0904-G-B	66	1939	4.00	28.7	41	3981	2900	41.11
DR-0905-G-B	80	1565	3.28	35.0	50	3981	2900	49.49
DR-0906-G-B	94	1312	2.78	41.3	59	3981	2900	57.87
DR-0907-G-B	108	1129	2.41	47.6	68	3981	2900	66.25
DR-0908-G-B	122	991	2.13	53.9	77	3981	2900	74.63
DR-0909-G-B	136	883	1.90	60.2	86	3981	2900	83.01
DR-0910-G-B	150	797	1.72	66.5	95	3981	2900	91.39
DR-0911-G-B	164	725	1.57	72.8	104	3981	2900	99.77
DR-0912-G-B	178	666	1.45	79.1	113	3981	2900	108.15
INTERNAL RUBBER LAYER THICKNESS - 12mm								
DR-1203-G-B	61	1228	4.00	28.7	41	2985	1900	34.52
DR-1204-G-B	78	927	3.09	37.1	53	2985	1900	43.50
DR-1205-G-B	95	745	2.52	45.5	65	2985	1900	52.47
DR-1206-G-B	112	623	2.13	43.9	77	2985	1900	61.45
DR-1207-G-B	129	535	1.84	62.3	89	2985	1900	70.43
DR-1208-G-B	146	468	1.62	70.7	101	2985	1900	79.40
DR-1209-G-B	163	417	1.45	79.1	113	2985	1900	88.38
DR-1210-G-B	180	375	1.31	87.5	125	2985	1900	97.36
INTERNAL RUBBER LAYER THICKNESS - 15mm								
DR-1503-G-B	70	670	3.28	35.0	50	2388	1300	36.31
DR-1504-G-B	90	504	2.52	45.5	65	2388	1300	45.88
DR-1505-G-B	110	404	2.05	56.0	80	2388	1300	55.45
DR-1506-G-B	130	337	1.72	66.5	95	2388	1300	65.03
DR-1507-G-B	150	289	1.49	77.0	110	2388	1300	74.60
DR-1508-G-B	170	253	1.31	87.5	125	2388	1300	84.18
DR-1509-G-B	190	225	1.17	98.0	140	2388	1300	93.75

RECTANGULAR

SERIES H - 600 x 330 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0905-H-B	80	1700	3.56	35.0	50	4324	3800	53.73
DR-0906-H-B	94	1425	3.02	41.3	59	4324	3800	62.83
DR-0907-H-B	108	1227	2.62	47.6	68	4324	3800	71.93
DR-0908-H-B	122	1077	2.31	53.9	77	4324	3800	81.03
DR-0909-H-B	136	960	2.07	60.2	86	4324	3800	90.12
DR-0910-H-B	150	866	1.87	66.5	95	4324	3800	99.22
DR-0911-H-B	164	788	1.71	72.8	104	4324	3800	108.32
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1203-H-B	61	1334	4.34	28.7	41	3243	2800	37.47
DR-1204-H-B	78	1007	3.36	37.1	53	3243	2800	47.22
DR-1205-H-B	95	809	2.74	45.5	65	3243	2800	56.97
DR-1206-H-B	112	676	2.31	53.9	77	3243	2800	66.71
DR-1207-H-B	129	581	2.00	62.3	89	3243	2800	76.46
DR-1208-H-B	146	509	1.76	70.7	101	3243	2800	86.21
DR-1209-H-B	163	453	1.57	79.1	113	3243	2800	95.95
INTERNAL RUBBER LAYER THICKNESS - 15mm								
DR-1502-H-B	50	1084	5.09	24.5	35	2594	2250	29.02
DR-1503-H-B	70	728	3.56	35.0	50	2594	2250	39.42
DR-1504-H-B	90	548	2.74	45.5	65	2594	2250	49.81
DR-1505-H-B	110	439	2.22	56.0	80	2594	2250	60.20
DR-1506-H-B	130	367	1.87	66.5	95	2594	2250	70.60
DR-1507-H-B	150	315	1.62	77.0	110	2594	2250	80.99

RECTANGULAR

SERIES I - 600 x 450 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1204-I-B	78	1946	4.58	37.1	53	5498	4200	65.10
DR-1205-I-B	95	1565	3.73	45.5	65	5498	4200	78.54
DR-1206-I-B	112	1308	3.15	53.9	77	5498	4200	91.97
DR-1207-I-B	129	1124	2.73	62.3	89	5498	4200	105.40
DR-1208-I-B	146	986	2.40	70.7	101	5498	4200	118.84
DR-1209-I-B	163	877	2.15	79.1	113	5498	4200	132.27
DR-1210-I-B	180	790	1.94	87.5	125	5498	4200	145.70
DR-1211-I-B	197	719	1.77	95.9	137	5498	4200	159.13
DR-1212-I-B	214	660	1.63	104.3	149	5498	4200	172.57
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1503-I-B	70	1437	4.86	35.0	50	4398	2500	54.32
DR-1504-I-B	90	1083	3.73	45.5	65	4398	2500	68.64
DR-1505-I-B	110	869	3.03	56.0	80	4398	2500	82.95
DR-1506-I-B	130	725	2.55	66.5	95	4398	2500	97.27
DR-1507-I-B	150	623	2.20	77.0	110	4398	2500	111.58
DR-1508-I-B	170	545	1.94	87.5	125	4398	2500	125.90
DR-1509-I-B	190	485	1.73	98.0	140	4398	2500	140.22
DR-1510-I-B	210	437	1.56	108.5	155	4398	2500	154.53
DR-1511-I-B	230	397	1.42	119.0	170	4398	2500	168.85
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DR-1803-I-B	79	873	4.11	41.3	59	3665	2100	56.97
DR-1804-I-B	102	657	3.15	53.9	77	3665	2100	72.17
DR-1805-I-B	125	526	2.55	66.5	95	3665	2100	87.37
DR-1806-I-B	148	439	2.15	79.1	113	3665	2100	102.57
DR-1807-I-B	171	377	1.85	91.7	131	3665	2100	117.76
DR-1808-I-B	194	330	1.63	104.3	149	3665	2100	132.96
DR-1809-I-B	217	293	1.45	116.9	167	3665	2100	148.16

RECTANGULAR

SERIES J - 600 x 600 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1504-J-B	90	1913	4.98	45.5	65	6968	3550	92.17
DR-1505-J-B	110	1536	4.05	56.0	80	6968	3550	111.39
DR-1506-J-B	130	1283	3.41	66.5	95	6968	3550	130.61
DR-1507-J-B	150	1101	2.94	77.0	110	6968	3550	149.82
DR-1508-J-B	170	965	2.59	87.5	125	6968	3550	169.04
DR-1509-J-B	190	858	2.31	98.0	140	6968	3550	188.26
DR-1510-J-B	210	773	2.09	108.5	155	6968	3550	207.48
DR-1511-J-B	230	703	1.90	119.0	170	6968	3550	226.70
DR-1512-J-B	250	645	1.75	129.5	185	6968	3550	245.92
DR-1513-J-B	270	596	1.62	140.0	200	6968	3550	265.13
INTERNAL RUBBER LAYER THICKNESS - 18mm								
DR-1804-J-B	102	1177	4.20	53.9	77	5806	2500	96.88
DR-1805-J-B	125	944	3.41	66.5	95	5806	2500	117.27
DR-1806-J-B	148	787	2.86	79.1	113	5806	2500	137.67
DR-1807-J-B	171	675	2.47	91.7	131	5806	2500	158.06
DR-1808-J-B	194	591	2.17	104.3	149	5806	2500	178.46
DR-1809-J-B	217	526	1.94	116.9	167	5806	2500	198.85
DR-1810-J-B	240	474	1.75	129.5	185	5806	2500	219.25
DR-1811-J-B	263	431	1.59	142.1	203	5806	2500	239.65
DR-1812-J-B	286	395	1.46	154.7	221	5806	2500	260.04



5.3 TABLES FOR CIRCULAR BEARING (TYPE B)

CIRCULAR SERIES K - Ø 240 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DC-0602-K-B	32	967	2.40	11.9	17	776	597	5.72
DC-0603-K-B	43	680	1.77	16.1	23	776	597	7.64
DC-0604-K-B	54	525	1.40	20.3	29	776	597	9.56
DC-0605-K-B	65	427	1.16	24.5	35	776	597	11.49
DC-0606-K-B	76	360	0.99	28.7	41	776	597	13.41
DC-0607-K-B	87	311	0.87	32.9	47	776	597	15.33
DC-0608-K-B	98	274	0.77	37.1	53	776	597	17.25
DC-0609-K-B	109	245	0.69	41.3	59	776	597	19.18
DC-0610-K-B	120	221	0.63	45.5	65	776	597	21.10
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DC-0902-K-B	38	354	1.77	16.1	23	449	333	6.01
DC-0903-K-B	52	241	1.27	22.4	32	449	333	8.09
DC-0904-K-B	66	182	0.99	28.7	41	449	333	10.16
DC-0905-K-B	80	147	0.81	35.0	50	449	333	12.23
DC-0906-K-B	94	123	0.69	41.3	59	449	333	14.30
DC-0907-K-B	108	105	0.60	47.6	68	449	333	16.37
DC-0908-K-B	122	92	0.53	53.9	77	449	333	18.44
DC-0909-K-B	136	82	0.47	60.2	86	449	333	20.51
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1202-K-B	44	160	1.40	20.3	29	245	181	6.31
DC-1203-K-B	61	108	0.99	28.7	41	245	181	8.53
DC-1204-K-B	78	81	0.77	37.1	53	245	181	10.75
DC-1205-K-B	95	65	0.63	45.5	65	245	181	12.97
DC-1206-K-B	112	54	0.53	53.9	77	245	181	15.18
DC-1207-K-B	129	47	0.46	62.3	89	245	181	17.40
DC-1208-K-B	146	41	0.40	70.7	101	245	181	19.62



CIRCULAR

SERIES L - Ø 330 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DC-0903-L-B	52	836	2.41	22.4	32	1430	1100	15.59
DC-0904-L-B	66	634	1.88	28.7	41	1430	1100	19.58
DC-0905-L-B	80	511	1.54	35.0	50	1430	1100	23.57
DC-0906-L-B	94	428	1.30	41.3	59	1430	1100	27.56
DC-0907-L-B	108	368	1.13	47.6	68	1430	1100	31.55
DC-0908-L-B	122	323	1.00	53.9	77	1430	1100	35.54
DC-0909-L-B	136	288	0.90	60.2	86	1430	1100	39.53
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1202-L-B	44	575	2.65	20.3	29	953	733	12.16
DC-1203-L-B	61	388	1.88	28.7	41	953	733	16.43
DC-1204-L-B	78	292	1.45	37.1	53	953	733	20.70
DC-1205-L-B	95	235	1.18	45.5	65	953	733	24.96
DC-1206-L-B	112	196	1.00	53.9	77	953	733	29.23
DC-1207-L-B	129	168	0.87	62.3	89	953	733	33.50
DC-1208-L-B	146	147	0.76	70.7	101	953	733	37.77
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1502-L-B	50	309	2.20	24.5	35	635	489	12.72
DC-1503-L-B	70	207	1.54	35.0	50	635	489	17.26
DC-1504-L-B	90	156	1.18	45.5	65	635	489	21.81
DC-1505-L-B	110	125	0.96	56.0	80	635	489	26.36
DC-1506-L-B	130	104	0.81	66.5	95	635	489	30.91

CIRCULAR

SERIES M - Ø 400 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DC-0904-M-B	66	1209	2.76	28.7	41	2495	1920	28.21
DC-0905-M-B	80	976	2.26	35.0	50	2495	1920	33.96
DC-0906-M-B	94	818	1.92	41.3	59	2495	1920	39.71
DC-0907-M-B	108	704	1.66	47.6	68	2495	1920	45.47
DC-0908-M-B	122	618	1.47	53.9	77	2495	1920	51.22
DC-0909-M-B	136	550	1.32	60.2	86	2495	1920	56.97
DC-0910-M-B	150	496	1.19	66.5	95	2495	1920	62.72
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1202-M-B	44	1122	3.90	20.3	29	1701	1309	17.53
DC-1203-M-B	61	758	2.76	28.7	41	1701	1309	23.69
DC-1204-M-B	78	572	2.13	37.1	53	1701	1309	29.85
DC-1205-M-B	95	460	1.74	45.5	65	1701	1309	36.02
DC-1206-M-B	112	384	1.47	53.9	77	1701	1309	42.18
DC-1207-M-B	129	330	1.27	62.3	89	1701	1309	48.34
DC-1208-M-B	146	289	1.12	70.7	101	1701	1309	54.50
DC-1209-M-B	163	257	1.00	79.1	113	1701	1309	60.67
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1502-M-B	50	612	3.23	24.5	35	1248	960	18.35
DC-1503-M-B	70	411	2.26	35.0	50	1248	960	24.92
DC-1504-M-B	90	310	1.74	45.5	65	1248	960	31.50
DC-1505-M-B	110	248	1.41	56.0	80	1248	960	38.07
DC-1506-M-B	130	207	1.19	66.5	95	1248	960	44.65
DC-1507-M-B	150	178	1.03	77.0	110	1248	960	51.22
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-M-B	56	367	2.76	28.7	41	907	698	19.17
DC-1803-M-B	79	246	1.92	41.3	59	907	698	26.16
DC-1804-M-B	102	185	1.47	53.9	77	907	698	33.14
DC-1805-M-B	125	148	1.19	66.5	95	907	698	40.13
DC-1806-M-B	148	123	1.00	79.1	113	907	698	47.11

CIRCULAR

SERIES N - Ø 480 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1204-N-B	78	1157	3.07	37.1	53	3324	2557	43.48
DC-1205-N-B	95	930	2.51	45.5	65	3324	2557	52.45
DC-1206-N-B	112	778	2.12	53.9	77	3324	2557	61.42
DC-1207-N-B	129	668	1.83	62.3	89	3324	2557	70.39
DC-1208-N-B	146	586	1.61	70.7	101	3324	2557	79.36
DC-1209-N-B	163	521	1.44	79.1	113	3324	2557	88.33
DC-1210-N-B	180	470	1.30	87.5	125	3324	2557	97.31
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-N-B	70	847	3.26	35.0	50	2493	1918	36.28
DC-1504-N-B	90	638	2.51	45.5	65	2493	1918	45.84
DC-1505-N-B	110	512	2.04	56.0	80	2493	1918	55.41
DC-1506-N-B	130	428	1.71	66.5	95	2493	1918	64.97
DC-1507-N-B	150	367	1.48	77.0	110	2493	1918	74.53
DC-1508-N-B	170	321	1.30	87.5	125	2493	1918	84.10
DC-1509-N-B	190	286	1.16	98.0	140	2493	1918	93.66
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-N-B	56	764	3.97	28.7	41	1828	1406	27.90
DC-1803-N-B	79	512	2.76	41.3	59	1828	1406	38.06
DC-1804-N-B	102	385	2.12	53.9	77	1828	1406	48.21
DC-1805-N-B	125	309	1.71	66.5	95	1828	1406	58.37
DC-1806-N-B	148	257	1.44	79.1	113	1828	1406	68.52
DC-1807-N-B	171	221	1.24	91.7	131	1828	1406	78.68
DC-1808-N-B	194	193	1.09	104.3	149	1828	1406	88.83

CIRCULAR

SERIES O - Ø 530 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1203-O-B	61	2216	4.84	28.7	41	4290	3300	42.29
DC-1204-O-B	78	1677	3.75	37.1	53	4290	3300	53.29
DC-1205-O-B	95	1349	3.06	45.5	65	4290	3300	64.28
DC-1206-O-B	112	1128	2.58	53.9	77	4290	3300	75.28
DC-1207-O-B	129	970	2.23	62.3	89	4290	3300	86.27
DC-1208-O-B	146	850	1.97	70.7	101	4290	3300	97.26
DC-1209-O-B	163	757	1.76	79.1	113	4290	3300	108.26
DC-1210-O-B	180	682	1.59	87.5	125	4290	3300	119.25
DC-1211-O-B	197	621	1.45	95.9	137	4290	3300	130.25
DC-1212-O-B	214	569	1.33	104.3	149	4290	3300	141.24
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-O-B	70	1244	3.97	35.0	50	3065	2357	44.46
DC-1504-O-B	90	938	3.06	45.5	65	3065	2357	56.17
DC-1505-O-B	110	752	2.48	56.0	80	3065	2357	67.89
DC-1506-O-B	130	628	2.09	66.5	95	3065	2357	79.61
DC-1507-O-B	150	539	1.81	77.0	110	3065	2357	91.32
DC-1508-O-B	170	472	1.59	87.5	125	3065	2357	103.04
DC-1509-O-B	190	420	1.42	98.0	140	3065	2357	114.75
DC-1510-O-B	210	379	1.28	108.5	155	3065	2357	126.47
DC-1511-O-B	230	344	1.17	119.0	170	3065	2357	138.18
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-O-B	56	1130	4.84	28.7	41	2656	2043	34.19
DC-1803-O-B	79	758	3.37	41.3	59	2656	2043	46.62
DC-1804-O-B	102	570	2.58	53.9	77	2656	2043	59.06
DC-1805-O-B	125	457	2.09	66.5	95	2656	2043	71.50
DC-1806-O-B	148	381	1.76	79.1	113	2656	2043	83.93
DC-1807-O-B	171	327	1.52	91.7	131	2656	2043	96.37
DC-1808-O-B	194	286	1.33	104.3	149	2656	2043	108.81

CIRCULAR

SERIES P - Ø 590 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1204-P-B	78	2482	4.64	37.1	53	6380	4908	66.38
DC-1205-P-B	95	1998	3.79	45.5	65	6380	4908	80.07
DC-1206-P-B	112	1672	3.20	53.9	77	6380	4908	93.76
DC-1207-P-B	129	1437	2.77	62.3	89	6380	4908	107.46
DC-1208-P-B	146	1261	2.44	70.7	101	6380	4908	121.15
DC-1209-P-B	163	1122	2.18	79.1	113	6380	4908	134.84
DC-1210-P-B	180	1012	1.97	87.5	125	6380	4908	148.53
DC-1211-P-B	197	921	1.80	95.9	137	6380	4908	162.23
DC-1212-P-B	214	845	1.65	104.3	149	6380	4908	175.92
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-P-B	70	1870	4.92	35.0	50	5104	3926	55.37
DC-1504-P-B	90	1411	3.79	45.5	65	5104	3926	69.95
DC-1505-P-B	110	1133	3.08	56.0	80	5104	3926	84.54
DC-1506-P-B	130	946	2.59	66.5	95	5104	3926	99.13
DC-1507-P-B	150	812	2.24	77.0	110	5104	3926	113.71
DC-1508-P-B	170	712	1.97	87.5	125	5104	3926	128.30
DC-1509-P-B	190	633	1.76	98.0	140	5104	3926	142.89
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-P-B	56	1715	6.00	28.7	41	3573	2748	42.57
DC-1803-P-B	79	1151	4.17	41.3	59	3573	2748	58.05
DC-1804-P-B	102	867	3.20	53.9	77	3573	2748	73.53
DC-1805-P-B	125	695	2.59	66.5	95	3573	2748	89.01
DC-1806-P-B	148	580	2.18	79.1	113	3573	2748	104.49
DC-1807-P-B	171	498	1.88	91.7	131	3573	2748	119.97
DC-1808-P-B	194	436	1.65	104.3	149	3573	2748	135.45
DC-1809-P-B	217	388	1.47	116.9	167	3573	2748	150.94
DC-1810-P-B	240	349	1.33	129.5	185	3573	2748	166.42

CIRCULAR

SERIES Q - Ø 650 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-Q-B	70	2682	5.97	35.0	50	6859	5276	67.47
DC-1504-Q-B	90	2025	4.59	45.5	65	6859	5276	85.24
DC-1505-Q-B	110	1626	3.73	56.0	80	6859	5276	103.01
DC-1506-Q-B	130	1359	3.14	66.5	95	6859	5276	120.78
DC-1507-Q-B	150	1167	2.71	77.0	110	6859	5276	138.56
DC-1508-Q-B	170	1022	2.39	87.5	125	6859	5276	156.33
DC-1509-Q-B	190	910	2.13	98.0	140	6859	5276	174.10
DC-1510-Q-B	210	820	1.93	108.5	155	6859	5276	191.87
DC-1511-Q-B	230	746	1.76	119.0	170	6859	5276	209.64
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1803-Q-B	79	1669	5.06	41.3	59	5300	4077	70.72
DC-1804-Q-B	102	1257	3.88	53.9	77	5300	4077	89.58
DC-1805-Q-B	125	1008	3.14	66.5	95	5300	4077	108.44
DC-1806-Q-B	148	841	2.64	79.1	113	5300	4077	127.29
DC-1807-Q-B	171	722	2.28	91.7	131	5300	4077	146.15
DC-1808-Q-B	194	632	2.00	104.3	149	5300	4077	165.01
DC-1809-Q-B	217	562	1.79	116.9	167	5300	4077	183.86
DC-1810-Q-B	240	507	1.61	129.5	185	5300	4077	202.72
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-Q-B	88	1100	4.39	47.6	68	4365	3357	73.98
DC-2104-Q-B	114	827	3.36	62.3	89	4365	3357	93.92
DC-2105-Q-B	140	663	2.71	77.0	110	4365	3357	113.86
DC-2106-Q-B	166	553	2.28	91.7	131	4365	3357	133.81
DC-2107-Q-B	192	474	1.96	106.4	152	4365	3357	153.75
DC-2108-Q-B	218	415	1.73	121.1	173	4365	3357	173.69

CIRCULAR

SERIES R - Ø 750 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1803-R-B	79	2854	6.74	41.3	59	8790	6762	94.64
DC-1804-R-B	102	2152	5.16	53.9	77	8790	6762	119.87
DC-1805-R-B	125	1726	4.19	66.5	95	8790	6762	145.09
DC-1806-R-B	148	1442	3.52	79.1	113	8790	6762	170.32
DC-1807-R-B	171	1237	3.04	91.7	131	8790	6762	195.54
DC-1808-R-B	194	1084	2.67	104.3	149	8790	6762	220.77
DC-1809-R-B	217	964	2.38	116.9	167	8790	6762	245.99
DC-1810-R-B	240	868	2.15	129.5	185	8790	6762	271.22
DC-1811-R-B	263	790	1.96	142.1	203	8790	6762	296.44
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-R-B	88	1905	5.85	47.6	68	7116	5474	98.98
DC-2104-R-B	114	1433	4.47	62.3	89	7116	5474	125.65
DC-2105-R-B	140	1149	3.62	77.0	110	7116	5474	152.32
DC-2106-R-B	166	959	3.04	91.7	131	7116	5474	178.99
DC-2107-R-B	192	822	2.62	106.4	152	7116	5474	205.66
DC-2108-R-B	218	720	2.30	121.1	173	7116	5474	232.33
DC-2109-R-B	244	641	2.05	135.8	194	7116	5474	259.00
DC-2110-R-B	270	577	1.85	150.5	215	7116	5474	285.67

CIRCULAR

SERIES S - Ø 810 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1804-S-B	102	2854	6.02	53.9	77	11275	8673	140.15
DC-1805-S-B	125	2291	4.88	66.5	95	11275	8673	169.64
DC-1806-S-B	148	1913	4.10	79.1	113	11275	8673	199.13
DC-1807-S-B	171	1643	3.54	91.7	131	11275	8673	228.62
DC-1808-S-B	194	1439	3.11	104.3	149	11275	8673	258.11
DC-1809-S-B	217	1280	2.78	116.9	167	11275	8673	287.60
DC-1810-S-B	240	1153	2.51	129.5	185	11275	8673	317.09
DC-1811-S-B	263	1049	2.28	142.1	203	11275	8673	346.58
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-S-B	88	2545	6.82	47.6	68	9805	7542	115.71
DC-2104-S-B	114	1916	5.21	62.3	89	9805	7542	146.89
DC-2105-S-B	140	1536	4.22	77.0	110	9805	7542	178.06
DC-2106-S-B	166	1282	3.54	91.7	131	9805	7542	209.24
DC-2107-S-B	192	1100	3.05	106.4	152	9805	7542	240.41
DC-2108-S-B	218	963	2.68	121.1	173	9805	7542	271.59
DC-2109-S-B	244	857	2.39	135.8	194	9805	7542	302.76
DC-2110-S-B	270	771	2.16	150.5	215	9805	7542	333.94

CIRCULAR

SERIES T - Ø 880 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1804-T-B	102	3849	7.11	53.9	77	14524	11172	165.80
DC-1805-T-B	125	3091	5.76	66.5	95	14524	11172	200.69
DC-1806-T-B	148	2582	4.84	79.1	113	14524	11172	235.57
DC-1807-T-B	171	2217	4.18	91.7	131	14524	11172	270.46
DC-1808-T-B	194	1942	3.67	104.3	149	14524	11172	305.34
DC-1809-T-B	217	1728	3.28	116.9	167	14524	11172	340.22
DC-1810-T-B	240	1557	2.96	129.5	185	14524	11172	375.11
DC-1811-T-B	263	1416	2.70	142.1	203	14524	11172	409.99
DC-1812-T-B	286	1299	2.48	154.7	221	14524	11172	444.88
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-T-B	88	3461	8.05	47.6	68	12200	9385	136.88
DC-2104-T-B	114	2607	6.15	62.3	89	12200	9385	173.76
DC-2105-T-B	140	2091	4.98	77.0	110	12200	9385	210.63
DC-2106-T-B	166	1745	4.18	91.7	131	12200	9385	247.50
DC-2107-T-B	192	1498	3.60	106.4	152	12200	9385	284.38
DC-2108-T-B	218	1312	3.16	121.1	173	12200	9385	321.25
DC-2109-T-B	244	1167	2.82	135.8	194	12200	9385	358.12
DC-2110-T-B	270	1051	2.55	150.5	215	12200	9385	395.00
DC-2111-T-B	296	955	2.32	165.2	236	12200	9385	431.87



5.4 TABLES FOR RECTANGULAR BEARING (TYPE C)

RECTANGULAR SERIES A - 230 x 150 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DR-0602-A-C	67	503	2.85	8.4	12	453	360	13.71
DR-0603-A-C	78	335	1.72	12.6	18	453	360	15.14
DR-0604-A-C	89	251	1.29	16.8	24	453	360	16.57
DR-0605-A-C	100	201	1.03	21.0	30	453	360	18.00
DR-0606-A-C	111	167	0.86	25.2	36	453	360	19.43
DR-0607-A-C	122	143	0.73	29.4	42	453	360	20.86
DR-0608-A-C	133	125	0.64	33.6	48	453	360	22.29
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-A-C	73	157	1.72	12.6	18	302	205	13.93
DR-0903-A-C	87	105	1.15	18.9	27	302	205	15.47
DR-0904-A-C	101	78	0.86	25.2	36	302	205	17.02
DR-0905-A-C	115	63	0.69	31.5	45	302	205	18.56
DR-0906-A-C	129	52	0.57	37.8	54	302	205	20.10

RECTANGULAR SERIES B - 230 x 200 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DR-0602-B-C	67	938	3.45	8.4	12	738	550	18.60
DR-0603-B-C	78	625	2.30	12.6	18	738	550	20.54
DR-0604-B-C	89	469	1.72	16.8	24	738	550	22.47
DR-0605-B-C	100	375	1.38	21.0	30	738	550	24.41
DR-0606-B-C	111	312	1.15	25.2	36	738	550	26.35
DR-0607-B-C	122	268	0.98	29.4	42	738	550	28.28
DR-0608-B-C	133	234	0.86	33.6	48	738	550	30.22
DR-0609-B-C	144	208	0.76	37.8	54	738	550	32.16
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-B-C	73	300	2.30	12.6	18	492	300	18.90
DR-0903-B-C	87	200	1.53	18.9	27	492	300	20.99
DR-0904-B-C	101	150	1.15	25.2	36	492	300	23.07
DR-0905-B-C	115	120	0.92	31.5	45	492	300	25.16
DR-0906-B-C	129	100	0.76	37.8	54	492	300	27.25
DR-0907-B-C	143	85	0.65	44.1	63	492	300	29.34



RECTANGULAR

SERIES C - 350 x 170 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DR-0602-C-C	67	1364	4.46	8.4	12	1026	900	24.20
DR-0603-C-C	78	909	2.97	12.6	18	1026	900	26.72
DR-0604-C-C	89	682	2.23	16.8	24	1026	900	29.24
DR-0605-C-C	100	545	1.78	21.0	30	1026	900	31.76
DR-0606-C-C	111	454	1.48	25.2	36	1026	900	34.28
DR-0607-C-C	122	389	1.27	29.4	42	1026	900	36.79
DR-0608-C-C	133	341	1.11	33.6	48	1026	900	39.31
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-C-C	73	442	2.97	12.6	18	684	580	24.59
DR-0903-C-C	87	294	1.98	18.9	27	684	580	27.30
DR-0904-C-C	101	221	1.48	25.2	36	684	580	30.02
DR-0905-C-C	115	176	1.19	31.5	45	684	580	32.73
DR-0906-C-C	129	147	0.99	37.8	54	684	580	35.44

RECTANGULAR

SERIES D - 350 x 280 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-D-C	73	1220	4.90	12.6	18	1485	950	39.70
DR-0903-D-C	87	813	3.26	18.9	27	1485	950	44.09
DR-0904-D-C	101	610	2.45	25.2	36	1485	950	48.49
DR-0905-D-C	115	488	1.96	31.5	45	1485	950	52.89
DR-0906-D-C	129	406	1.63	37.8	54	1485	950	57.28
DR-0907-D-C	143	348	1.40	44.1	63	1485	950	61.68
DR-0908-D-C	157	305	1.22	50.4	72	1485	950	66.07
DR-0909-D-C	171	271	1.08	56.7	81	1485	950	70.47
DR-0910-D-C	185	244	0.98	63.0	90	1485	950	74.86
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1202-D-C	79	545	3.67	16.8	24	1114	655	40.34
DR-1203-D-C	96	363	2.45	25.2	36	1114	655	45.06
DR-1204-D-C	113	272	1.83	33.6	48	1114	655	49.77
DR-1205-D-C	130	218	1.47	42.0	60	1114	655	54.49
DR-1206-D-C	147	181	1.22	50.4	72	1114	655	59.20
DR-1207-D-C	164	155	1.05	58.8	84	1114	655	63.92
DR-1208-D-C	181	136	0.91	67.2	96	1114	655	68.64
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1502-D-C	85	287	2.94	21.0	30	891	570	40.98
DR-1503-D-C	105	191	1.96	31.5	45	891	570	46.02
DR-1504-D-C	125	143	1.47	42.0	60	891	570	51.05
DR-1505-D-C	145	114	1.17	52.5	75	891	570	56.09
DR-1506-D-C	165	95	0.98	63.0	90	891	570	61.13

RECTANGULAR

SERIES E - 480 x 250 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0902-E-C	73	1649	6.00	12.6	18	1931	1680	48.89
DR-0903-E-C	87	1099	4.00	18.9	27	1931	1680	54.29
DR-0904-E-C	101	824	3.00	25.2	36	1931	1680	59.70
DR-0905-E-C	115	659	2.40	31.5	45	1931	1680	65.11
DR-0906-E-C	129	549	2.00	37.8	54	1931	1680	70.51
DR-0907-E-C	143	471	1.71	44.1	63	1931	1680	75.92
DR-0908-E-C	157	412	1.50	50.4	72	1931	1680	81.33
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1202-E-C	79	741	4.50	16.8	24	1448	1270	49.67
DR-1203-E-C	96	494	3.00	25.2	36	1448	1270	55.47
DR-1204-E-C	113	370	2.25	33.6	48	1448	1270	61.27
DR-1205-E-C	130	296	1.80	42.0	60	1448	1270	67.07
DR-1206-E-C	147	247	1.50	50.4	72	1448	1270	72.87
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1502-E-C	85	391	3.60	21.0	30	1158	1020	50.46
DR-1503-E-C	105	261	2.40	31.5	45	1158	1020	56.65
DR-1504-E-C	125	195	1.80	42.0	60	1158	1020	62.84
DR-1505-E-C	145	156	1.44	52.5	75	1158	1020	69.03

RECTANGULAR

SERIES F - 480 x 300 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9mm								
DR-0903-F-C	87	1658	4.80	18.9	27	2668	2350	65.90
DR-0904-F-C	101	1243	3.60	25.2	36	2668	2350	72.45
DR-0905-F-C	115	994	2.88	31.5	45	2668	2350	79.00
DR-0906-F-C	129	829	2.40	37.8	54	2668	2350	85.55
DR-0907-F-C	143	710	2.05	44.1	63	2668	2350	92.10
DR-0908-F-C	157	621	1.80	50.4	72	2668	2350	98.65
DR-0909-F-C	171	552	1.60	56.7	81	2668	2350	105.20
INTERNAL RUBBER LAYER THICKNESS - 12mm								
DR-1202-F-C	79	1135	5.40	16.8	24	2001	1700	60.29
DR-1203-F-C	96	757	3.60	25.2	36	2001	1700	67.31
DR-1204-F-C	113	567	2.70	33.6	48	2001	1700	74.33
DR-1205-F-C	130	454	2.16	42.0	60	2001	1700	81.35
DR-1206-F-C	147	378	1.80	50.4	72	2001	1700	88.38
DR-1207-F-C	164	324	1.54	58.8	84	2001	1700	95.40
DR-1208-F-C	181	283	1.35	67.2	96	2001	1700	102.42
INTERNAL RUBBER LAYER THICKNESS - 15mm								
DR-1502-F-C	85	604	4.32	21.0	30	1601	1390	61.23
DR-1503-F-C	105	403	2.88	31.5	45	1601	1390	68.72
DR-1504-F-C	125	302	2.16	42.0	60	1601	1390	76.22
DR-1505-F-C	145	241	1.72	52.5	75	1601	1390	83.71
DR-1506-F-C	165	201	1.44	63.0	90	1601	1390	91.20

RECTANGULAR

SERIES G - 480 x 380 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9mm								
DR-0904-G-C	101	2030	4.56	25.2	36	3981	3100	92.85
DR-0905-G-C	115	1624	3.64	31.5	45	3981	3100	101.23
DR-0906-G-C	129	1353	3.04	37.8	54	3981	3100	109.61
DR-0907-G-C	143	1160	2.60	44.1	63	3981	3100	117.99
DR-0908-G-C	157	1015	2.28	50.4	72	3981	3100	126.37
DR-0909-G-C	171	902	2.02	56.7	81	3981	3100	134.75
DR-0910-G-C	185	812	1.82	63.0	90	3981	3100	143.13
DR-0911-G-C	199	738	1.65	69.3	99	3981	3100	151.51
DR-0912-G-C	213	676	1.52	75.6	108	3981	3100	159.89
INTERNAL RUBBER LAYER THICKNESS - 12mm								
DR-1203-G-C	96	1264	4.56	25.2	36	2985	2030	86.25
DR-1204-G-C	113	948	3.42	33.6	48	2985	2030	95.23
DR-1205-G-C	130	758	2.73	42.0	60	2985	2030	104.21
DR-1206-G-C	147	632	2.28	50.4	72	2985	2030	113.19
DR-1207-G-C	164	541	1.95	58.8	84	2985	2030	122.16
DR-1208-G-C	181	474	1.71	67.2	96	2985	2030	131.14
DR-1209-G-C	198	421	1.52	75.6	108	2985	2030	140.12
DR-1210-G-C	215	379	1.36	84.0	120	2985	2030	149.09
INTERNAL RUBBER LAYER THICKNESS - 15mm								
DR-1503-G-C	105	680	3.64	31.5	45	2388	1390	88.04
DR-1504-G-C	125	510	2.73	42.0	60	2388	1390	97.62
DR-1505-G-C	145	408	2.18	52.5	75	2388	1390	107.19
DR-1506-G-C	165	340	1.82	63.0	90	2388	1390	116.76
DR-1507-G-C	185	291	1.56	73.5	105	2388	1390	126.34
DR-1508-G-C	205	255	1.36	84.0	120	2388	1390	135.91
DR-1509-G-C	225	226	1.21	94.5	135	2388	1390	145.49

RECTANGULAR

SERIES H - 600 x 330 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DR-0905-H-C	115	1764	3.96	31.5	45	4324	3700	109.90
DR-0906-H-C	129	1470	3.30	37.8	54	4324	3700	119.00
DR-0907-H-C	143	1260	2.82	44.1	63	4324	3700	128.10
DR-0908-H-C	157	1102	2.47	50.4	72	4324	3700	137.20
DR-0909-H-C	171	980	2.20	56.7	81	4324	3700	146.30
DR-0910-H-C	185	882	1.98	63.0	90	4324	3700	155.40
DR-0911-H-C	199	802	1.80	69.3	99	4324	3700	164.49
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1203-H-C	96	1373	4.95	25.2	36	3243	2700	93.65
DR-1204-H-C	113	1030	3.71	33.6	48	3243	2700	103.39
DR-1205-H-C	130	824	2.97	42.0	60	3243	2700	113.14
DR-1206-H-C	147	686	2.47	50.4	72	3243	2700	122.89
DR-1207-H-C	164	588	2.12	58.8	84	3243	2700	132.63
DR-1208-H-C	181	515	1.85	67.2	96	3243	2700	142.38
DR-1209-H-C	198	457	1.65	75.6	108	3243	2700	152.12
INTERNAL RUBBER LAYER THICKNESS - 15mm								
DR-1502-H-C	85	1109	5.94	21.0	30	2594	2200	85.20
DR-1503-H-C	105	739	3.96	31.5	45	2594	2200	95.59
DR-1504-H-C	125	554	2.97	42.0	60	2594	2200	105.98
DR-1505-H-C	145	443	2.37	52.5	75	2594	2200	116.38
DR-1506-H-C	165	369	1.98	63.0	90	2594	2200	126.77
DR-1507-H-C	185	317	1.69	73.5	105	2594	2200	137.16

RECTANGULAR

SERIES I - 600 x 450 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DR-1204-I-C	113	1998	5.06	33.6	48	5498	3950	142.84
DR-1205-I-C	130	1599	4.05	42.0	60	5498	3950	156.28
DR-1206-I-C	147	1332	3.37	50.4	72	5498	3950	169.71
DR-1207-I-C	164	1142	2.89	58.8	84	5498	3950	183.14
DR-1208-I-C	181	999	2.53	67.2	96	5498	3950	196.57
DR-1209-I-C	198	888	2.25	75.6	108	5498	3950	210.01
DR-1210-I-C	215	799	2.02	84.0	120	5498	3950	223.44
DR-1211-I-C	232	726	1.84	92.4	132	5498	3950	236.87
DR-1212-I-C	249	666	1.68	100.8	144	5498	3950	250.31
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1503-I-C	105	1466	5.40	31.5	45	4398	2550	132.06
DR-1504-I-C	125	1099	4.05	42.0	60	4398	2550	146.37
DR-1505-I-C	145	879	3.24	52.5	75	4398	2550	160.69
DR-1506-I-C	165	733	2.70	63.0	90	4398	2550	175.01
DR-1507-I-C	185	628	2.31	73.5	105	4398	2550	189.32
DR-1508-I-C	205	549	2.02	84.0	120	4398	2550	203.64
DR-1509-I-C	225	488	1.80	94.5	135	4398	2550	217.95
DR-1510-I-C	245	439	1.62	105.0	150	4398	2550	232.27
DR-1511-I-C	265	399	1.47	115.5	165	4398	2550	246.58
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DR-1803-I-C	114	884	4.50	37.8	54	3665	2200	134.71
DR-1804-I-C	137	663	3.37	50.4	72	3665	2200	149.91
DR-1805-I-C	160	530	2.70	63.0	90	3665	2200	165.11
DR-1806-I-C	183	442	2.25	75.6	108	3665	2200	180.30
DR-1807-I-C	206	378	1.92	88.2	126	3665	2200	195.50
DR-1808-I-C	229	331	1.68	100.8	144	3665	2200	210.70
DR-1809-I-C	252	294	1.50	113.4	162	3665	2200	225.90

RECTANGULAR

SERIES J - 600 x 600 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DR-1504-J-C	125	1948	5.40	42.0	60	6968	3700	196.87
DR-1505-J-C	145	1558	4.32	52.5	75	6968	3700	216.08
DR-1506-J-C	165	1298	3.60	63.0	90	6968	3700	235.30
DR-1507-J-C	185	1113	3.08	73.5	105	6968	3700	254.52
DR-1508-J-C	205	974	2.70	84.0	120	6968	3700	273.74
DR-1509-J-C	225	865	2.40	94.5	135	6968	3700	292.96
DR-1510-J-C	245	779	2.16	105.0	150	6968	3700	312.18
DR-1511-J-C	265	708	1.96	115.5	165	6968	3700	331.39
DR-1512-J-C	285	649	1.80	126.0	180	6968	3700	350.61
DR-1513-J-C	305	599	1.66	136.5	195	6968	3700	369.83
INTERNAL RUBBER LAYER THICKNESS - 18mm								
DR-1804-J-C	137	1190	4.50	50.4	72	5806	2650	201.57
DR-1805-J-C	160	952	3.60	63.0	90	5806	2650	221.97
DR-1806-J-C	183	793	3.00	75.6	108	5806	2650	242.36
DR-1807-J-C	206	680	2.57	88.2	126	5806	2650	262.76
DR-1808-J-C	229	595	2.25	100.8	144	5806	2650	283.16
DR-1809-J-C	252	529	2.00	113.4	162	5806	2650	303.55
DR-1810-J-C	275	476	1.80	126.0	180	5806	2650	323.95
DR-1811-J-C	298	432	1.63	138.6	198	5806	2650	344.34
DR-1812-J-C	321	396	1.50	151.2	216	5806	2650	364.74

5.5 TABLES FOR CIRCULAR BEARING (TYPE C)

CIRCULAR SERIES K - Ø 240 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 6 mm								
DC-0602-K-C	67	1149	3.39	8.4	12	776	597	18.48
DC-0603-K-C	78	766	2.26	12.6	18	776	597	20.41
DC-0604-K-C	89	574	1.70	16.8	24	776	597	22.33
DC-0605-K-C	100	459	1.36	21.0	30	776	597	24.25
DC-0606-K-C	111	383	1.13	25.2	36	776	597	26.17
DC-0607-K-C	122	328	0.97	29.4	42	776	597	28.10
DC-0608-K-C	133	287	0.85	33.6	48	776	597	30.02
DC-0609-K-C	144	255	0.75	37.8	54	776	597	31.94
DC-0610-K-C	155	230	0.68	42.0	60	776	597	33.86
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DC-0902-K-C	73	376	2.26	12.6	18	449	333	18.78
DC-0903-K-C	87	250	1.51	18.9	27	449	333	20.85
DC-0904-K-C	101	188	1.13	25.2	36	449	333	22.92
DC-0905-K-C	115	150	0.90	31.5	45	449	333	24.99
DC-0906-K-C	129	125	0.75	37.8	54	449	333	27.06
DC-0907-K-C	143	107	0.65	44.1	63	449	333	29.13
DC-0908-K-C	157	94	0.57	50.4	72	449	333	31.20
DC-0909-K-C	171	83	0.50	56.7	81	449	333	33.27
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1202-K-C	79	164	1.70	16.8	24	245	181	19.08
DC-1203-K-C	96	110	1.13	25.2	36	245	181	21.29
DC-1204-K-C	113	82	0.85	33.6	48	245	181	23.51
DC-1205-K-C	130	66	0.68	42.0	60	245	181	25.73
DC-1206-K-C	147	55	0.57	50.4	72	245	181	27.95
DC-1207-K-C	164	47	0.48	58.8	84	245	181	30.17
DC-1208-K-C	181	41	0.42	67.2	96	245	181	32.39



CIRCULAR

SERIES L - Ø 330 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DC-0903-L-C	87	879	2.85	18.9	27	1430	1100	40.33
DC-0904-L-C	101	659	2.14	25.2	36	1430	1100	44.32
DC-0905-L-C	115	527	1.71	31.5	45	1430	1100	48.31
DC-0906-L-C	129	439	1.43	37.8	54	1430	1100	52.30
DC-0907-L-C	143	377	1.22	44.1	63	1430	1100	56.29
DC-0908-L-C	157	330	1.07	50.4	72	1430	1100	60.28
DC-0909-L-C	171	293	0.95	56.7	81	1430	1100	64.27
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1202-L-C	79	595	3.21	16.8	24	953	733	36.90
DC-1203-L-C	96	397	2.14	25.2	36	953	733	41.17
DC-1204-L-C	113	297	1.60	33.6	48	953	733	45.44
DC-1205-L-C	130	238	1.28	42.0	60	953	733	49.71
DC-1206-L-C	147	198	1.07	50.4	72	953	733	53.98
DC-1207-L-C	164	170	0.92	58.8	84	953	733	58.25
DC-1208-L-C	181	149	0.80	67.2	96	953	733	62.52
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1502-L-C	85	315	2.57	21.0	30	635	489	37.46
DC-1503-L-C	105	210	1.71	31.5	45	635	489	42.01
DC-1504-L-C	125	157	1.28	42.0	60	635	489	46.56
DC-1505-L-C	145	126	1.03	52.5	75	635	489	51.11
DC-1506-L-C	165	105	0.86	63.0	90	635	489	55.66

CIRCULAR

SERIES M - Ø 400 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 9 mm								
DC-0904-M-C	101	1263	3.14	25.2	36	2495	1920	63.67
DC-0905-M-C	115	1010	2.51	31.5	45	2495	1920	69.43
DC-0906-M-C	129	842	2.09	37.8	54	2495	1920	75.18
DC-0907-M-C	143	722	1.80	44.1	63	2495	1920	80.93
DC-0908-M-C	157	632	1.57	50.4	72	2495	1920	86.68
DC-0909-M-C	171	561	1.40	56.7	81	2495	1920	92.43
DC-0910-M-C	185	505	1.26	63.0	90	2495	1920	98.18
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1202-M-C	79	1168	4.71	16.8	24	1701	1309	52.99
DC-1203-M-C	96	779	3.14	25.2	36	1701	1309	59.16
DC-1204-M-C	113	584	2.36	33.6	48	1701	1309	65.32
DC-1205-M-C	130	467	1.88	42.0	60	1701	1309	71.48
DC-1206-M-C	147	389	1.57	50.4	72	1701	1309	77.64
DC-1207-M-C	164	334	1.35	58.8	84	1701	1309	83.80
DC-1208-M-C	181	292	1.18	67.2	96	1701	1309	89.97
DC-1209-M-C	198	260	1.05	75.6	108	1701	1309	96.13
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1502-M-C	85	626	3.77	21.0	30	1248	960	53.81
DC-1503-M-C	105	417	2.51	31.5	45	1248	960	60.39
DC-1504-M-C	125	313	1.88	42.0	60	1248	960	66.96
DC-1505-M-C	145	250	1.51	52.5	75	1248	960	73.53
DC-1506-M-C	165	209	1.26	63.0	90	1248	960	80.11
DC-1507-M-C	185	179	1.08	73.5	105	1248	960	86.68
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-M-C	91	372	3.14	25.2	36	907	698	54.64
DC-1803-M-C	114	248	2.09	37.8	54	907	698	61.62
DC-1804-M-C	137	186	1.57	50.4	72	907	698	68.60
DC-1805-M-C	160	149	1.26	63.0	90	907	698	75.59
DC-1806-M-C	183	124	1.05	75.6	108	907	698	82.57

CIRCULAR

SERIES N - Ø 480 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1204-N-C	113	1186	3.39	33.6	48	3324	2557	95.32
DC-1205-N-C	130	949	2.71	42.0	60	3324	2557	104.29
DC-1206-N-C	147	791	2.26	50.4	72	3324	2557	113.26
DC-1207-N-C	164	678	1.94	58.8	84	3324	2557	122.23
DC-1208-N-C	181	593	1.70	67.2	96	3324	2557	131.21
DC-1209-N-C	198	527	1.51	75.6	108	3324	2557	140.18
DC-1210-N-C	215	474	1.36	84.0	120	3324	2557	149.15
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-N-C	105	863	3.62	31.5	45	2493	1918	88.13
DC-1504-N-C	125	647	2.71	42.0	60	2493	1918	97.69
DC-1505-N-C	145	518	2.17	52.5	75	2493	1918	107.25
DC-1506-N-C	165	431	1.81	63.0	90	2493	1918	116.81
DC-1507-N-C	185	370	1.55	73.5	105	2493	1918	126.38
DC-1508-N-C	205	324	1.36	84.0	120	2493	1918	135.94
DC-1509-N-C	225	288	1.21	94.5	135	2493	1918	145.50
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-N-C	91	777	4.52	25.2	36	1828	1406	79.75
DC-1803-N-C	114	518	3.02	37.8	54	1828	1406	89.90
DC-1804-N-C	137	388	2.26	50.4	72	1828	1406	100.06
DC-1805-N-C	160	311	1.81	63.0	90	1828	1406	110.21
DC-1806-N-C	183	259	1.51	75.6	108	1828	1406	120.36
DC-1807-N-C	206	222	1.29	88.2	126	1828	1406	130.52
DC-1808-N-C	229	194	1.13	100.8	144	1828	1406	140.67

CIRCULAR

SERIES O - Ø 530 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1203-O-C	96	2299	5.52	25.2	36	4290	3300	105.95
DC-1204-O-C	113	1724	4.14	33.6	48	4290	3300	116.95
DC-1205-O-C	130	1379	3.31	42.0	60	4290	3300	127.94
DC-1206-O-C	147	1150	2.76	50.4	72	4290	3300	138.93
DC-1207-O-C	164	985	2.36	58.8	84	4290	3300	149.93
DC-1208-O-C	181	862	2.07	67.2	96	4290	3300	160.92
DC-1209-O-C	198	766	1.84	75.6	108	4290	3300	171.92
DC-1210-O-C	215	690	1.65	84.0	120	4290	3300	182.91
DC-1211-O-C	232	627	1.50	92.4	132	4290	3300	193.90
DC-1212-O-C	249	575	1.38	100.8	144	4290	3300	204.90
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-O-C	105	1270	4.41	31.5	45	3065	2357	108.12
DC-1504-O-C	125	952	3.31	42.0	60	3065	2357	119.83
DC-1505-O-C	145	762	2.65	52.5	75	3065	2357	131.55
DC-1506-O-C	165	635	2.21	63.0	90	3065	2357	143.26
DC-1507-O-C	185	544	1.89	73.5	105	3065	2357	154.98
DC-1508-O-C	205	476	1.65	84.0	120	3065	2357	166.69
DC-1509-O-C	225	423	1.47	94.5	135	3065	2357	178.41
DC-1510-O-C	245	381	1.32	105.0	150	3065	2357	190.12
DC-1511-O-C	265	346	1.20	115.5	165	3065	2357	201.84
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-O-C	91	1151	5.52	25.2	36	2656	2043	97.85
DC-1803-O-C	114	768	3.68	37.8	54	2656	2043	110.28
DC-1804-O-C	137	576	2.76	50.4	72	2656	2043	122.72
DC-1805-O-C	160	461	2.21	63.0	90	2656	2043	135.15
DC-1806-O-C	183	384	1.84	75.6	108	2656	2043	147.59
DC-1807-O-C	206	329	1.58	88.2	126	2656	2043	160.03
DC-1808-O-C	229	288	1.38	100.8	144	2656	2043	172.46

CIRCULAR

SERIES P - Ø 590 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 12 mm								
DC-1204-P-C	113	2561	5.13	33.6	48	6380	4908	145.81
DC-1205-P-C	130	2049	4.10	42.0	60	6380	4908	159.51
DC-1206-P-C	147	1708	3.42	50.4	72	6380	4908	173.20
DC-1207-P-C	164	1464	2.93	58.8	84	6380	4908	186.89
DC-1208-P-C	181	1281	2.56	67.2	96	6380	4908	200.58
DC-1209-P-C	198	1138	2.28	75.6	108	6380	4908	214.27
DC-1210-P-C	215	1025	2.05	84.0	120	6380	4908	227.97
DC-1211-P-C	232	931	1.86	92.4	132	6380	4908	241.66
DC-1212-P-C	249	854	1.71	100.8	144	6380	4908	255.35
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-P-C	105	1914	5.47	31.5	45	5104	3926	134.80
DC-1504-P-C	125	1436	4.10	42.0	60	5104	3926	149.39
DC-1505-P-C	145	1149	3.28	52.5	75	5104	3926	163.98
DC-1506-P-C	165	957	2.73	63.0	90	5104	3926	178.56
DC-1507-P-C	185	820	2.34	73.5	105	5104	3926	193.15
DC-1508-P-C	205	718	2.05	84.0	120	5104	3926	207.73
DC-1509-P-C	225	638	1.82	94.5	135	5104	3926	222.32
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1802-P-C	91	1752	6.83	25.2	36	3573	2748	122.00
DC-1803-P-C	114	1168	4.56	37.8	54	3573	2748	137.49
DC-1804-P-C	137	876	3.42	50.4	72	3573	2748	152.97
DC-1805-P-C	160	701	2.73	63.0	90	3573	2748	168.45
DC-1806-P-C	183	584	2.28	75.6	108	3573	2748	183.93
DC-1807-P-C	206	501	1.95	88.2	126	3573	2748	199.41
DC-1808-P-C	229	438	1.71	100.8	144	3573	2748	214.89
DC-1809-P-C	252	389	1.52	113.4	162	3573	2748	230.37
DC-1810-P-C	275	350	1.37	126.0	180	3573	2748	245.85

CIRCULAR

SERIES Q - Ø 650 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 15 mm								
DC-1503-Q-C	105	2754	6.64	31.5	45	6859	5276	164.43
DC-1504-Q-C	125	2066	4.98	42.0	60	6859	5276	182.20
DC-1505-Q-C	145	1652	3.98	52.5	75	6859	5276	199.97
DC-1506-Q-C	165	1377	3.32	63.0	90	6859	5276	217.74
DC-1507-Q-C	185	1180	2.84	73.5	105	6859	5276	235.52
DC-1508-Q-C	205	1033	2.49	84.0	120	6859	5276	253.29
DC-1509-Q-C	225	918	2.21	94.5	135	6859	5276	271.06
DC-1510-Q-C	245	826	1.99	105.0	150	6859	5276	288.83
DC-1511-Q-C	265	751	1.81	115.5	165	6859	5276	306.60
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1803-Q-C	114	1697	5.53	37.8	54	5300	4077	167.69
DC-1804-Q-C	137	1273	4.15	50.4	72	5300	4077	186.54
DC-1805-Q-C	160	1018	3.32	63.0	90	5300	4077	205.40
DC-1806-Q-C	183	848	2.77	75.6	108	5300	4077	224.26
DC-1807-Q-C	206	727	2.37	88.2	126	5300	4077	243.11
DC-1808-Q-C	229	636	2.07	100.8	144	5300	4077	261.97
DC-1809-Q-C	252	566	1.84	113.4	162	5300	4077	280.83
DC-1810-Q-C	275	509	1.66	126.0	180	5300	4077	299.68
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-Q-C	123	1112	4.74	44.1	63	4365	3357	170.94
DC-2104-Q-C	149	834	3.56	58.8	84	4365	3357	190.88
DC-2105-Q-C	175	667	2.84	73.5	105	4365	3357	210.82
DC-2106-Q-C	201	556	2.37	88.2	126	4365	3357	230.77
DC-2107-Q-C	227	477	2.03	102.9	147	4365	3357	250.71
DC-2108-Q-C	253	417	1.78	117.6	168	4365	3357	270.65

CIRCULAR

SERIES R- Ø 750 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1803-R-C	114	2912	7.36	37.8	54	8790	6762	224.68
DC-1804-R-C	137	2184	5.52	50.4	72	8790	6762	249.90
DC-1805-R-C	160	1747	4.42	63.0	90	8790	6762	275.13
DC-1806-R-C	183	1456	3.68	75.6	108	8790	6762	300.35
DC-1807-R-C	206	1248	3.16	88.2	126	8790	6762	325.57
DC-1808-R-C	229	1092	2.76	100.8	144	8790	6762	350.80
DC-1809-R-C	252	971	2.45	113.4	162	8790	6762	376.02
DC-1810-R-C	275	874	2.21	126.0	180	8790	6762	401.25
DC-1811-R-C	298	794	2.01	138.6	198	8790	6762	426.47
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-R-C	123	1930	6.31	44.1	63	7116	5474	229.01
DC-2104-R-C	149	1448	4.73	58.8	84	7116	5474	255.68
DC-2105-R-C	175	1158	3.79	73.5	105	7116	5474	282.35
DC-2106-R-C	201	965	3.16	88.2	126	7116	5474	309.02
DC-2107-R-C	227	827	2.70	102.9	147	7116	5474	335.69
DC-2108-R-C	253	724	2.37	117.6	168	7116	5474	362.35
DC-2109-R-C	279	643	2.10	132.3	189	7116	5474	389.02
DC-2110-R-C	305	579	1.89	147.0	210	7116	5474	415.69

CIRCULAR

SERIES S- Ø 810 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1804-S-C	137	2902	6.44	50.4	72	11275	8673	292.36
DC-1805-S-C	160	2322	5.15	63.0	90	11275	8673	321.85
DC-1806-S-C	183	1935	4.29	75.6	108	11275	8673	351.33
DC-1807-S-C	206	1659	3.68	88.2	126	11275	8673	380.82
DC-1808-S-C	229	1451	3.22	100.8	144	11275	8673	410.31
DC-1809-S-C	252	1290	2.86	113.4	162	11275	8673	439.80
DC-1810-S-C	275	1161	2.58	126.0	180	11275	8673	469.29
DC-1811-S-C	298	1055	2.34	138.6	198	11275	8673	498.78
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-S-C	123	2583	7.36	44.1	63	9805	7542	267.92
DC-2104-S-C	149	1937	5.52	58.8	84	9805	7542	299.10
DC-2105-S-C	175	1550	4.42	73.5	105	9805	7542	330.27
DC-2106-S-C	201	1292	3.68	88.2	126	9805	7542	361.44
DC-2107-S-C	227	1107	3.15	102.9	147	9805	7542	392.62
DC-2108-S-C	253	969	2.76	117.6	168	9805	7542	423.79
DC-2109-S-C	279	861	2.45	132.3	189	9805	7542	454.96
DC-2110-S-C	305	775	2.21	147.0	210	9805	7542	486.14

CIRCULAR

SERIES T- Ø 880 mm

Part No.	Overall Height (mm)	Designed Compressive stiffness at zero shear (kN/mm)	Designed Shear stiffness (kN/mm)	Shear Deflection Capacity (mm)	Total Rubber (mm)	Rated load at ZERO shear At Rotation : 0.003 rad (kN)	Rated load at 70% shear At Rotation : 0.003 rad (kN)	Estimated Mass (kg)
INTERNAL RUBBER LAYER THICKNESS - 18 mm								
DC-1804-T-C	137	3921	7.60	50.4	72	14524	11172	346.10
DC-1805-T-C	160	3137	6.08	63.0	90	14524	11172	380.98
DC-1806-T-C	183	2614	5.07	75.6	108	14524	11172	415.86
DC-1807-T-C	206	2241	4.34	88.2	126	14524	11172	450.75
DC-1808-T-C	229	1961	3.80	100.8	144	14524	11172	485.63
DC-1809-T-C	252	1743	3.38	113.4	162	14524	11172	520.52
DC-1810-T-C	275	1569	3.04	126.0	180	14524	11172	555.40
DC-1811-T-C	298	1426	2.76	138.6	198	14524	11172	590.29
DC-1812-T-C	321	1307	2.53	151.2	216	14524	11172	625.17
INTERNAL RUBBER LAYER THICKNESS - 21 mm								
DC-2103-T-C	123	3520	8.69	44.1	63	12200	9385	317.18
DC-2104-T-C	149	2640	6.52	58.8	84	12200	9385	354.05
DC-2105-T-C	175	2112	5.21	73.5	105	12200	9385	390.92
DC-2106-T-C	201	1760	4.34	88.2	126	12200	9385	427.80
DC-2107-T-C	227	1508	3.72	102.9	147	12200	9385	464.67
DC-2108-T-C	253	1320	3.26	117.6	168	12200	9385	501.54
DC-2109-T-C	279	1173	2.90	132.3	189	12200	9385	538.42
DC-2110-T-C	305	1056	2.61	147.0	210	12200	9385	575.29
DC-2111-T-C	331	960	2.37	161.7	231	12200	9385	612.16



6.0 DESIGN BASIC

DESIGN BASIC ACCORDING TO EN1337-3

6.1.0 General terms and conditions

This catalogue serves for preliminary elastomeric bearing selection purpose. All products description and design values contained herein are accurate to our best knowledge under laboratory environment and design theory. Please contact our technical department should further information is required.

Design of the elastomeric bearing (structural bearing) are shown in this section. Main steps and equations are shown. For further information or additional remarks, kindly refer to our technical department or the corresponding parts contained within EN1337. Structural engineer has to provide essential data for bearing manufacturer to come up with the right bearing design. Determination of such data by the bearing manufacturer is not the scope of bearing manufacturer.

6.2.0 Basic of Design

a) Maximum design strain

The sum of the strains ($\epsilon_{t,d}$) due to the design load effects is given by the expression :

$$\epsilon_{t,d} = K_L (\epsilon_{c,d} + \epsilon_{q,d} + \epsilon_{\alpha,d})$$

where:

- $\epsilon_{c,d}$: is the design strain due to compressive design loads.
- $\epsilon_{q,d}$: is the design shear strain due to design translatory movements.
- $\epsilon_{\alpha,d}$: is the design strain due to the design angular rotation.
- K_L : is a type-loading factor.

$\epsilon_{t,d}$: shall not exceed the maximum value $\epsilon_{u,d}$ given by the expression :

$$\epsilon_{u,d} = \frac{\epsilon_{u,k}}{\gamma_m}$$

where:

- $\epsilon_{u,k}$: is the maximum permissible value of 7 for ULS
- γ_m : is a partial safety factor, the recommended value is $\gamma_m = 1.00$

6.2.1 Shape Factor

The shape factor is given by the expression :

$$S = \frac{A_1}{l_p \cdot t_e}$$

where:

- A_1 : is the effective plan area of the bearing, i.e. the plan area common to elastomer and steel plate, excluding the area of any holes if these are not later effectively plugged.
- l_p : is the force-free perimeter of the bearing including that of any holes if these are not later effectively plugged.
- t_e : is the effective thickness of an individual elastomer layer in compression; in laminated bearing it is taken as the actual thickness, t_i , for inner layers, and $1,4 t_i$ for outer layers with a thickness ≥ 3 mm ; in plain pad and strip bearings it is taken as $1,8 t_i$ (t_i is the thickness of an individual elastomer layer).

6.2.2 Design strain due to compressive load

$\epsilon_{c,d}$ is the design strain due to compressive loads, is given by the expression:

$$\epsilon_{c,d} = \frac{1,5 \cdot F_{z,d}}{G \cdot A_r \cdot S}$$

A_r is the reduced effective plan area :

$$A_r = A_1 \left(1 - \frac{V_{x,d}}{a'} - \frac{V_{y,d}}{b'} \right)$$

where

- $V_{x,d}$: is the maximum horizontal relative displacement of parts of the bearing in the direction of dimension a of the bearing due to all design load effects ;
- $V_{y,d}$: is the maximum horizontal relative displacement of parts of the bearing in the direction of dimension b of the bearing due to all design load effects.

6.2.3 Shear strain

The shear strain $\epsilon_{q,d}$ of the elastomer due to translatory movement is given by the expression.

$$\epsilon_{q,d} = \frac{V_{xy,d}}{T_q} \leq 1.0$$

where

- $V_{xy,d}$ is the maximum resultant horizontal relative displacement of parts of the bearing obtained by vectorial addition of $V_{x,d}$ and $V_{y,d}$;
- T_q is the total thickness of the elastomer in shear including the top and bottom cover.

6.2.4 Design Strain due to angular rotation

The nominal strain due to angular rotation is given by the expression :

$$\varepsilon_{\alpha,d} = \frac{(a'^2 \cdot \alpha_{a,d} + b'^2 \cdot \alpha_{b,d}) t_i}{2 \sum (t_i^3)}$$

- $\alpha_{a,d}$: is the angle of rotation across the width, **a** , of the bearing;
- $\alpha_{b,d}$: the angle of rotation (if any) across the length, **b** , of the bearing;
- t_i : is the thickness of an individual layer of elastomer.

6.2.5 Reinforcing plate thickness

The minimum thickness of the steel plates in a laminated bearing is given by the expression:

$$t_s = \frac{K_p \cdot F_{z,d} \cdot (t_1 + t_2) \cdot K_h \cdot \gamma_m}{A_r \cdot f_y} \geq 2\text{mm}$$

where

- t_1 and t_2 are the thickness of elastomer on either side of the plate;
- f_y is the yield stress of the steel;

Without holes : $K_h = 1$

With holes : $K_h = 2$

$$\gamma_m = 1,00$$

$$K_p = 1,3$$

6.2.6 Limiting conditions

- Rotational limitation condition

The rotational limitation shall be satisfied when the total vertical deflection $\sum v_{z,d}$ complies with:

$$\text{For rectangular bearings } \sum v_{z,d} - \frac{(a \cdot \alpha_{a,d} + b \cdot \alpha_{b,d})}{K_{r,d}} \geq 0$$

$$\text{For circular bearings } \sum v_{z,d} - \frac{(D' \cdot \alpha_d)}{K_{r,d}} \geq 0$$

where

- D' : is the effective diameter of the bearing.
- $K_{r,d}$: is a rotation factor,
- $\sum v_{z,d}$: is the total vertical deflection producing α_a and α_b

- Buckling stability

For laminated bearings, the pressure, $\frac{F_{z,d}}{A_r}$ shall satisfy the expression :

$$\text{For rectangular bearings } \frac{F_{z,d}}{A_r} < \frac{2 \cdot a' \cdot G \cdot S_1}{3 \cdot T_e}$$

For circular bearings a' shall be deemed to be the diameter.

- Non sliding condition

For non anchored bearings the following formulae shall be satisfied:

$$F_{xy,d} \leq \mu_e \cdot F_{z,d \text{ min}}$$

and under permanent loads:

$$\sigma_{cd \text{ min}} = \frac{F_{z,d \text{ min}}}{A_r} \geq 3 \text{ (in N/mm}^2 \text{)}$$

where

- $F_{xy,d}$: is the resultant of all the horizontal forces
- $F_{z,d \text{ min}}$: is the minimum vertical design force coexisting with $F_{xy,d}$
- μ_e : is the friction coefficient given by the expression hereafter:

$$\mu_e = 0,1 + \frac{1,5 K_f}{\sigma_m}$$

where

- K_f = 0,6 for concrete
- = 0,2 for all other surfaces including bedding resin mortars.
- σ_m is the average of the compressive stress from $F_{z,d \text{ min}}$

7.0 TYPICAL BRIDGE BEARING SCHEDULE

BRIDGE NAME OR REFERENCE

Bearing identification mark						
Number off						
Seating material ^a	Upper surface					
	Lower surface					
Allowable average contact pressure (N/mm ²)	Upper face	Serviceability				
		Ultimate				
	Lower face	Serviceability				
		Ultimate				
Design load effects (kN)	Ultimate limit state	Vertical	max.			
			permanent			
			min.			
	Serviceability limit state	Vertical	max.			
			permanent			
			min.			
Translation (mm)	Ultimate limit state	Transverse				
		Longitudinal				
Rotation (radians)	Serviceability limit state	Transverse				
		Longitudinal				
Maximum bearing dimensions (mm)	Ultimate limit state	Transverse				
		Longitudinal				
		Overall height				
Tolerable movement of bearing under transient loads (mm) If relevant	Serviceability limit state	Vertical				
		Transverse				
		Longitudinal				
Allowable resistance to translation under serviceability limit state (kN) If relevant	Ultimate limit state	Transverse				
		Longitudinal				
Allowable resistance to rotation under serviceability limit state (kN.m) If relevant	Serviceability limit state	Transverse				
		Longitudinal				
Type of fixing required	Ultimate limit state	Upper face				
		Lower face				
NOTE State any other requirements on separate sheet.						
^a For example cement mortar, epoxy mortar, in situ concrete, precast concrete, steel, timber.						

8.0 RESTRAINT DESIGN

8.1 GUIDED ELASTOMERIC BEARING

Sometimes, certain project requires the elastomeric bearing to transmit horizontal loads from the superstructure to the substructure. As such, the elastomeric bearing needs to be fixed in the required direction in order to restrain itself from movement. Usually, these horizontal forces are originated from wind load, braking force, centrifugal force on curved elevated span, etc.

Typically, longitudinal direction refers to the direction of traffic while transverse is the direction perpendicular it. Hence, there are basically three types of commonly used elastomeric bearing with guides as follow:

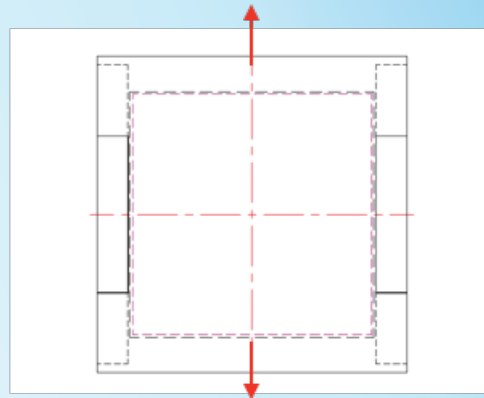
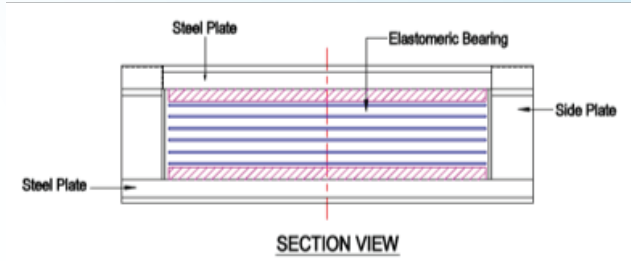
- (a) Longitudinal bearing – bearing with restraining steel component (termed as guided bar) to permit movement only in the longitudinal direction. Forces in the transverse direction are transmitted to the substructure.
- (b) Transverse guided bearing – bearing with guided bar to permit movement only in the transverse direction. Forces in the longitudinal direction are transmitted to the substructure.
- (c) Fixed bearing – bearing that is locked from movement in both transverse and longitudinal direction. Forces in both directions are transmitted to the substructure.

In addition, we also have another type of elastomeric bearing with simple dowel

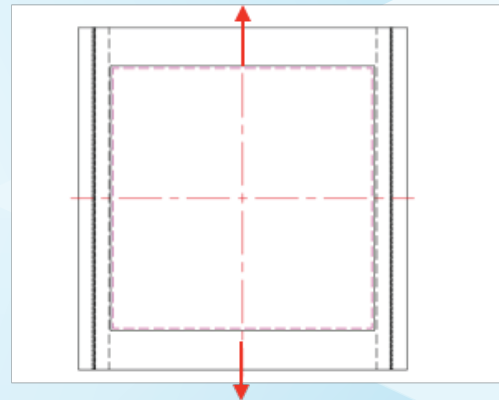
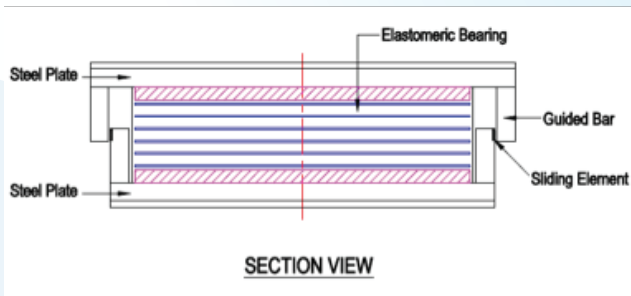


8.2 RESTRAINT TYPE BEARING

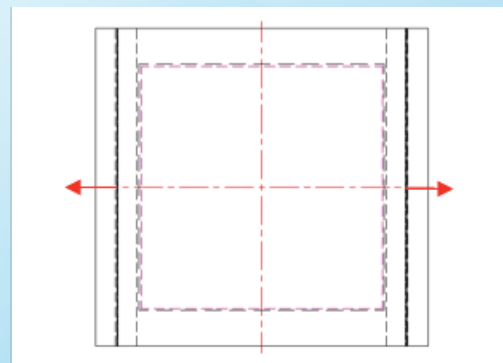
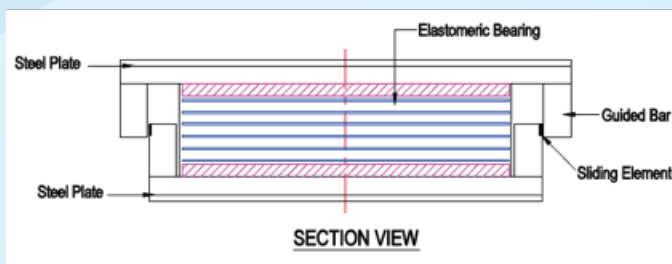
Fixed Bearing



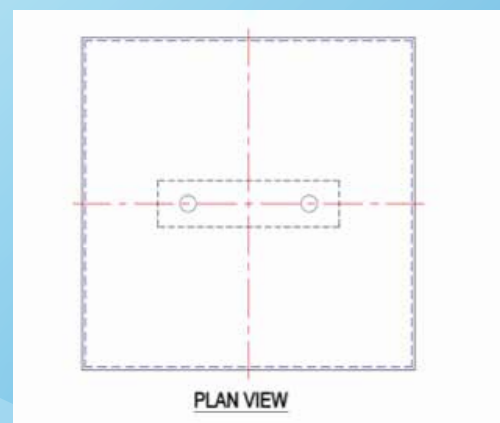
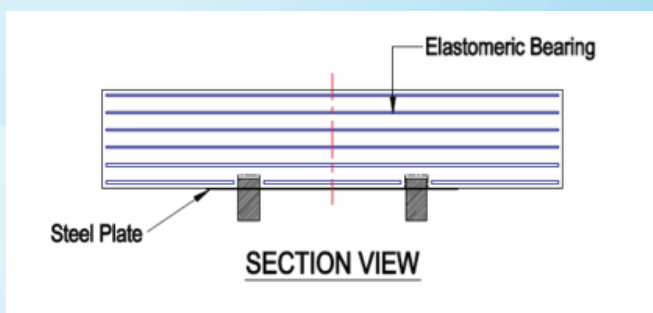
Longitudinal Bearing



Transverse Bearing



Free Bearing



9.0 TESTING METHOD

TESTING METHOD ACCORDANCE TO EN 1337-3

The routine testing is carried out continuously by the Doshin Rubber Products(M) Sdn Bhd, and the test frequency and the sample sizes are defined as in Tables below.

The routine test frequency for complete bearings is defined in terms of volume of rubber for each thickness category in accordance with the EN 1337-3 requirements.

To ensure the good quality of the elastomeric bearings, the first manufactured production bearing of each category is tested. As soon as the relevant volume given in the Table below has been produced new tests are also performed.

Type of Test	Total Thickness			
	$T_b \leq 50$	$50 < T_b \leq 100$	$100 < T_b \leq 150$	$T_b > 150$
Compression Stiffness^a	150 dm ³	250 dm ³	300 dm ³	350 dm ³
Shear Stiffness	1500 dm ³	2500 dm ³	3000 dm ³	3500 dm ³
Shear Bond	3000 dm ³ on sample type I			

^a Quick compressive test

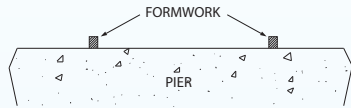
Bearing sample types	a	b	Number of layers	(Thickness of layers and steel reinforcing plates)
I	200	300	3	(8 + 3)
II	400	500	5	(12 + 4)
III	600	700	7	(16 + 5)



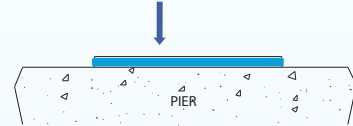
10.0 INSTALLATION

10.1 INSTALLATION – TYPE B

STEP 1 : LEVELING & BEDDING

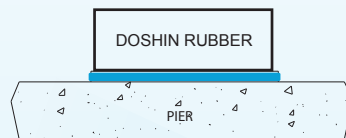


Prepare formwork for grouting. Pour the grouting material provided by WPC (Work Package Contractor)



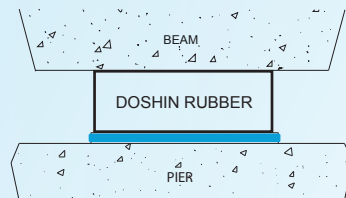
Let the plinth cured until it achieves the required strength

STEP 2 : PLACE THE RUBBER BEARING



Place the Laminated Rubber Bearing on the plinth. Ensure the position is correct. Make sure that the bearing is seated at the correct level.

STEP 3 : LAUNCHING THE BEAM ON THE RUBBER BEARING



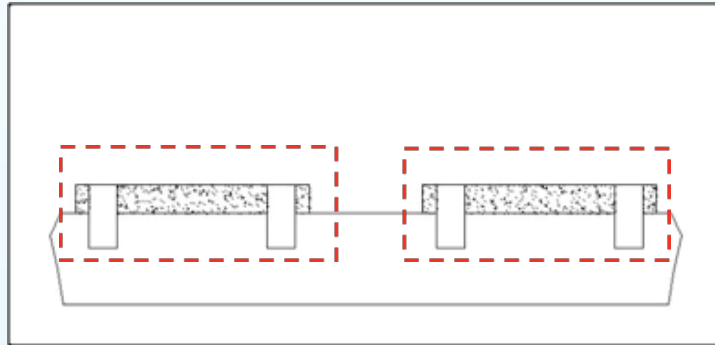
Launch the beam gently directly above the Laminated Rubber Bearing until full beam load is transferred to the Laminated Rubber Bearing. The installation of the Laminated Rubber Bearing is now complete. Ensure that the top (beam) and bottom (pier) is parallel and fully contact.

10.2 INSTALLATION – RESTRAINT TYPE

10.2.1 INSTALLATION - BEARING WITH STEEL

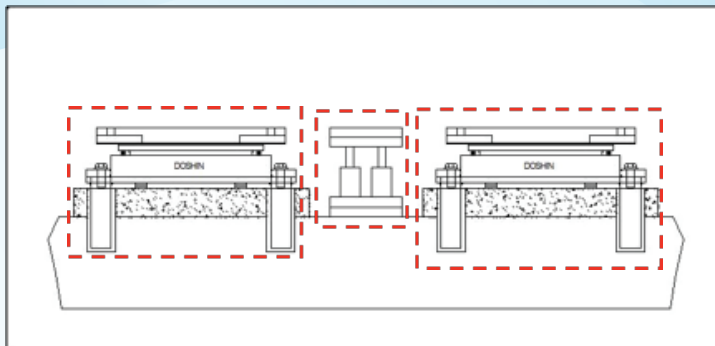
STEP 1 :

Prepare block out / recess holes using template / PVC pipes and cast the bottom plinth according to the required height and size.



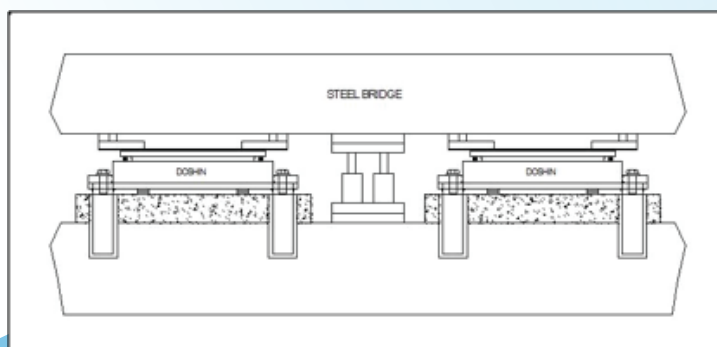
STEP 2 :

Place the Bearing on the bottom plinth. Use shim plates to ensure bearing reaches the required height. Place the hydraulic jacks / temporary support at designated location.



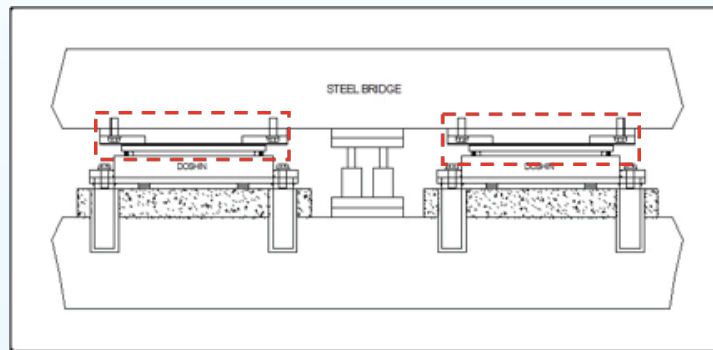
STEP 3 :

Launch the steel structural above the Bearing.



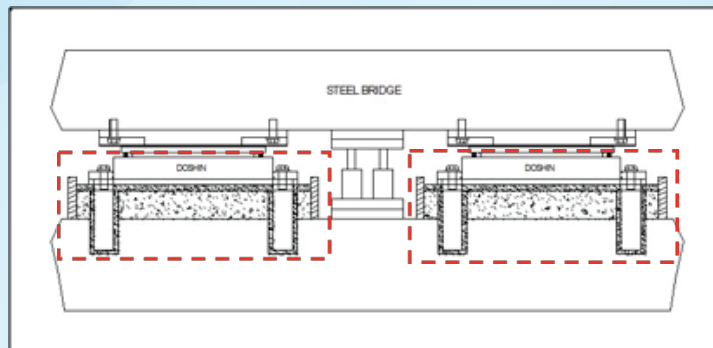
STEP 4 :

Tighten the bolts at the top attachment plate to its respective torque value.



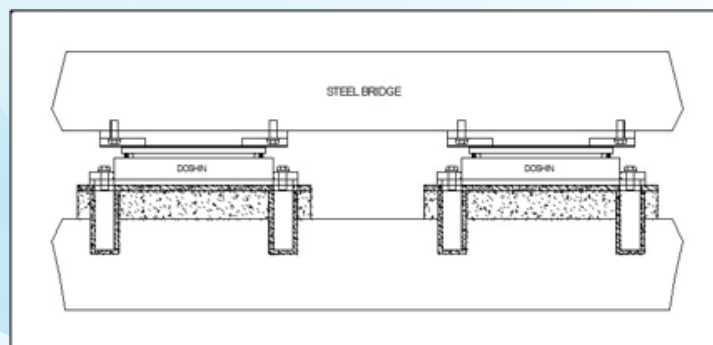
STEP 5 :

Prepare formwork for grouting. Using approved grout material, grout the bottom anchor plate using manual pouring method.



STEP 6 :

Remove the hydraulic jacks / temporary support after the grout has achieved the required strength.



10.2.2 INSTALLATION - BEARING WITH CONCRETE

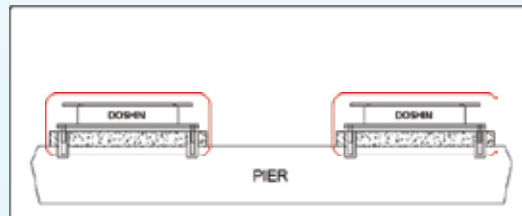
STEP 1 :

Prepare block out/ recess holes using template / PVC pipe and cast the bottom plinth according to the required height and size.



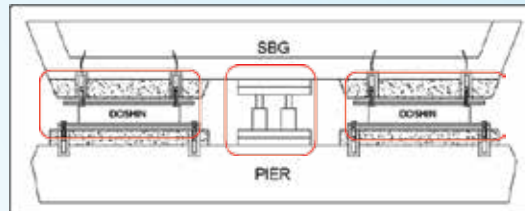
STEP 2 :

Place the Bearing on the bottom plinth. Use shim plates to ensure bearing reaches the required height. Place the hydraulic jacks / temporary support at designated location.



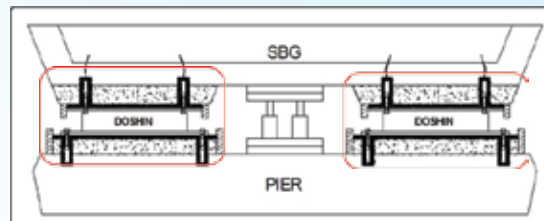
STEP 3 :

Launch the super structural above the Bearing. The hydraulic jacks will absorb the load of the beam first. Gradually decrease the height of the hydraulic jacks until the desired grouting height is achieved. Tighten the bolts at the top and bottom attachments plates to their respective torque values.



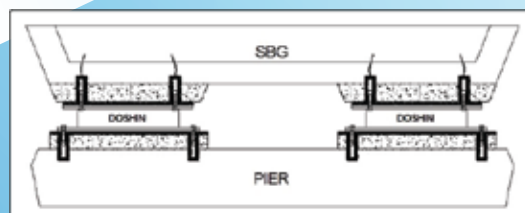
STEP 4 :

Prepare formwork for grouting. Pour the grout at the bottom plinth and top plinth through the grouting hose.



STEP 5 :

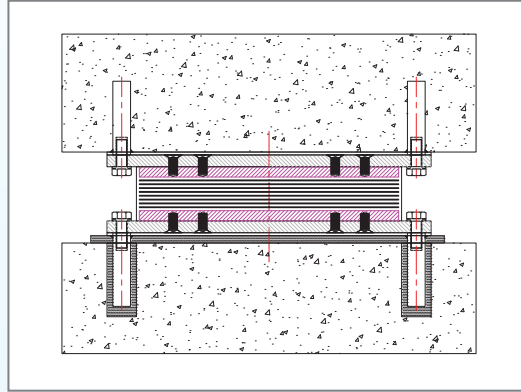
Remove the hydraulic jacks after the grouting plinth has achieved the required strength.



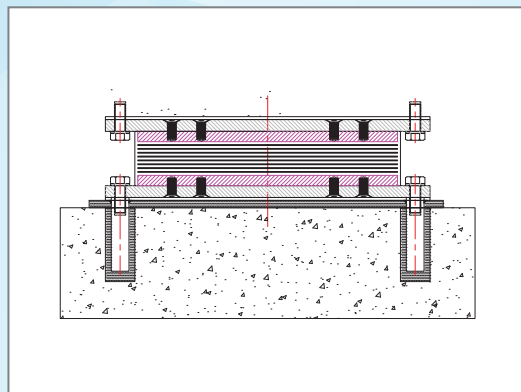
10.3 CONNECTION METHODS

10.3 CONNECTION METHODS WITH DIFFERENT STRUCTURAL

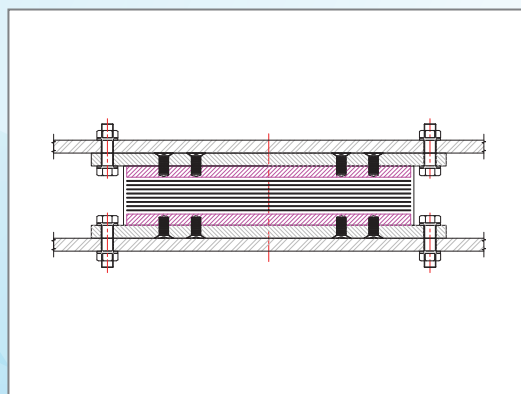
10.3.1 Concrete



10.3.2 Steel / Concrete



10.3.3 Steel



NOTE

A series of horizontal dashed lines for writing notes.



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