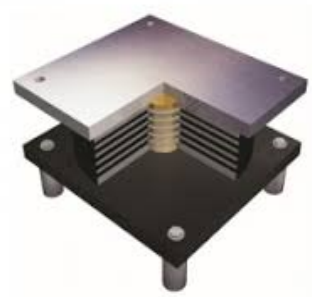




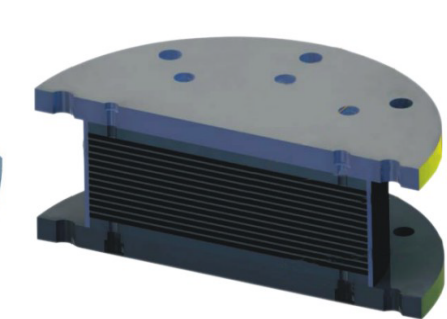
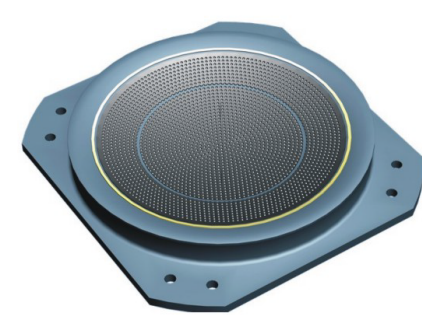
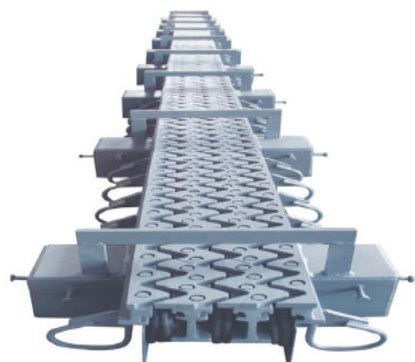
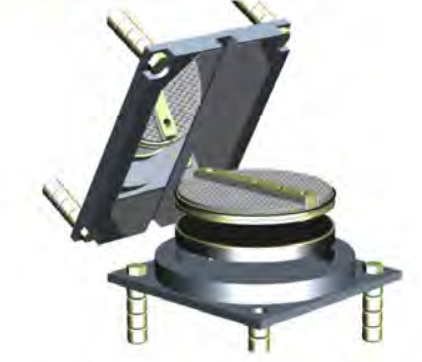
**HiSCS**  
engineering experts



**Bearings**

**Anti-seismic  
Technology**

**Expansion  
Joints**



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# Profile

HiSCS S.A. is a General Trading and Contracting Company dealing with the supply & application of the LMK Infrastructure materials and Engineering applications for Bridges, Buildings and Highways.

- ▶ **LMK Post-Tensioning System (anchorage, hardware, strands, tendon ducts, equipment and other PT accessories)**
- ▶ **LMK Bearings & Expansion Joints**
- ▶ **Traffic & Road Safety systems**
- ▶ **Bridges, Buildings & Highways structural elements**
- ▶ **Specialized Engineering services for infrastructure (inspection, evaluation, NDT, installation, jacking & lifting, etc.)**



# Pot Bearings

Pot bearings are designed according to EN-1337, AASHTO LRFD and other Int'l standards.

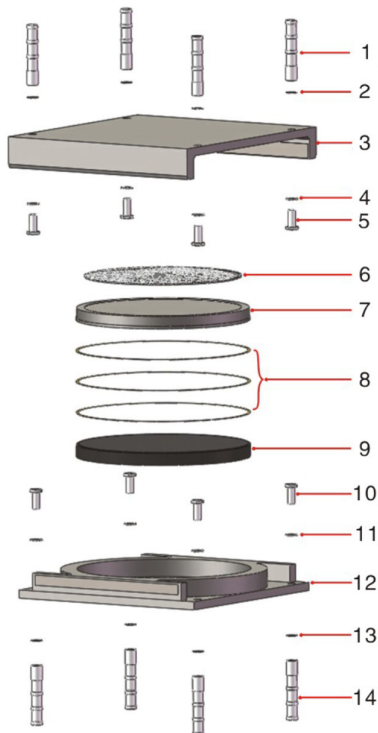
## Sliding Guided type PG

Vertical load (MN) / <sub>Long. or Transv.</sub> Movement (mm) – <sub>Long. or Transv.</sub> Horizontal load (MN)



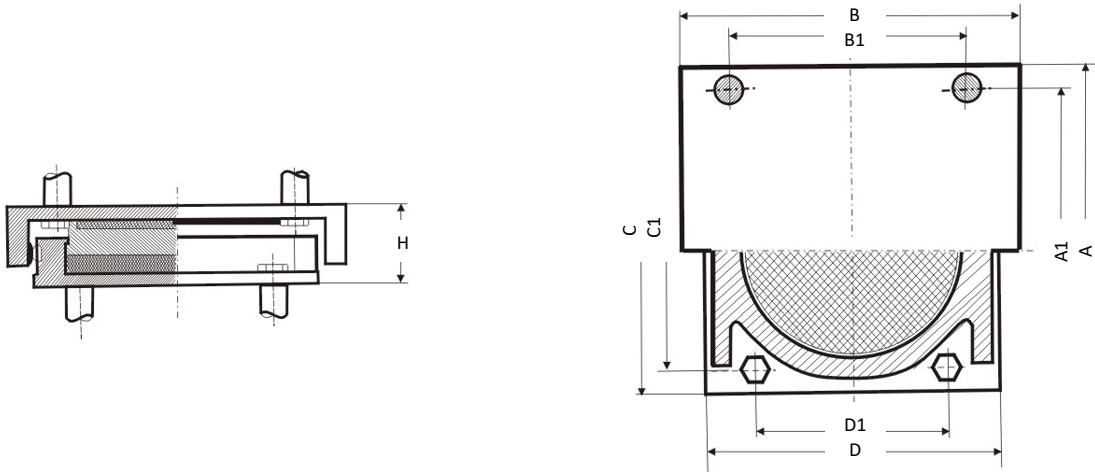
Typical Values:

- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Horizontal load at SLS (H):  $(0.1 \text{ to } 0.2) \times V$
- Horizontal load at ULS:  $1.5 \times H_{SLS}$
- Rotation:  $\pm 0.03$  rad



1. Upper Anchors
2. Washers
3. Top Plate with Inox
4. Washers
5. Upper Bolts
6. PTFE
7. Piston
8. Sealing Ring
9. Rubber Disc
10. Lower Bolts
11. Washers
12. Lower Plate
13. Washers
14. Lower Anchors

# Sliding Guided type PG-Typical Dimensions



Type	A						A1						B	B1	C(D)	C1	D1	H	
	MN	±50	±100	±150	±200	±250	±300	±50	±100	±150	±200	±250							±300
0.8	320	420	520				280	380	480					315	220	265	230	180	80
1	340	440	540				300	400	500					340	245	290	225	200	85
1.25	360	460	560				320	420	520					370	275	320	280	230	90
1.5	380	480	580				340	440	540					410	300	350	310	260	95
2	420	520	620				380	480	580					460	350	400	360	310	105
2.5	460	560	660				420	520	620					505	395	445	405	355	115
3	490	590	690				440	540	640					565	425	485	435	370	120
3.5		620	720	820				570	670	770				600	460	520	470	400	130
4		640	740	840				590	690	790				635	485	555	505	435	140
5		690	790	890				630	730	830				710	545	620	560	480	155
6		740	840	940				680	780	880				770	600	680	620	540	165
7		780	880	980				720	820	920				820	650	730	670	590	175
8		810	910	1010				740	840	940				890	690	780	710	620	190
9		850	950	1050				780	880	980				935	725	825	755	665	200
10			980	1080	1180				910	1010	1110			985	770	875	800	715	210
12.5			1060	1160	1260				980	1080	1180			1100	860	970	890	780	230
15			1130	1230	1330				1050	1150	1250			1190	950	1060	980	870	250
17.5			1190	1290	1390				1100	1200	1300			1295	1030	1145	1060	935	265
20			1250	1350	1450				1150	1250	1350			1375	1100	1225	1130	1000	285
22.5			1310	1410	1510				1220	1320	1420			1450	1180	1300	1210	1080	300
25			1360	1460	1560				1270	1370	1470			1540	1240	1370	1270	1120	315
27.5			1440	1540	1640				1340	1440	1540			1610	1310	1440	1340	1190	330
30			1500	1600	1700				1400	1500	1600			1670	1370	1500	1400	1250	345
32.5				1610	1710	1810				1500	1600	1700		1750	1420	1580	1450	1270	360
35				1650	1750	1850				1540	1640	1740		1810	1480	1620	1510	1330	375
37.5				1690	1790	1890				1580	1680	1780		1890	1540	1680	1570	1370	385
40				1730	1830	1930				1620	1720	1820		1940	1590	1730	1620	1420	395
45				1840	1940	2040				1710	1810	1910		2070	1680	1840	1710	1510	420
50				1930	2030	2130				1800	1900	2000		2160	1770	1930	1800	1600	440
55				2030	2130	2230				1890	1990	2090		2280	1860	2030	1890	1680	465
60				2110	2210	2310				1970	2070	2170		2360	1940	2110	1970	1760	485

Notes:

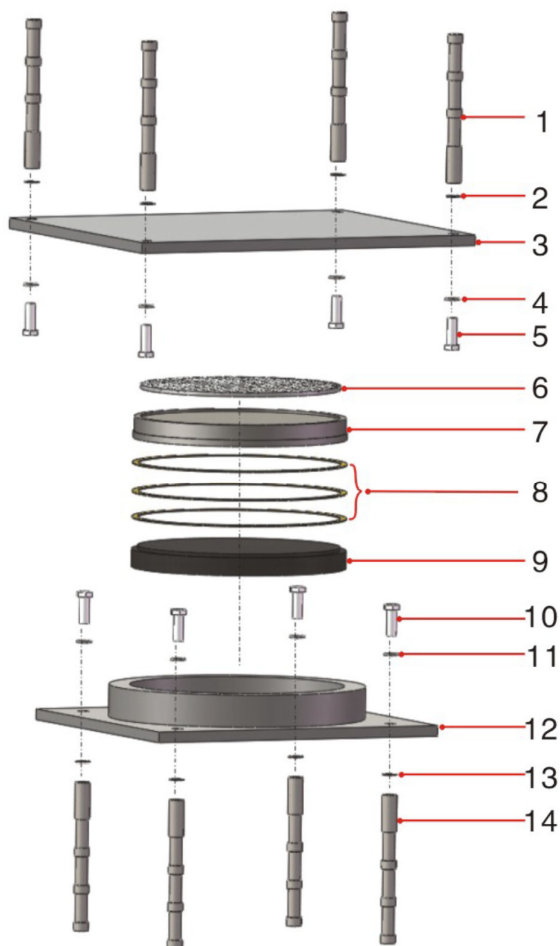
- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

# Free Sliding type PM

Vertical load (MN) /  $L_{\text{Long.}}$  Movement (mm) /  $L_{\text{Transv.}}$  Movement (mm)

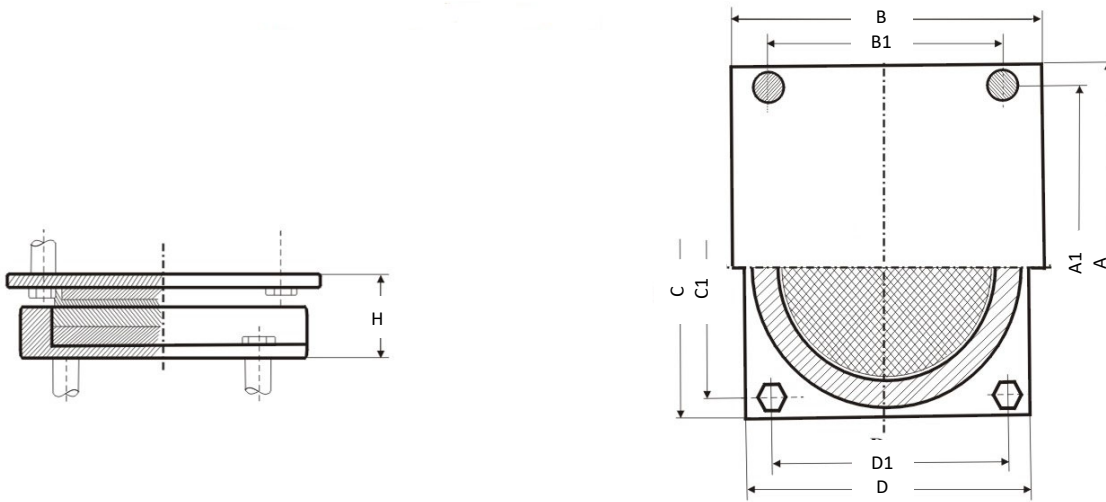
Typical Values:

- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{\text{SLS}}$
- Rotation:  $\pm 0.03$  rad



1. Upper Anchors
2. Washers
3. Top Plate with Inox
4. Washers
5. Upper Bolts
6. PTFE
7. Piston
8. Sealing Ring
9. Rubber Disc
10. Lower Bolts
11. Washers
12. Lower Plate
13. Washers
14. Lower Anchors

# Free Sliding type PM-Typical Dimensions



Type	A						A1						B	B1	C(D)	C1(D1)	H	
	MN	±50	±100	±150	±200	±250	±300	±50	±100	±150	±200	±250						±300
0.8	320	420	520				280	380	480					300	260	245	200	80
1	340	440	540				300	400	500					320	280	270	225	85
1.25	360	460	560				320	420	520					340	300	300	250	90
1.5	380	480	580				340	440	540					360	320	330	275	95
2	420	520	620				380	480	580					400	360	385	320	105
2.5	460	560	660				420	520	620					440	400	425	355	110
3	490	590	690				440	540	640					465	415	465	385	115
3.5		620	720	820				570	670	770				500	450	500	415	125
4		640	740	840				590	690	790				540	490	540	450	135
5		690	790	890				630	730	830				600	540	600	500	150
6		740	840	940				680	780	880				655	595	655	540	160
7		780	880	980				720	820	920				705	640	705	580	170
8		810	910	1010				740	840	940				755	680	755	630	180
9		850	950	1050				780	880	980				800	720	800	660	190
10			980	1080	1180				910	1010	1110			845	765	845	700	200
12.5			1060	1160	1260				980	1080	1180			945	855	945	780	220
15			1130	1230	1330				1050	1150	1250			1030	940	1030	860	235
17.5			1190	1290	1390				1100	1200	1300			1110	1020	1110	920	250
20			1250	1350	1450				1150	1250	1350			1190	1090	1190	990	265
22.5			1310	1410	1510				1220	1320	1420			1260	1160	1260	1050	275
25			1360	1460	1560				1270	1370	1470			1340	1230	1340	1110	290
27.5			1440	1540	1640				1340	1440	1540			1410	1300	1410	1170	300
30			1500	1600	1700				1400	1500	1600			1470	1360	1470	1220	315
32.5				1610	1710	1810				1500	1600	1700		1525	1400	1525	1270	325
35				1650	1750	1850				1540	1640	1740		1585	1460	1585	1320	340
37.5				1690	1790	1890				1580	1680	1780		1645	1520	1645	1370	350
40				1730	1830	1930				1620	1720	1820		1690	1570	1690	1410	360
45				1840	1940	2040				1710	1810	1910		1800	1660	1800	1500	380
50				1930	2030	2130				1800	1900	2000		1890	1750	1890	1570	400
55				2030	2130	2230				1890	1990	2090		1990	1850	1990	1660	420
60				2110	2210	2310				1970	2070	2170		2070	1930	2070	1720	435

Notes:

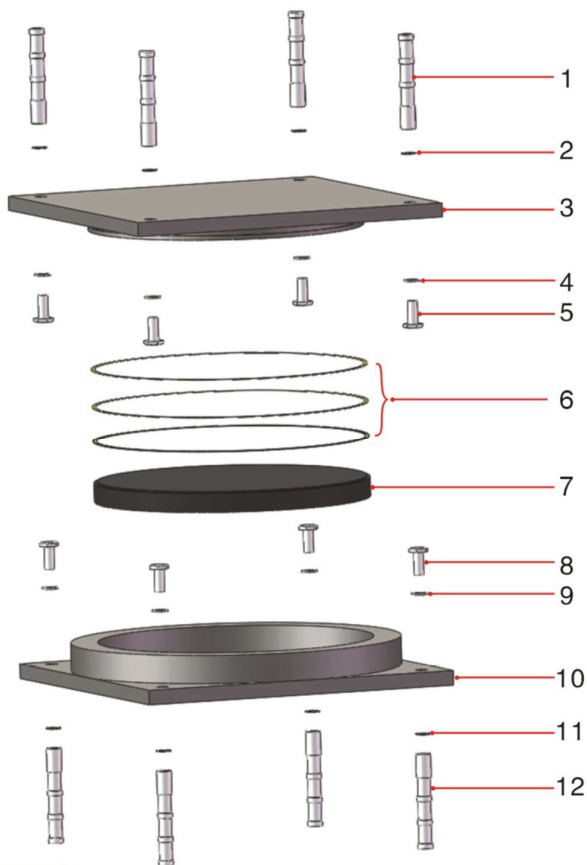
- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

# Fixed type PFX

Vertical load (MN) - <sub>Long.</sub> Horizontal Load (MN) - <sub>Transv.</sub> Horizontal Load (MN)

## Typical Values:

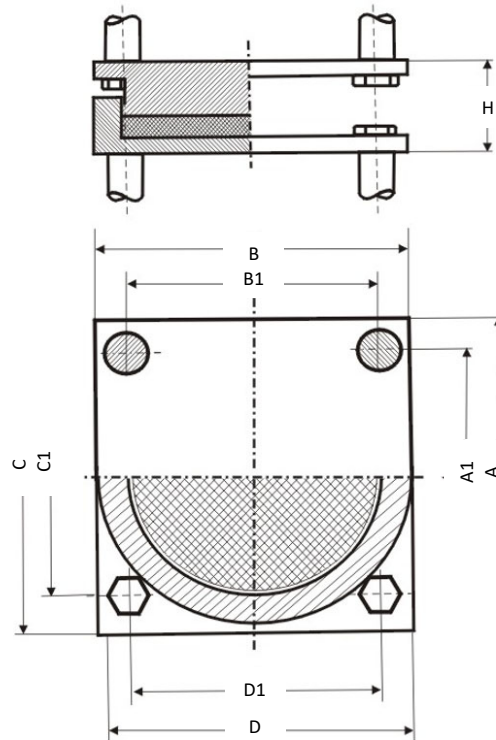
- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Horizontal load at SLS (H):  $(0.1 \text{ to } 0.2) \times V$
- Horizontal load at ULS:  $1.5 \times H_{SLS}$
- Rotation:  $\pm 0.03 \text{ rad}$





# Fixed type PFX-Typical Dimensions

Type MN	A,B,C,D	A1,B1,C1,D1	H
0.8	250	210	75
1	280	235	80
1.25	310	260	85
1.5	340	290	90
2	390	330	100
2.5	435	370	110
3	475	400	115
3.5	510	430	125
4	545	460	135
5	610	520	150
6	670	570	160
7	720	610	170
8	770	650	180
9	815	690	190
10	860	730	200
12.5	960	810	220
15	1050	890	235
17.5	1135	960	255
20	1220	1040	270
22.5	1290	1100	285
25	1360	1150	300
27.5	1430	1220	315
30	1490	1270	330
32.5	1550	1320	340
35	1610	1370	355
37.5	1670	1420	365
40	1720	1460	375
45	1830	1560	395
50	1920	1630	420
55	2020	1720	435
60	2100	1790	455

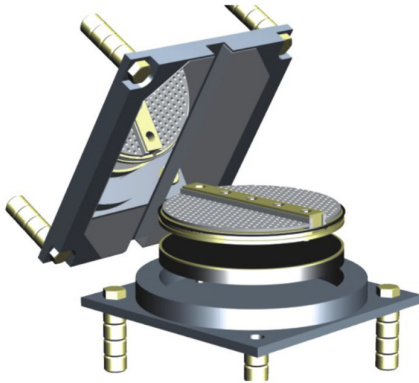


**Notes:**

- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

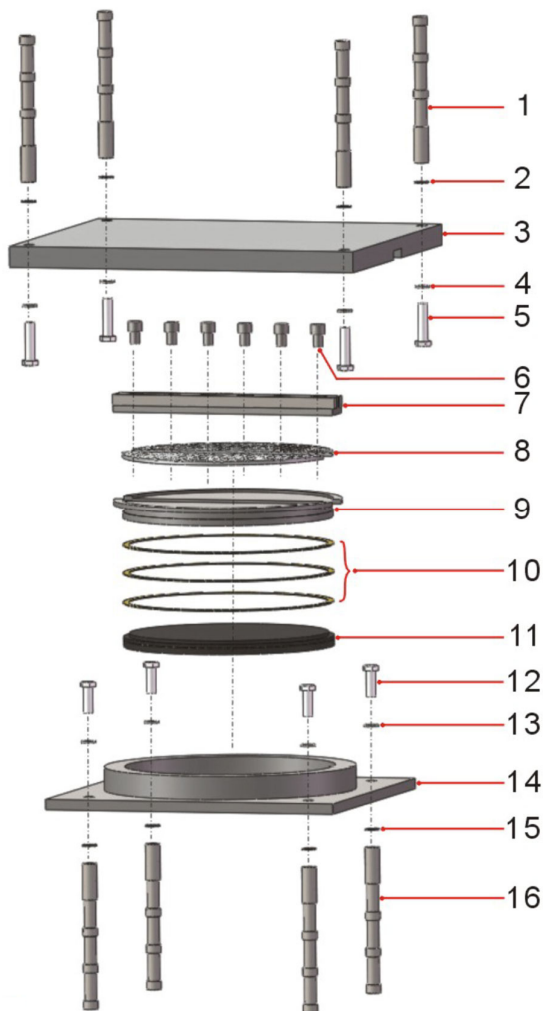
# Sliding Guided type PSG

Vertical load (MN) / Long. or Transv. Movement (mm) – Long. or Transv. Horizontal load (MN)



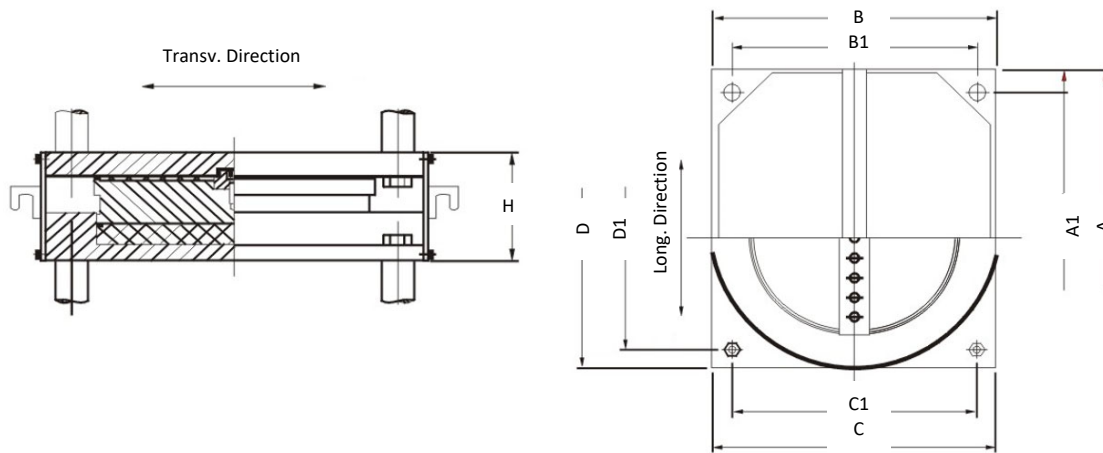
## Typical Values:

- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Horizontal load at SLS (H):  $(0.1 \text{ to } 0.2) \times V$
- Horizontal load at ULS:  $1.5 \times H_{SLS}$
- Rotation:  $\pm 0.03 \text{ rad}$



1. Upper Anchors
2. Washers
3. Top Plate with Inox
4. Washers
5. Upper Bolts
6. Guide Bar Bolts
7. Guide Bar
8. PTFE
9. Piston
10. Sealing Ring
11. Rubber Disc
12. Lower Bolts
13. Washers
14. Lower Plate
15. Washers
16. Lower Anchors

# Sliding Guided type PSG-Typical Dimensions



Type	A						A1						B,C,D	B1, C1, D1	H
	±50	±100	±150	±200	±250	±300	±50	±100	±150	±200	±250	±300			
0.8	350	450	550				300	400	500				250	180	103
1	370	470	570				320	420	520				275	200	106
1.25	400	500	600				340	440	540				305	230	108
1.5	430	530	630				370	470	570				335	260	115
2	485	585	685				430	530	630				385	310	123
2.5	530	630	730				470	570	670				430	355	130
3	570	670	770				510	610	710				470	370	136
3.5		690	790	890				620	720	820			510	400	150
4		710	810	910				640	740	840			540	435	160
5		780	880	980				710	810	910			610	480	175
6		820	920	1020				740	840	940			670	540	185
7		870	970	1070				790	890	990			720	590	200
8		930	1030	1130				830	930	1030			770	650	210
9		960	1060	1160				860	960	1060			810	680	220
10		1000	1100	1200				900	1000	1100			860	740	235
12.5		1060	1160	1260				960	1060	1160			960	800	255
15		1150	1250	1350				1050	1150	1250			1050	900	275
17.5		1230	1330	1430				1100	1200	1300			1130	950	295
20		1290	1390	1490				1160	1260	1360			1210	1030	310
22.5		1350	1450	1550				1220	1320	1420			1290	1110	325
25		1400	1500	1600				1240	1340	1440			1360	1150	340
27.5		1470	1570	1670				1310	1410	1510			1420	1220	355
30		1530	1630	1730				1370	1470	1570			1480	1270	370
32.5		1580	1680	1780				1430	1530	1630			1540	1320	385
35		1620	1720	1820				1470	1570	1670			1600	1380	400
37.5		1660	1760	1860				1510	1610	1710			1660	1420	410
40		1710	1810	1910				1560	1660	1760			1710	1480	420
45		1820	1920	2020				1650	1750	1850			1820	1580	440
50		1910	2010	2110				1740	1840	1940			1910	1670	460
55				2040	2140	2340			1850	1950	2050	2150	2010	1730	485
60				2110	2210	2310			1900	2000	2100	2200	2090	1800	505

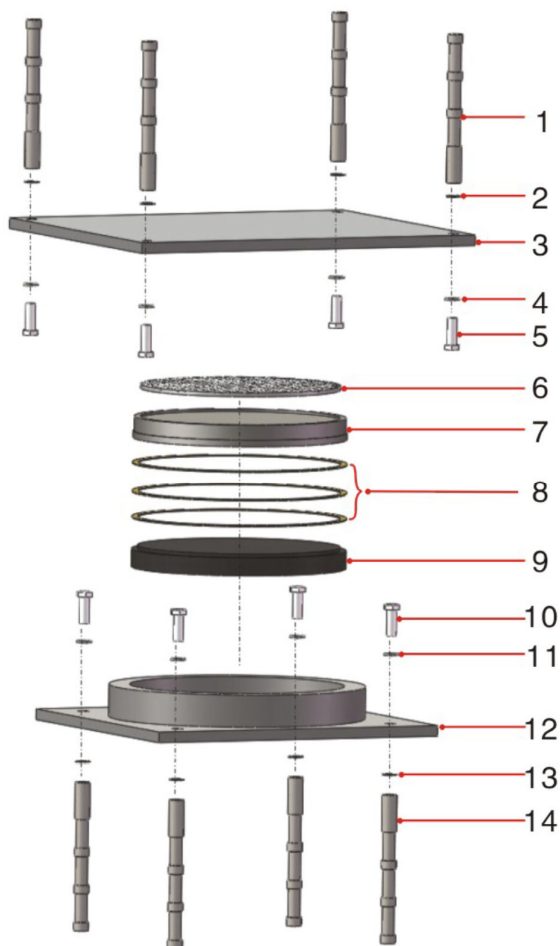
Notes:  
 - Above values are typical - subject to specifications & project requirements.  
 - Dimensions in mm

# Free Sliding type PFS

Vertical load (MN) /  $L_{ong.}$  Movement (mm) /  $T_{ransv.}$  Movement (mm)

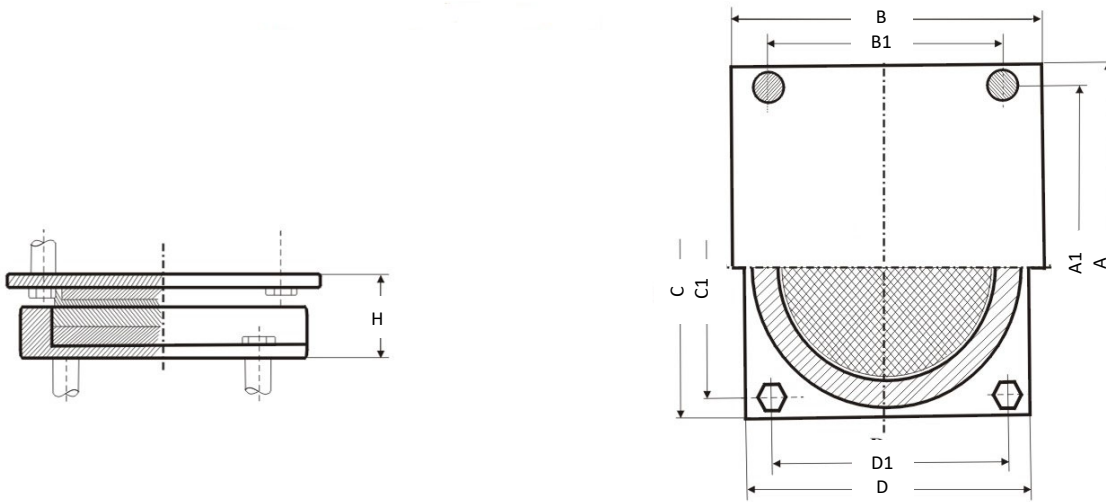
Typical Values:

- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Rotation:  $\pm 0.03$  rad



1. Upper Anchors
2. Washers
3. Top Plate with Inox
4. Washers
5. Upper Bolts
6. PTFE
7. Piston
8. Sealing Ring
9. Rubber Disc
10. Lower Bolts
11. Washers
12. Lower Plate
13. Washers
14. Lower Anchors

# Free Sliding type PFS-Typical Dimensions



Type	A						A1						B	B1	C(D)	C1(D1)	H	
	MN	±50	±100	±150	±200	±250	±300	±50	±100	±150	±200	±250						±300
0.8	320	420	520				280	380	480					300	260	245	200	80
1	340	440	540				300	400	500					320	280	270	225	85
1.25	360	460	560				320	420	520					340	300	300	250	90
1.5	380	480	580				340	440	540					360	320	330	275	95
2	420	520	620				380	480	580					400	360	385	320	105
2.5	460	560	660				420	520	620					440	400	425	355	110
3	490	590	690				440	540	640					465	415	465	385	115
3.5		620	720	820				570	670	770				500	450	500	415	125
4		640	740	840				590	690	790				540	490	540	450	135
5		690	790	890				630	730	830				600	540	600	500	150
6		740	840	940				680	780	880				655	595	655	540	160
7		780	880	980				720	820	920				705	640	705	580	170
8		810	910	1010				740	840	940				755	680	755	630	180
9		850	950	1050				780	880	980				800	720	800	660	190
10			980	1080	1180				910	1010	1110			845	765	845	700	200
12.5			1060	1160	1260				980	1080	1180			945	855	945	780	220
15			1130	1230	1330				1050	1150	1250			1030	940	1030	860	235
17.5			1190	1290	1390				1100	1200	1300			1110	1020	1110	920	250
20			1250	1350	1450				1150	1250	1350			1190	1090	1190	990	265
22.5			1310	1410	1510				1220	1320	1420			1260	1160	1260	1050	275
25			1360	1460	1560				1270	1370	1470			1340	1230	1340	1110	290
27.5			1440	1540	1640				1340	1440	1540			1410	1300	1410	1170	300
30			1500	1600	1700				1400	1500	1600			1470	1360	1470	1220	315
32.5				1610	1710	1810				1500	1600	1700		1525	1400	1525	1270	325
35				1650	1750	1850				1540	1640	1740		1585	1460	1585	1320	340
37.5				1690	1790	1890				1580	1680	1780		1645	1520	1645	1370	350
40				1730	1830	1930				1620	1720	1820		1690	1570	1690	1410	360
45				1840	1940	2040				1710	1810	1910		1800	1660	1800	1500	380
50				1930	2030	2130				1800	1900	2000		1890	1750	1890	1570	400
55				2030	2130	2230				1890	1990	2090		1990	1850	1990	1660	420
60				2110	2210	2310				1970	2070	2170		2070	1930	2070	1720	435

Notes:

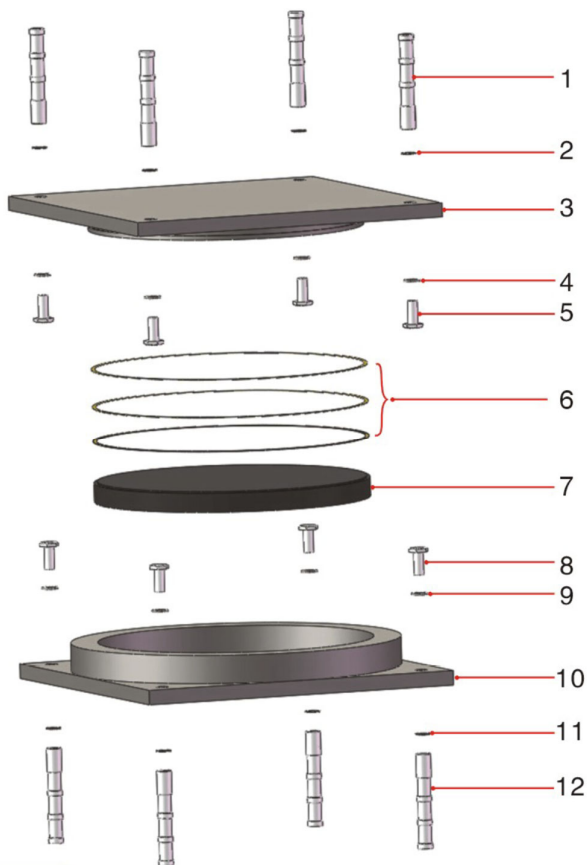
- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

# Fixed type PF

Vertical load (MN) - <sub>Long.</sub> Horizontal Load (MN) - <sub>Transv.</sub> Horizontal Load (MN)

## Typical Values:

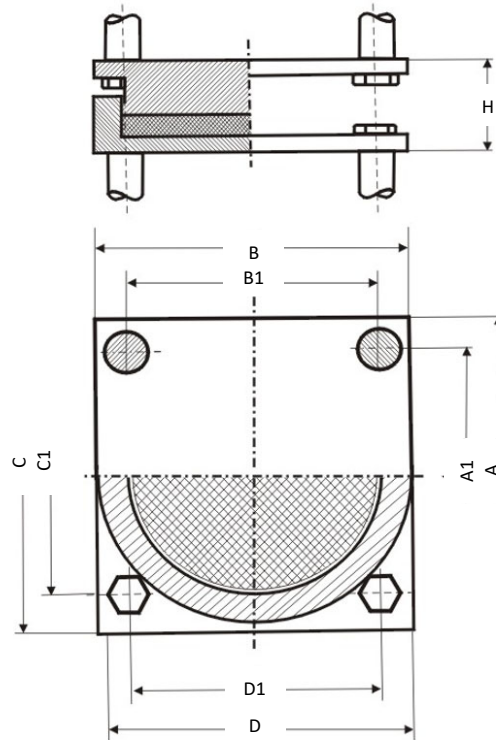
- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Horizontal load at SLS (H):  $(0.1 \text{ to } 0.2) \times V$
- Horizontal load at ULS:  $1.5 \times H_{SLS}$
- Rotation:  $\pm 0.03 \text{ rad}$



1. Upper Anchors
2. Washers
3. Top Plate
4. Washers
5. Upper Bolts
6. Sealing Ring
7. Rubber Disc
8. Lower Bolts
9. Washers
10. Lower Plate
11. Washers
12. Lower Anchors

## Fixed type PF-Typical Dimensions

Type MN	A,B,C,D	A1,B1,C1,D1	H
0.8	250	210	75
1	280	235	80
1.25	310	260	85
1.5	340	290	90
2	390	330	100
2.5	435	370	110
3	475	400	115
3.5	510	430	125
4	545	460	135
5	610	520	150
6	670	570	160
7	720	610	170
8	770	650	180
9	815	690	190
10	860	730	200
12.5	960	810	220
15	1050	890	235
17.5	1135	960	255
20	1220	1040	270
22.5	1290	1100	285
25	1360	1150	300
27.5	1430	1220	315
30	1490	1270	330
32.5	1550	1320	340
35	1610	1370	355
37.5	1670	1420	365
40	1720	1460	375
45	1830	1560	395
50	1920	1630	420
55	2020	1720	435
60	2100	1790	455

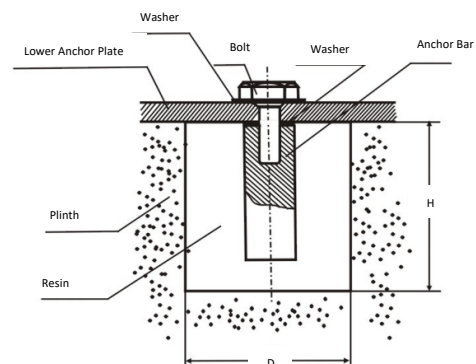


### Notes:

- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

## Typical Anchor Bars Recess for Pot Bearings

Type MN	Dimensions (mm)	
	D	H
0.8 to 4	80	300
5 to 7	100	360
8 to 10	120	360
12.5 to 17.5	140	420
20 to 22.5	160	420
25 to 30	180	480
32.5 to 40	200	480
45 to 50	220	540
55 to 60	240	540

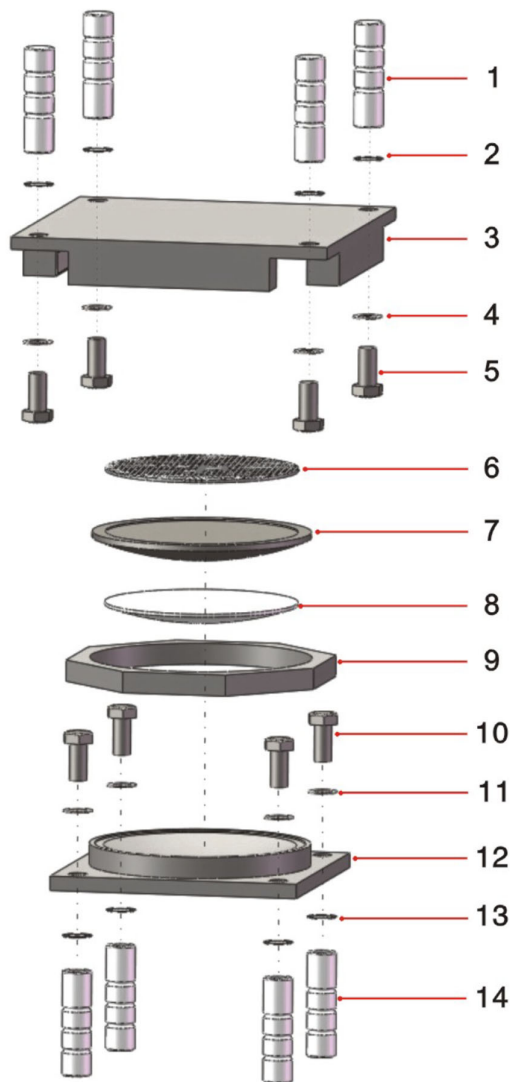


# Spherical Bearings

Spherical bearings are designed according to EN-1337, AASHTO LRFD and other Int'l standards.

## Sliding Guided type SSG

Vertical load (MN) / Long. or Transv. Movement (mm) – Long. or Transv. Horizontal load (MN)



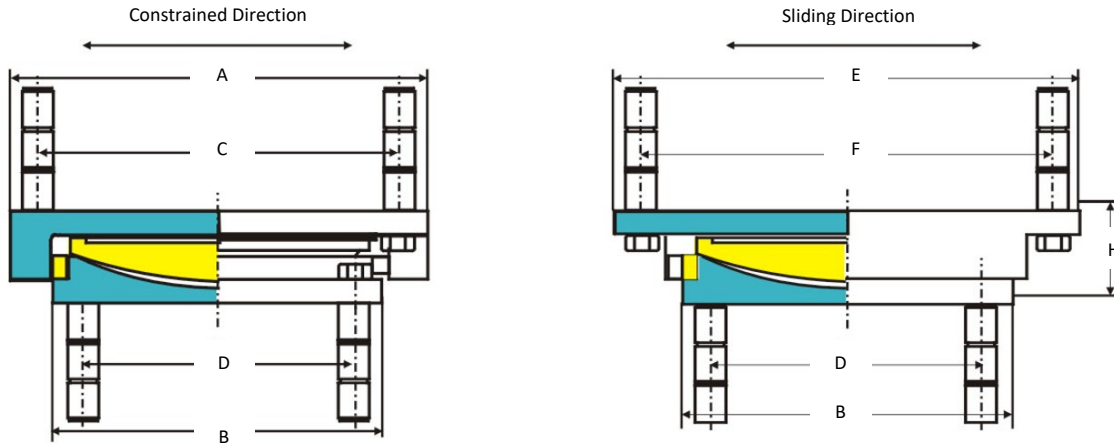
### Typical Values:

- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Horizontal load at SLS (H):  $(0.1 \text{ to } 0.2) \times V$
- Horizontal load at ULS:  $1.5 \times H_{SLS}$
- Rotation:  $\pm 0.04 \text{ rad}$

1. Upper Anchors
2. Washers
3. Top Plate with Inox
4. Washers
5. Upper Bolts
6. PTFE
7. Concave
8. Concave PTFE
9. Guide Rings
10. Lower Bolts
11. Washers
12. Lower Plate
13. Washers
14. Lower Anchors



# Sliding Guided type SSG-Typical Dimensions



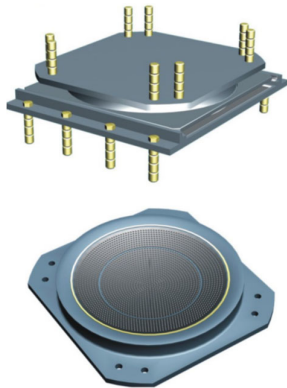
Type	Load Capacity	Movement	Dimensions (mm)							Anchor Bolt	Socket
			A	B	C	D	E	F	H		
MN	KN	mm								mm	mm
1	1000	± 50/±100	300	220	260	180	300/400	260/360	85	M16 x 55	26 x 150
1.5	1500	± 50/± 100	350	270	300	220	350/450	300/400	90	M20 x 60	33 x 150
2	2000	± 50/±100	390	300	340	250	380/480	330/430	95	M20 x 60	33 x 150
2.5	2500	± 50/±100	430	340	370	280	410/510	350/450	100	M24 X 65	40 x 200
3	3000	± 50/±100	480	380	420	320	460/560	400/500	105	M24 x 65	40 x 200
4	4000	± 50/± 100	550	430	480	360	500/600	430/530	115	M30 x 75	50 X 200
5	5000	±100/± 150	610	480	540	410	640/740	570/670	125	M30 x 80	50 x 250
6	6000	±100/± 150	660	510	570	420	670/770	580/680	135	M36 X 85	60 x 250
7	7000	±100/± 150	720	560	620	460	720/820	620/720	140	M39 x 90	66 X 250
8	8000	±100/± 150	770	600	660	490	730/830	620/720	150	M42 x 90	72 x 250
9	9000	±100/± 150	810	640	700	530	770/870	660/760	160	M42 x 95	72 x 300
10	10000	±100/± 150	850	670	730	550	780/880	660/760	165	M45 X 100	76 x 300
12.5	12500	±150/±200	950	750	810	610	970/1070	830/930	185	M52x 110	88 x 300
15	15000	±150/±200	1040	820	890	670	1020/1120	870/970	195	M56 x 120	94 x 350
17.5	17500	±150/±200	1130	890	960	720	1080/1180	910/1010	210	M60 x 125	100 x 350
20	20000	±150/±200	1200	950	1020	770	1130/1230	950/1050	220	M64 X 130	105 x 350
22.5	22500	±150/±200	1270	1010	1090	830	1170/1270	990/1090	230	M64 X 140	105 x 400
25	25000	±150/±200	1330	1060	1130	860	1210/1310	1010/1110	240	M72 x 145	120 x 400
27.5	27500	±150/±200	1390	1110	1190	910	1260/1360	1060/1160	250	M72 x 150	120 x 400
30	30000	±150/±200	1440	1160	1240	960	1300/1400	1100/1200	260	M72 X 150	126 x 450
32.5	32500	±200/±250	1510	1210	1300	1000	1450/1550	1240/1340	270	M80 x 165	132 x 450
35	35000	±200/±250	1560	1250	1340	1030	1480/1580	1260/1360	280	M84 x 165	140 x 450
37.5	37500	±200/±250	1620	1300	1400	1080	1520/1620	1300/1400	290	M84 x 170	140 x 500
40	40000	±200/±250	1670	1340	1430	1100	1550/1650	1310/1410	300	M90 X 175	150 x 500
45	45000	±200/±250	1770	1420	1520	1170	1610/1710	1360/1460	315	M96 X 190	160 x 550
50	50000	±200/±250	1880	1500	1620	1240	1680/1780	1420/1520	335	M100 x 205	165 x 550
60	60000	±250/±300	2 40	1640	1750	1 50	1 00/2000	1610/1710	365	M106 x 220	175 x 600
70	70000	±250/±300	2200	1770	1880	1450	2020/2120	1700/1800	400	M115x235	180 x 600
80	80000	±250/±300	2340	1890	2000	1550	2240/2340	1900/2000	430	M125 X 250	200 X 650
90	90000	±300/±350	2490	2010	2130	1650	2350/2450	1990/2090	465	M130 x 260	210 X 650
100	100000	±300/±350	2620	2120	2250	1750	2450/2550	2080/2180	495	M136 x 275	220 X 700
125	125000	±350/±400	2910	2370	2490	1950	2760/2860	2340/2440	535	M150 X 300	240 X 850
150	150000	±350/±400	3200	2600	2720	2120	2960/3060	2480/2580	580	M175 x 330	270 X 950

Notes:

- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

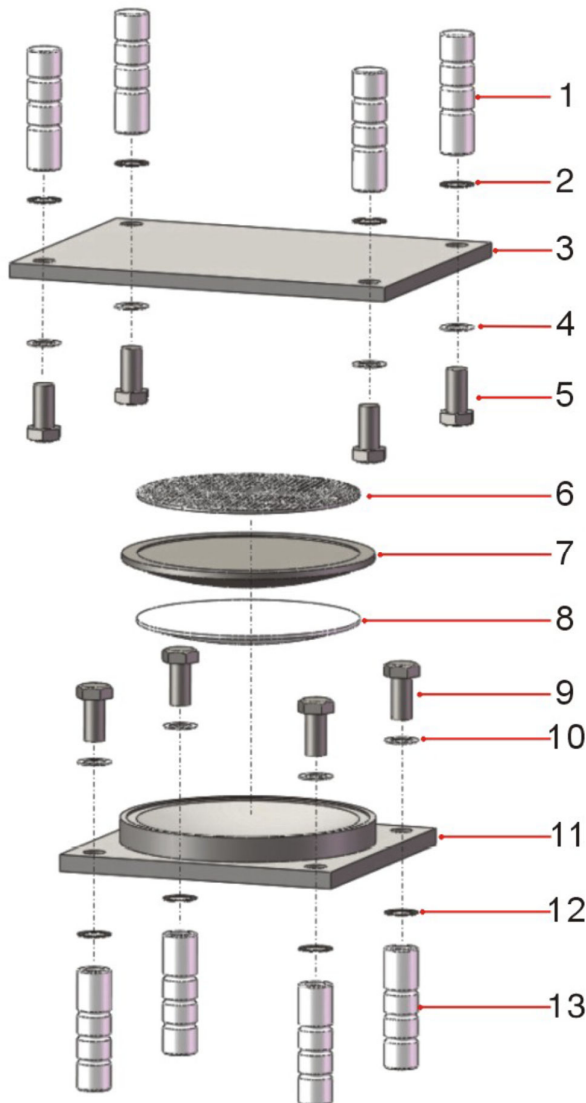
# Free Sliding type SFS

Vertical load (MN) / Long. Movement (mm) / Transv. Movement (mm)



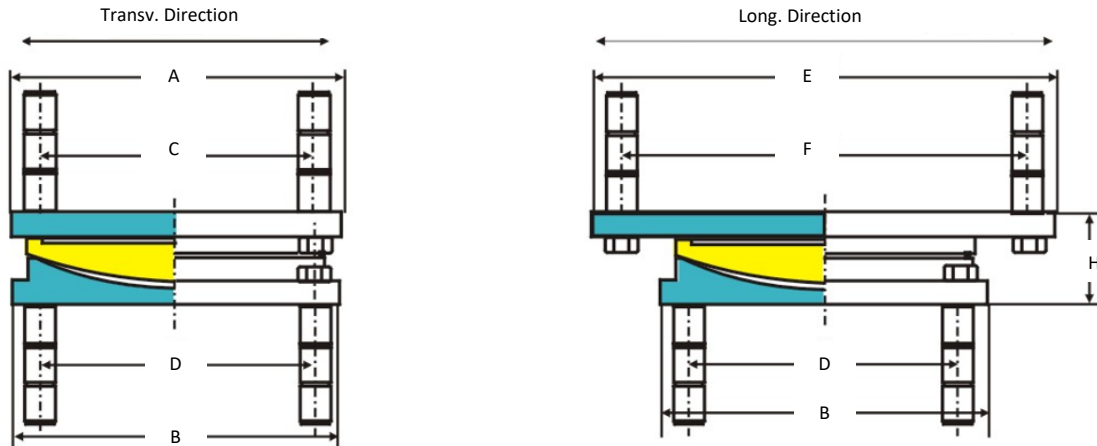
Typical Values:

- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Rotation:  $\pm 0.03$  rad



1. Upper Anchors
2. Washers
3. Top Plate
4. Washers
5. Upper Bolts
6. PTFE
7. Concave
8. Concave PTFE
9. Lower Bolts
10. Washers
11. Lower Plate
12. Washers
13. Lower Anchors

# Free Sliding type SFS-Typical Dimensions



Type	Load Capacity	Movement	Dimensions (mm)							Anchor Bolt D x L	Socket D x L
			A	B	C	D	E	F	H		
MN	KN	mm								mm	mm
1	1000	± 50/±100	280	220	240	180	300/400	260/360	85	M16 x 55	26 x 150
1.5	1500	± 50/± 100	330	270	280	220	350/450	300/400	90	M20 x 60	33 x 150
2	2000	± 50/±100	360	300	310	250	380/480	330/430	95	M20 x 60	33 x 150
2.5	2500	± 50/±100	390	340	330	280	410/510	350/450	100	M24 X 65	40 x 200
3	3000	± 50/±100	430	380	370	320	460/560	400/500	105	M24 x 65	40 x 200
4	4000	± 50/± 100	470	430	400	360	500/600	430/530	115	M30 x 75	50 X 200
5	5000	±100/± 150	510	480	440	410	640/740	570/670	125	M30 x 80	50 x 250
6	6000	±100/± 150	540	510	450	420	670/770	580/680	135	M36 X 85	60 x 250
7	7000	±100/± 150	580	560	480	460	720/820	620/720	140	M39 x 90	66 X 250
8	8000	±100/± 150	610	600	500	490	730/830	620/720	150	M42 x 90	72 x 250
9	9000	±100/± 150	640	640	530	530	770/870	660/760	160	M42 x 95	72 x 300
10	10000	±100/± 150	670	670	550	550	780/880	660/760	165	M45 X 100	76 x 300
12.5	12500	±150/±200	750	750	610	610	970/1070	830/930	185	M52x 110	88 x 300
15	15000	±150/±200	790	820	640	670	1020/1120	870/970	195	M56 x 120	94 x 350
17.5	17500	±150/±200	850	890	680	720	1080/1180	910/1010	210	M60 x 125	100 x 350
20	20000	±150/±200	910	950	730	770	1130/1230	950/1050	220	M64 X 130	105 x 350
22.5	22500	±150/±200	950	1010	770	830	1170/1270	990/1090	230	M64 X 140	105 x 400
25	25000	±150/±200	990	1060	790	860	1210/1310	1010/1110	240	M72 x 145	120 x 400
27.5	27500	±150/±200	1040	1110	840	910	1260/1360	1060/1160	250	M72 x 150	120 x 400
30	30000	±150/±200	1080	1160	880	960	1300/1400	1100/1200	260	M72 X 150	126 x 450
32.5	32500	±200/±250	1120	1210	910	1000	1450/1550	1240/1340	270	M80 x 165	132 x 450
35	35000	±200/±250	1150	1250	930	1030	1480/1580	1260/1360	280	M84 x 165	140 x 450
37.5	37500	±200/±250	1190	1300	970	1080	1520/1620	1300/1400	290	M84 x 170	140 x 500
40	40000	±200/±250	1220	1340	980	1100	1550/1650	1310/1410	300	M90 X 175	150 x 500
45	45000	±200/±250	1280	1420	1030	1170	1610/1710	1360/1460	315	M96 X 190	160 x 550
50	50000	±200/±250	1350	1500	1090	1240	1680/1780	1420/1520	335	M100 x 205	165 x 550
60	60000	±250/±300	1480	1640	1190	1350	1900/2000	1610/1710	RS	M106 x 220	175 x 600
70	70000	±250/±300	1600	1770	1280	1450	2020/2120	1700/1800	400	M115x235	180 x 600
80	80000	±250/±300	1720	1890	1380	1550	2240/2340	1900/2000	430	M125 X 250	200 X 650
90	90000	±300/±350	1820	2010	1460	1650	2350/2450	1990/2090	465	M130 x 260	210 X 650
100	100000	±300/±350	1940	2120	1570	1750	2450/2550	2080/2180	495	M136 x 275	220 X 700
125	125000	±350/±400	2140	2370	1720	1950	2760/2860	2340/2440	535	M150 X 300	240 X 850
150	150000	±350/±400	2330	2600	1850	2120	2960/3060	2480/2580	580	M175 x 330	270 X 950

**Notes:**

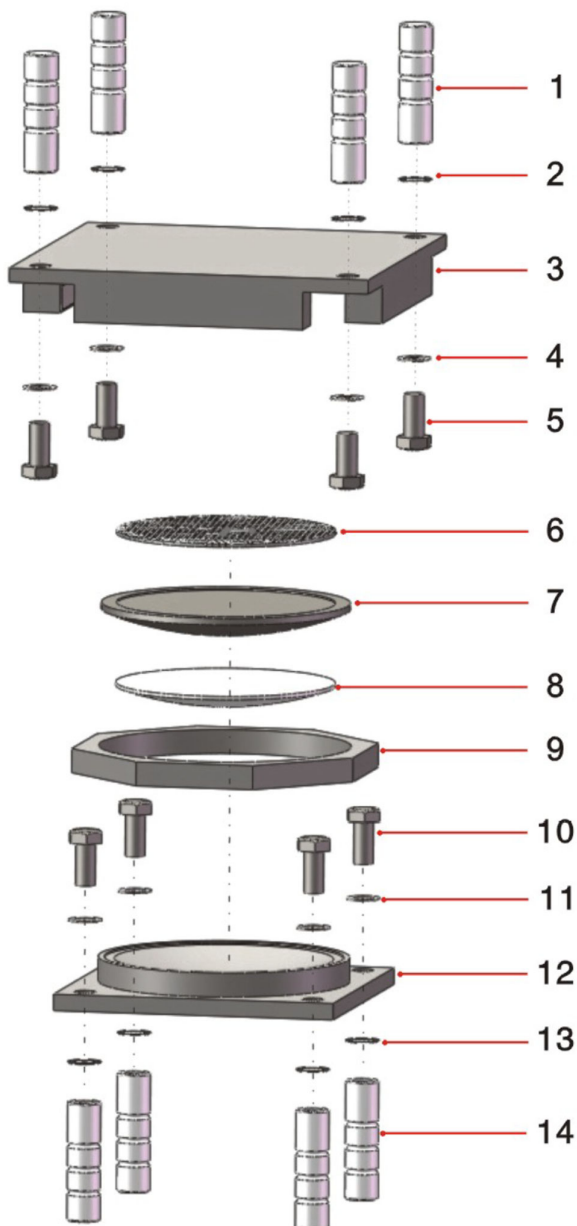
- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

# Fixed type SF

Vertical load (MN) - <sub>Long.</sub> Horizontal Load (MN) - <sub>Transv.</sub> Horizontal Load (MN)

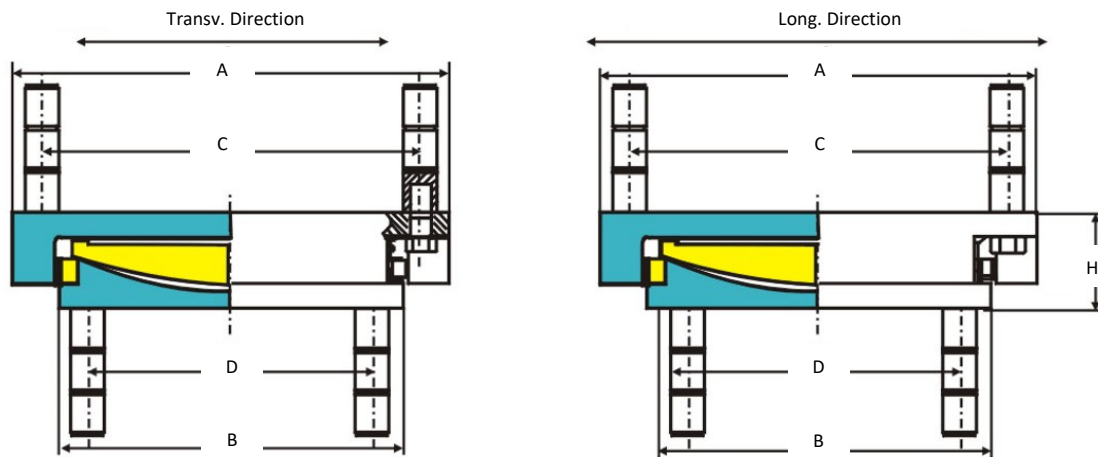
Typical Values:

- Vertical load (V): the nominal load at SLS
- Vertical load at ULS:  $1.5 \times V_{SLS}$
- Horizontal load at SLS (H):  $(0.1 \text{ to } 0.2) \times V$
- Horizontal load at ULS:  $1.5 \times H_{SLS}$
- Rotation:  $\pm 0.03 \text{ rad}$



1. Upper Anchors
2. Washers
3. Top Plate
4. Washers
5. Upper Bolts
6. PTFE
7. Concave
8. Concave PTFE
9. Guide Rings
10. Lower Bolts
11. Washers
12. Lower Plate
13. Washers
14. Lower Anchors

# Fixed type SF-Typical Dimensions



Type	Load Capacity		Movement	Dimensions (mm)					Anchor Bolt D x L	Socket D x L
	MN	KN		mm	A	B	C	D		
1		1000	± 50/±100	300	220	260	180	85	M16 x 55	26 x 150
1.5		1500	± 50/± 100	350	270	300	220	90	M20 x 60	33 x 150
2		2000	± 50/±100	390	300	340	250	95	M20 x 60	33 x 150
2.5		2500	± 50/±100	430	340	370	280	100	M24 X 65	40 x 200
3		3000	± 50/±100	480	380	420	320	105	M24 x 65	40 x 200
4		4000	± 50/± 100	550	430	480	360	115	M30 x 75	50 X 200
5		5000	±100/± 150	610	480	540	410	125	M30 x 80	50 x 250
6		6000	±100/± 150	660	510	570	420	135	M36 X 85	60 x 250
7		7000	±100/± 150	720	560	620	460	140	M39 x 90	66 X 250
8		8000	±100/± 150	770	600	660	490	150	M42 x 90	72 x 250
9		9000	±100/± 150	810	640	700	530	160	M42 x 95	72 x 300
10		10000	±100/± 150	850	670	730	550	165	M45 X 100	76 x 300
12.5		12500	±150/±200	950	750	810	610	185	M52x 110	88 x 300
15		15000	±150/±200	1040	820	890	670	195	M56 x 120	94 x 350
17.5		17500	±150/±200	1130	890	960	720	210	M60 x 125	100 x 350
20		20000	±150/±200	1200	950	1020	770	220	M64 X 130	105 x 350
22.5		22500	±150/±200	1270	1010	1090	830	230	M64 X 140	105 x 400
25		25000	±150/±200	1330	1060	1130	860	240	M72 x 145	120 x 400
27.5		27500	±150/±200	1390	1110	1190	910	250	M72 x 150	120 x 400
30		30000	±150/±200	1440	1160	1240	960	260	M72 X 150	126 x 450
32.5		32500	±200/±250	1510	1210	1300	1000	270	M80 x 165	132 x 450
35		35000	±200/±250	1560	1250	1340	1030	280	M84 x 165	140 x 450
37.5		37500	±200/±250	1620	1300	1400	1080	290	M84 x 170	140 x 500
40		40000	±200/±250	1670	1340	1430	1100	300	M90 X 175	150 x 500
45		45000	±200/±250	1770	1420	1520	1170	315	M96 X 190	160 x 550
50		50000	±200/±250	1880	1500	1620	1240	335	M100 x 205	165 x 550
60		60000	±250/±300	2 40	1640	1750	1 50	365	M106 x 220	175 x 600
70		70000	±250/±300	2200	1770	1880	1450	400	M115x235	180 x 600
80		80000	±250/±300	2340	1890	2000	1550	430	M125 X 250	200 X 650
90		90000	±300/±350	2490	2010	2130	1650	465	M130 x 260	210 X 650
100		100000	±300/±350	2620	2120	2250	1750	495	M136 x 275	220 X 700
125		125000	±350/±400	2910	2370	2490	1950	535	M150 X 300	240 X 850
150		150000	±350/±400	3200	2600	2720	2120	580	M175 x 330	270 X 950

Notes:

- Above values are typical - subject to specifications & project requirements.
- Dimensions in mm

# Typical Maintenance of Bearings

- Annual inspection to evaluate the deterioration rate (see recommended below Table):

Grade of Deterioration	Crack & Deformation of Steel Elements	Wear of PTFE	Over Displacement	Over Rotation	Defects on Anchoring System	Corrosion of Steel Elements
<b>Extremely serious</b>	Cracks of anchor plates	> 1.5mm	More than 10mm	More than 30% of design rotation	< 50%	> 30% of overall surface
<b>Serious</b>	Cracks of anchoring system	< 1.5mm	More than 10mm	More than 25% of design rotation	< 25%	< 20% of overall surface
<b>Quite Serious</b>	Cracks everywhere apart from anchoring	< 1mm	Less than 10mm	More than 20% of design rotation	< 15%	< 15% of overall surface
<b>Moderate</b>	Cracks of elements except steel parts	< 0.5mm	Less than 10mm	More than 10% of design rotation	< 10%	< 10% of overall surface
<b>Light</b>	Cracks of elements except steel parts	< 0.2mm	Less than 10mm	More than 5% of design rotation	< 5%	< 5% of overall surface

- Dry clean anchoring system (bolts-washers) and check bolts tightening.
- Check the anticorrosion painting layer. If any damages (peeling, cracks tec.) repair locally.
- All inspection defects together with repairs must be recorded.
- For any abnormal condition refer to manufacturer.



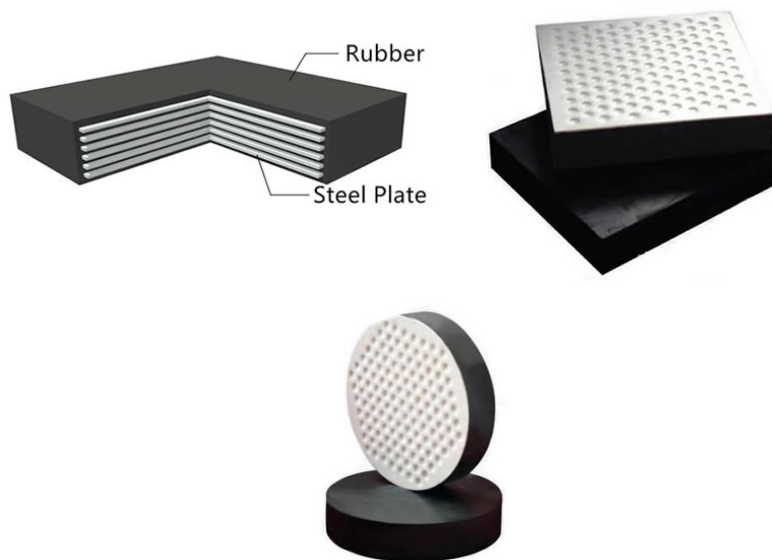
# Elastomeric Bearings

Elastomeric bearings are designed according to EN-1337, AASHTO LRFD and other Int'l standards.

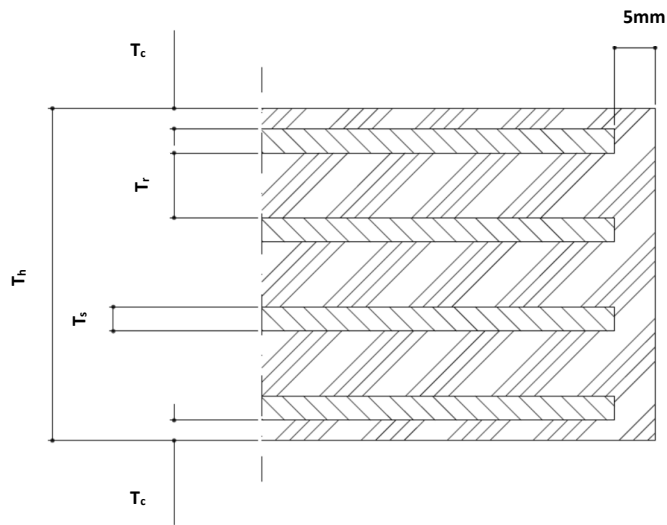
Length or Dia (mm) x Width (mm) x Total Height (mm) (Total rubber thickness-mm)

## Typical Properties of Rubber

Typical Rubber Properties		Chloroprene			Natural rubber		
Hardness(Shore A Durometer) ASTM D2240		50±5	60±5	70±5	50±5	60±5	70±5
Tensile strength(MPa) ASTM D412		≥15.5			≥15.5		
Elongation at break (%) ASTM D412		≥400	≥350	≥300	≥450	≥400	≥300
Peel strength of rubber bonded to steel plate(KN/m) ASTMD 429,B		≥7			≥7		
Low temperature brittleness(°C) ASTM D746		≤-40			≤-40		
Permanent deformation at constantcompression(%) ASTM D395		100°C x 22h			70°C x 22h		
		≤35			≤25		
Ozone resistance ageing, 20%of elongation (38 ± 1°C x 100h) ASTMD 1149		100pphm			25pphm		
		No cracks			No cracks		
Hot air-oven ageing test ASTM D573	Testing conditions(°C x h)	100°C x 70 h			100°C x 70 h		
	Reduction of tensile strength Maximum (%)	-15			-25		
	RedJction of elongationat break Maximum (%)	-40			-25		
	Hardness changeable range Maximum Points (ShoreADurometer)	15			10		

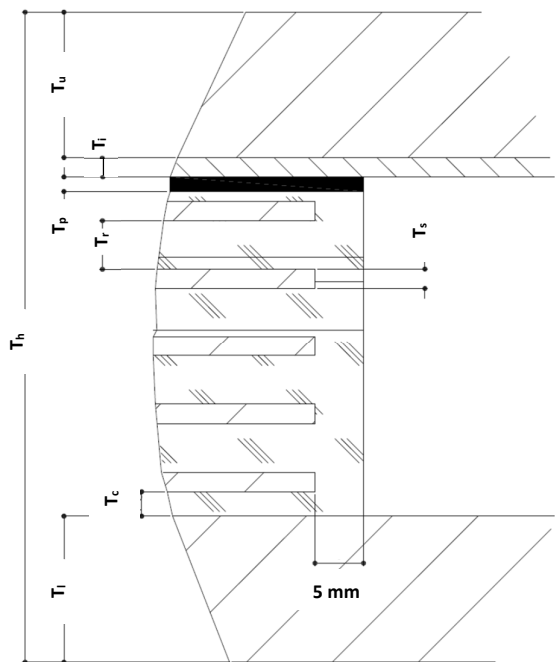


## Typical Construction of Elastomeric Bearing



- $T_h$ : Total Bearing Height
- $T_r$ : Thickness of individual Rubber Layer
- $T_s$ : Thickness of individual Inner Steel Plate
- $T_c$ : Thickness of Rubber Cover

## Typical Construction of Elastomeric Bearing with PTFE (sliding)



- $T_h$ : Total Bearing Height
- $T_r$ : Thickness of individual Rubber Layer
- $T_p$ : PTFE layer Thickness
- $T_i$ : Inox Thickness
- $T_s$ : Thickness of individual Inner Steel Plate
- $T_c$ : Thickness of Rubber Cover
- $T_u$ : Upper Anchor Plate Thickness

Sliding bearings are identical with elastomeric bearings having a factory bonded or protruded PTFE layer. Due to low friction of PTFE are suitable for the majority of design movement requirements. Load range: 100 KN up to 10000 KN



# Elastomeric Bearings Typical Sizes

Dimensions		Capacity	Shape Factor	Tangent Angle	Total Thickness	Maximum Displacement	Total Thickness	Maximum Displacement
mm x mm		KN	S	Tan (θ)	mm	mm	mm	mm
100	150	150	6.00	0.0085	14	5.6	16	30
				0.0128	21	9.1	23	
				0.0171	28	12.6	30	
100	200	200	6.67	0.0720	14	5.6	16	30
				0.0108	21	9.1	23	
				0.0144	28	12.6	30	
100	250	250	7.14	0.0065	14	5.6	16	30
				0.0097	21	9.1	23	
				0.0129	28	12.6	30	
100	300	300	7.50	0.0060	14	5.6	16	30
				0.0090	21	9.1	23	
				0.0120	28	12.6	30	
120	120	144	6.00	0.0107	21	5.6	23	30
				0.0142	28	9.1	30	
120	140	168	6.46	0.0095	21	12.6	23	30
				0.0126	28	5.6	30	
120	160	192	6.86	0.0086	21	9.1	23	30
				0.0115	28	12.6	30	
120	180	216	7.20	0.0080	21	5.6	23	30
				0.0106	28	9.1	30	
120	200	240	7.50	0.0075	21	12.6	23	30
				0.0100	28	5.6	30	
120	250	300	8.11	0.0067	21	9.1	23	30
				0.0089	28	12.6	30	
150	150	255	7.50	0.0060	21	9.1	23	40
				0.0080	28	12.6	30	
				0.0100	35	16.1	37	
				0.0120	42	19.6	44	
150	180	270	8.11	0.0053	21	9.1	23	40
				0.0071	28	12.6	30	
				0.0088	35	16.1	37	
				0.0106	42	19.6	44	
150	200	300	8.57	0.0050	21	9.1	23	40
				0.0066	28	12.6	30	
				0.0083	35	16.1	37	
				0.0099	42	19.6	44	
150	250	375	9.38	0.0044	21	9.1	23	40
				0.0058	28	12.6	30	
				0.0073	35	16.1	37	
				0.0088	42	19.6	44	
150	300	450	10.00	0.0040	21	9.1	23	40
				0.0054	28	12.6	30	
				0.0067	35	16.1	37	
				0.0080	42	19.6	44	
			6.25	0.0012	27	13.3	29	
				0.0154	37	18.9	39	
150	350	525	10.50	0.0033	21	9.1	23	40
				0.0050	28	12.6	30	
				0.0063	35	16.1	37	
				0.0075	42	19.6	44	
			6.56	0.0103	27	13.3	29	
				0.0143	37	18.9	39	
180	180	324	9.08	0.0051	28	12.6	30	50
				0.0064	35	16.1	37	
				0.0077	42	19.6	44	
				0.0090	49	23.1	51	

Notes:

-Above values are typical - subject to specifications & project requirements.

Dimensions		Capacity	Shape Factor	Tangent Angle	Total Thickness	Maximum Displacement	Total Thickness	Maximum Displacement
mm x mm		KN	S	Tan (θ)	mm	mm	mm	mm
180	200	360	9.47	0.0048	28	12.6	30	50
				0.0060	35	16.1	37	
				0.0072	42	19.6	44	
				0.0084	49	23.1	51	
180	250	450	10.47	0.0042	28	12.6	30	50
				0.0053	35	16.1	37	
				0.0063	42	19.6	44	
				0.0074	49	23.1	51	
			6.54	0.0086	27	13.3	29	
				0.0119	37	18.9	39	
180	300	540	11.25	0.0038	28	12.6	30	50
				0.0048	35	16.1	37	
				0.0057	42	19.6	44	
				0.0067	49	23.1	51	
			7.03	0.0077	27	13.3	29	
				0.0107	37	18.9	39	
180	350	630	11.89	0.0036	28	12.6	30	50
				0.0045	35	16.1	37	
				0.0051	42	19.6	44	
				0.0062	49	23.1	51	
			7.43	0.0071	27	13.3	29	
				0.0098	37	18.9	39	
180	400	720	12.41	0.0012	35	16.1	37	50
				0.0051	42	19.6	44	
				0.0059	49	23.1	51	
				0.0067	27	13.3	29	
			7.76	0.0092	37	18.9	39	
200	250	500	11.11	0.0035	28	12.6	30	70
				0.0044	35	16.1	37	
				0.0053	42	19.6	44	
				0.0061	49	23.1	51	
				0.0070	56	26.6	58	
			6.94	0.0071	27	13.3	29	
				0.0098	37	18.9	39	
200	300	600	12.00	0.0040	35	16.1	37	70
				0.0048	42	19.6	44	
				0.0056	49	23.1	51	
				0.0063	56	26.6	58	
			7.50	0.0063	27	13.3	29	
				0.0087	37	18.6	39	
				0.0111	47	24.5	49	
				0.0037	35	16.1	37	
200	350	700	12.73	0.0044	42	19.6	44	70
				0.0052	49	23.1	51	
				0.0059	56	26.6	58	
				0.0058	27	13.3	29	
			7.95	0.0080	37	18.6	39	
				0.0102	47	24.5	49	
200	400	800	8.33	0.0054	27	13.3	29	70
				0.0075	37	18.9	39	
				0.0095	47	24.5	49	
			6.06	0.0113	36	17.5	38	
				0.0160	50	25.2	52	
200	450	900	8.65	0.0051	27	13.3	29	70
				0.0071	37	18.9	39	
				0.0090	47	24.5	49	
			6.29	0.0107	36	17.5	38	
				0.0150	50	25.2	52	

Notes:

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Dimensions		Capacity	Shape Factor	Tangent Angle	Total Thickness	Maximum Displacement	Total Thickness	Maximum Displacement
mm x mm		KN	S	Tan (θ)	mm	mm	mm	mm
200	500	1000	8.93	0.0049	27	13.3	29	70
				0.0068	37	18.9	39	
				0.0087	47	24.5	49	
			6.49	0.0102	36	17.5	38	
				0.0143	50	25.2	52	
250	300	750	8.52	0.0058	37	18.9	39	70
				0.0074	47	24.5	49	
				0.0090	57	30.1	59	
			6.20	0.0087	36	17.5	38	
				0.0123	50	25.2	52	
				0.0159	64	35.9	66	
250	350	875	9.11	0.0053	37	18.9	39	70
				0.0067	47	24.5	49	
				0.0082	57	30.1	59	
			6.63	0.0078	36	17.5	38	
				0.0110	50	25.2	52	
				0.0142	64	35.9	66	
250	400	1000	9.62	0.0049	37	18.9	39	70
				0.0063	47	24.5	49	
				0.0076	57	30.1	59	
			6.99	0.0072	36	17.5	38	
				0.0102	50	25.2	52	
				0.0131	64	35.9	66	
250	450	1125	10.04	0.0046	37	18.9	39	70
				0.0059	47	24.5	49	
				0.0072	57	30.1	59	
			7.31	0.0068	36	17.5	38	
				0.0095	50	25.2	52	
				0.0123	64	35.9	66	
250	500	1250	10.42	0.0044	37	18.9	39	70
				0.0056	47	24.5	49	
				0.0068	57	30.1	59	
			7.58	0.0064	36	17.5	38	
				0.0090	50	25.2	52	
				0.0116	64	35.9	66	
250	550	1375	10.74	0.0042	37	18.9	39	70
				0.0060	47	24.5	49	
				0.0077	57	30.1	59	
			7.81	0.0061	36	17.5	38	
				0.0086	50	25.2	52	
				0.0111	64	35.9	66	
300	350	1050	10.10	0.0049	47	24.5	49	100
				0.0059	57	30.1	59	
				0.0070	67	17.5	38	
			7.34	0.0079	50	25.2	52	
				0.0101	64	32.9	66	
				0.0124	78	40.6	80	
300	400	1200	10.71	0.0045	47	24.5	49	100
				0.0055	57	30.1	59	
				0.0065	67	17.5	38	
			7.79	0.0072	50	25.2	52	
				0.0093	64	32.9	66	
				0.0144	78	40.6	80	

Notes:

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Dimensions		Capacity	Shape Factor	Tangent Angle	Total Thickness	Maximum Displacement	Total Thickness	Maximum Displacement
mm x mm	mm	KN	S	Tan (θ)	mm	mm	mm	mm
300	450	1350	11.25	0.0042	47	24.5	49	100
				0.0052	57	30.1	59	
				0.0061	67	17.5	38	
			8.18	0.0067	50	25.2	52	
				0.0049	64	32.9	66	
300	500	1500	11.72	0.0040	47	24.5	49	100
				0.0049	57	30.1	59	
				0.0058	67	17.5	38	
			8.18	0.0063	50	25.2	52	
				0.0082	64	32.9	66	
300	550	1650	12.13	0.0039	47	24.5	50	100
				0.0047	57	30.1	60	
				0.0055	67	17.5	70	
			8.82	0.0060	50	25.2	53	
				0.0078	64	32.9	67	
300	600	1800	12.50	0.0037	47	24.5	50	100
				0.0045	57	30.1	60	
				0.0053	67	17.5	70	
			9.09	0.0058	50	25.2	53	
				0.0075	64	32.9	67	
300	650	1950	12.83	0.0036	47	24.5	50	100
				0.0044	57	30.1	60	
				0.0052	67	17.5	70	
			9.33	0.0056	50	25.2	53	
				0.0072	64	32.9	67	
350	400	1400	11.67	0.0035	47	24.5	49	100
				0.0042	57	30.1	59	
				0.0050	67	35.7	69	
			9.09	0.0057	77	41.3	79	
				0.0055	50	25.2	52	
350	450	1575	12.30	0.0070	64	32.9	66	100
				0.0086	78	40.6	80	
				0.0033	47	30.1	59	
			8.95	0.0040	57	35.7	69	
				0.0047	67	41.3	79	
350	500	1750	12.87	0.0054	77	46.9	89	100
				0.0051	50	25.2	52	
				0.0065	64	32.9	66	
			9.36	0.0080	78	40.6	80	
				0.0037	47	30.1	60	
350	550	1925	13.37	0.0044	57	35.7	70	100
				0.0051	67	41.3	80	
				0.0057	77	46.9	90	
			9.72	0.0048	50	25.2	53	
				0.0061	64	32.9	67	
350	600	2100	13.72	0.0075	78	40.6	81	100
				0.0045	50	25.2	53	
				0.0058	64	32.9	67	
			9.72	0.0071	78	40.6	81	
				0.0048	50	25.2	53	

Notes:

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Dimensions		Capacity	Shape Factor	Tangent Angle	Total Thickness	Maximum Displacement	Total Thickness	Maximum Displacement
mm x mm		KN	S	Tan (θ)	mm	mm	mm	mm
350	600	2100	13.82	0.0034	47	30.1	60	100
				0.0040	57	35.7	70	
				0.0046	67	41.3	80	
			10.05	0.0053	77	46.9	90	
				0.0043	50	25.2	53	
				0.0056	64	32.9	67	
350	650	2275	10.34	0.0042	50	25.2	53	100
				0.0054	64	32.9	67	
				0.0066	78	40.6	81	
			7.52	0.0059	47	23.0	50	
				0.0085	66	33.6	69	
				0.0110	85	44.1	88	
350	700	2450	10.61	0.0040	50	25.2	53	100
				0.0052	64	32.9	67	
				0.0064	78	40.6	81	
			7.78	0.0057	47	23.1	50	
				0.0081	66	33.6	69	
				0.0106	85	44.1	88	
400	450	1800	9.63	0.0052	64	32.9	67	100
				0.0063	78	40.6	81	
				0.0075	47	23.1	50	
			7.06	0.0082	66	33.6	69	
				0.0107	85	44.1	88	
				0.0132	104	54.6	106	
400	500	2000	10.10	0.0049	64	32.9	67	100
				0.0059	78	40.6	81	
				0.0070	47	23.1	50	
			7.41	0.0079	66	33.6	69	
				0.0099	85	44.1	88	
				0.0122	104	54.6	106	
400	550	2200	10.53	0.0046	64	32.9	67	100
				0.0056	78	40.6	81	
				0.0067	47	23.1	50	
			7.72	0.0072	66	33.6	69	
				0.0093	85	44.1	88	
				0.0115	104	54.6	107	
400	600	2400	10.90	0.0044	64	32.9	67	100
				0.0054	78	40.6	81	
				0.0064	47	23.1	50	
			8.00	0.0068	66	33.6	69	
				0.0089	85	44.1	88	
				0.0109	104	54.6	107	
400	650	2600	11.26	0.0042	64	32.9	67	100
				0.0052	78	40.6	81	
				0.0061	47	23.1	50	
			8.25	0.0065	66	33.6	69	
				0.0085	85	44.1	88	
				0.0104	104	54.6	107	
400	700	2800	13.25	0.0041	64	32.9	67	100
				0.0039	78	40.6	81	
				0.0045	47	23.1	50	
			9.72	0.0042	66	33.6	69	
				0.0054	85	44.1	88	
				0.0101	104	54.6	107	
400	750	3000	11.85	0.0040	64	32.9	67	100
				0.0048	78	40.6	81	
				0.0057	92	48.3	95	
			8.70	0.0061	66	33.6	69	
				0.0079	85	44.1	88	
				0.0097	104	54.6	107	

Notes:

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Dimensions		Capacity	Shape Factor	Tangent Angle	Total Thickness	Maximum Displacement	Total Thickness	Maximum Displacement
mm x mm		KN	S	Tan (θ)	mm	mm	mm	mm
400	800	3200	12.12	0.0038	64	32.9	67	100
				0.0047	78	40.6	81	
				0.0056	92	48.3	95	
			8.89	0.0059	66	33.6	69	
				0.0076	85	44.1	88	
				0.0094	104	54.6	107	
450	500	2250	10.77	0.0049	64	40.6	80	120
				0.0057	78	48.3	94	
				0.0066	92	56.0	108	
			7.89	0.0062	66	33.6	68	
				0.0080	85	44.1	87	
				0.0099	104	54.6	106	
450	550	2475	12.25	0.0046	64	40.6	80	120
				0.0054	78	48.3	94	
				0.0063	92	56.0	108	
			8.25	0.0058	66	33.6	68	
				0.0075	85	44.1	87	
				0.0093	104	54.6	106	
450	600	2700	11.69	0.0044	64	40.6	80	120
				0.0052	78	48.3	94	
				0.0062	92	56.0	108	
			8.57	0.0055	66	33.6	68	
				0.0072	85	44.1	87	
				0.0088	104	54.6	106	
450	650	2925	12.09	0.0042	64	40.6	81	120
				0.0050	78	48.3	95	
				0.0057	92	56.0	109	
			8.86	0.0053	66	33.6	69	
				0.0068	85	44.1	88	
				0.0085	104	54.6	107	
450	700	3150	12.45	0.0033	64	32.9	67	120
				0.0044	78	40.6	81	
				0.0048	92	48.3	95	
				0.0055	106	56.0	109	
			9.13	0.0050	66	33.6	69	
				0.0066	85	44.1	88	
450	750	3375	12.78	0.0039	78	40.6	81	120
				0.0046	92	48.3	95	
				0.0054	106	56.0	109	
			9.38	0.0049	66	33.6	69	
				0.0063	85	44.1	88	
				0.0078	104	54.6	107	
450	800	3600	13.00	0.0038	78	40.6	81	120
				0.0045	92	48.3	95	
				0.0052	106	56.0	109	
			9.60	0.0047	66	33.6	69	
				0.0061	85	44.1	88	
				0.0075	104	54.6	107	
450	850	3825	13.37	0.0037	78	40.6	81	120
				0.0044	92	48.3	95	
				0.0051	106	56.0	109	
			9.81	0.0046	66	33.6	69	
				0.0060	85	44.1	88	
				0.0073	104	54.6	107	

Notes:

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Dimensions		Capacity	Shape Factor	Tangent Angle	Total Thickness	Maximum Displacement	Total Thickness	Maximum Displacement
mm x mm		KN	S	Tan (θ)	mm	mm	mm	mm
500	600	3000	12.40	0.0037	78	40.6	81	140
				0.0043	92	48.3	95	
				0.0050	106	56.0	109	
				0.0057	120	63.7	123	
			9.09	0.0046	66	33.6	69	
				0.0059	85	44.1	88	
				0.0073	104	54.6	107	
500	700	3500	13.25	0.0033	78	40.6	81	140
				0.0039	92	48.3	95	
				0.0045	106	56.0	109	
				0.0051	120	63.7	123	
			9.72	0.0042	66	33.6	69	
				0.0054	85	44.1	88	
				0.0067	104	54.6	107	
500	800	4000	13.99	0.0032	78	40.6	81	140
				0.0037	92	48.3	95	
				0.0043	106	56.0	109	
				0.0049	120	63.7	123	
			10.26	0.0039	66	33.6	69	
				0.0050	85	44.1	88	
				0.0062	104	54.6	107	
500	900	4200	10.71	0.0074	123	65.1	126	
				0.0040	66	33.6	69	
				0.0052	85	44.1	88	
				0.0064	104	54.6	107	
600	700	4200	10.77	0.0076	123	65.1	126	
				0.0039	85	44.1	88	
				0.0049	104	54.6	107	
				0.0064	123	65.1	126	
600	800	4800	11.43	0.0076	142	75.6	145	
				0.0036	85	44.1	88	
				0.0044	104	54.6	107	
				0.0053	123	65.1	126	
600	900	5400	12.00	0.0061	142	75.6	145	
				0.0034	85	44.1	88	
				0.0042	104	54.6	107	
				0.0050	123	65.1	126	
600	1000	6000	12.50	0.0058	142	75.6	145	
				0.0040	104	54.6	107	
				0.0048	123	65.1	126	
700	800	5600	12.44	0.0055	142	75.6	145	
				0.0035	104	54.6	107	
				0.0041	123	65.1	126	
				0.0048	142	75.6	145	
				0.0054	161	86.1	164	
700	900	6300	13.13	0.0061	180	96.6	183	
				0.0039	123	65.1	126	
				0.0045	142	75.6	145	
				0.0051	161	86.1	164	
700	1000	7000	13.73	0.0057	180	96.6	183	
				0.0036	123	65.1	126	
				0.0042	142	75.6	145	
				0.0048	161	86.1	164	
				0.0054	180	96.6	183	

Notes:

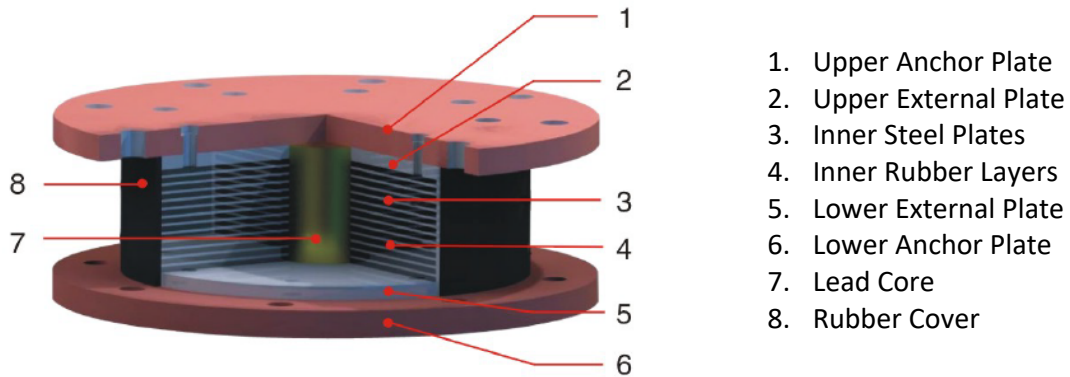
-Above values are typical - subject to specifications & project requirements.

# Seismic Isolation - LRB

Lead rubber bearings are designed according to EN-15129 for anti-seismic devices and other Int'l standards.

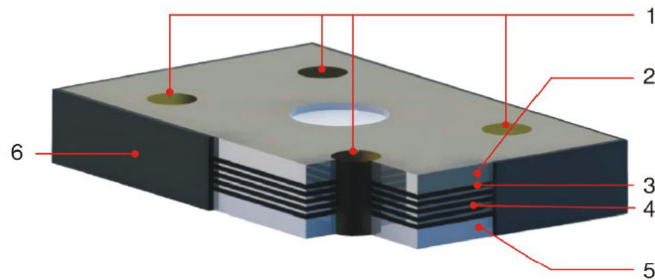
Length or Dia (mm) x Width (mm) x Total Height (mm) (Total rubber thickness-mm)

## Lead Rubber Bearings (LRB)



1. Upper Anchor Plate
2. Upper External Plate
3. Inner Steel Plates
4. Inner Rubber Layers
5. Lower External Plate
6. Lower Anchor Plate
7. Lead Core
8. Rubber Cover

1. Lead Core
2. Upper External Plate
3. Inner Steel Plates
4. Inner Rubber Layers
5. Lower External Plate
6. Rubber Cover



Typical Properties of LRB		Unit	Natural Rubber Values		
Shear Modulus (G)		MPa	8	10	12
Hardness		Shore A	50±5	60±5	65±5
Tensile strength		MPa	≥ 5		
Elongation at break		%	≥ 550	≥ 500	
Permanent deformation at constant compression	70°C x 22h	%	≤ 35		
Peel strength of rubber bonded to steel plate	-40°C	MPa	≥ 5		
Low temperature brittleness		--	OK		
Hot air-oven ageing test (70°C x 70h)	Reduction of tensile strength	%	-10 to +10		
	Reduction of elongation at break	%	≥ -50		
Ozone resistance ageing	38 ± 1°C x 100h, 50 pphm, 20% of elongation	--	No cracks		
Weight variation due to moisture absorption	55 ± 2°C x 72h	%	≤ 10		

Note:

- Chloroprene rubber can also be used subject to specifications & project requirements.

Note: Bearings will be designed having dimensions and other properties as per Design requirements

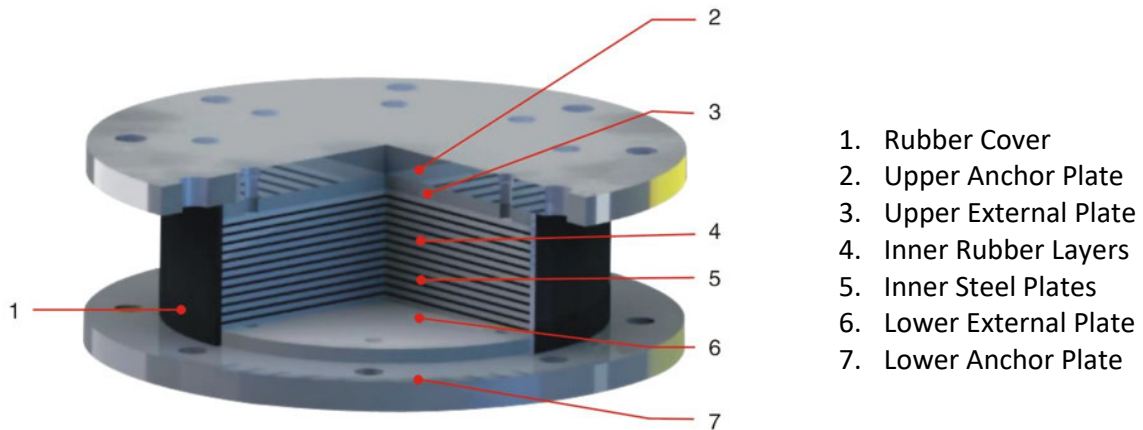


# Seismic Isolation - HDRB

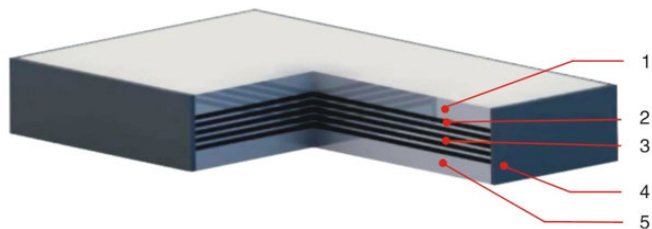
Damping rubber bearings are designed according to EN-15129 for anti-seismic devices and other Int'l standards.

Length or Dia (mm) x Width (mm) x Total Height (mm) (Total rubber thickness-mm)

## High Damping Rubber Bearings (HDRB)



1. Upper External Plate
2. Inner Rubber Layers
3. Inner Steel Plates
4. Rubber Cover
5. Lower External Plate

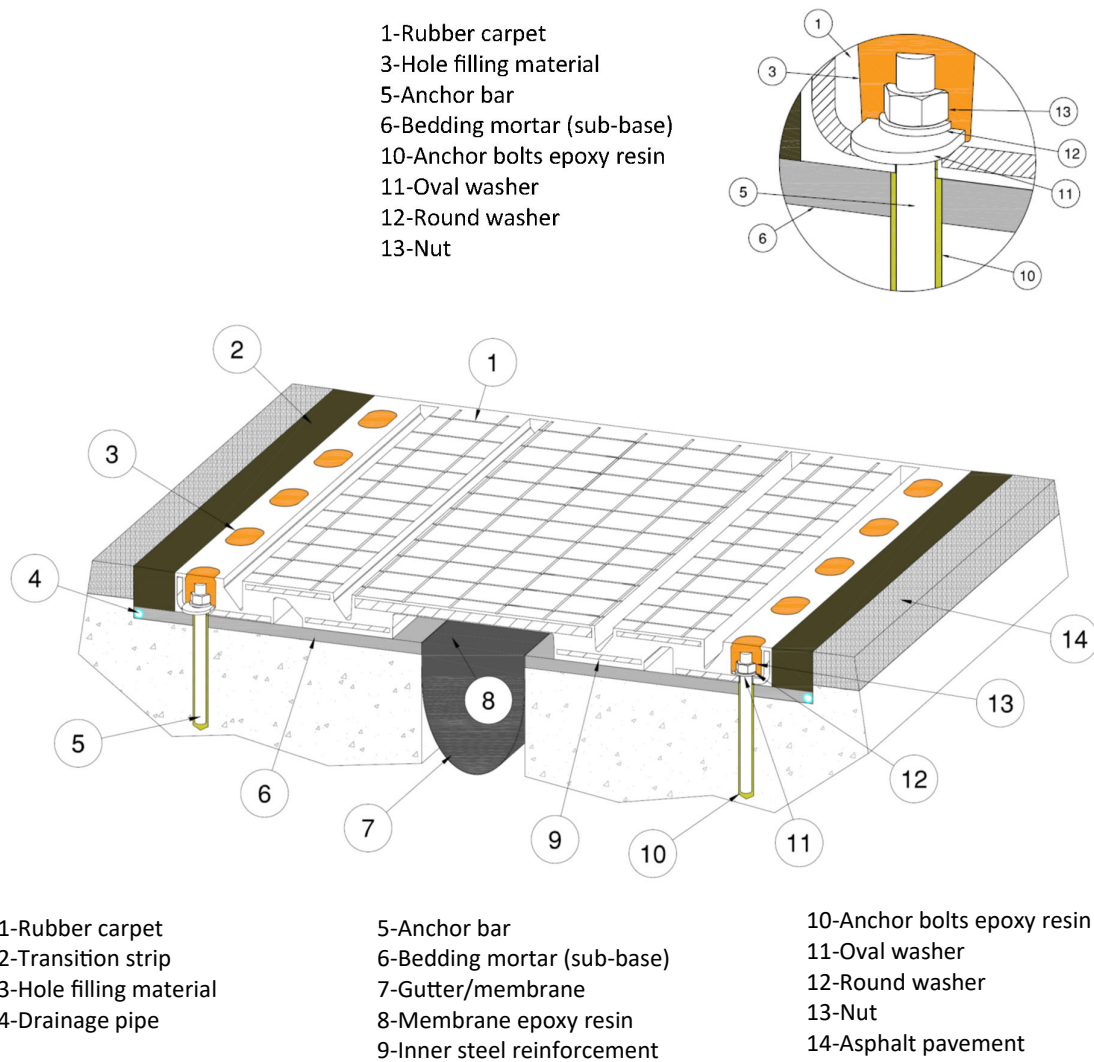


Note: Bearings will be designed having dimensions and other properties as per Design requirements

# Expansion Joints - Elastomeric

Mat type expansion joints are designed according to ETAG 032 and other Int'l standards.

## Mat Expansion Joint type M

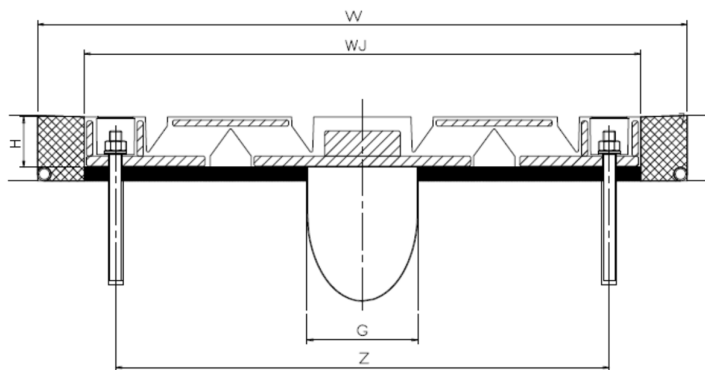
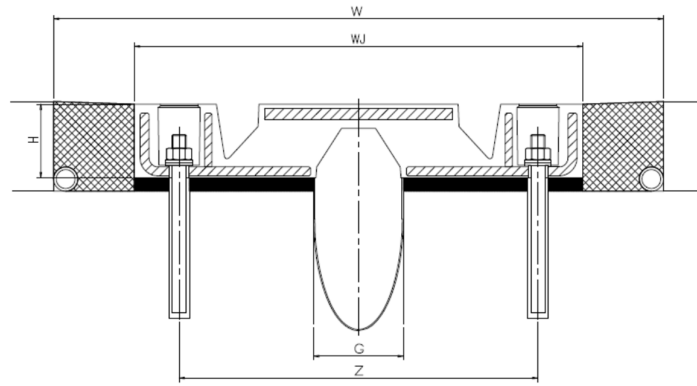


Bridge expansion joints are designed to allow longitudinal, transversal, and vertical movements of the bridge deck as per the design requirements (thermal, service and seismic movements).

M expansion joint types can accommodate total movements ranging from 50mm up to 330mm.

Can be easily installed and replaced providing waterproofing and noiseless characteristics.

The elastomer properties fulfil all current Int'l specifications (EN, AASHTO etc.) and long resistance against UV radiations, ozone, and other chemical substances (oils, fuels etc.)



TOTAL MOVEMENT mm	TYPICAL CROSS SECTION	W mm	WJ mm	H mm	L mm	G mm	Z mm	Anchor Bolts mm
50 (±25)		455	275	40	2000	40	220	M12 x 190
80 (±40)		545	355	45	2000	60	280	M14 x 200
100 (±50)		580	390	55	2000	70	300	M16 x 200
120 (±60)		780	590	55	2000	80	500	M16 x 200
140 (±70)		650	470	80	2000	90	370	M16 x 200
160 (±80)		680	500	85	2000	100	400	M16 x 200
200 (±100)		980	800	70	2000	140	700	M20 x 230
250 (±125)		1070	890	80	2000	160	790	M20 x 230
330 (±165)		1230	1100	100	1000	220	980	M24 x 300

Notes:

G = max gap during installation

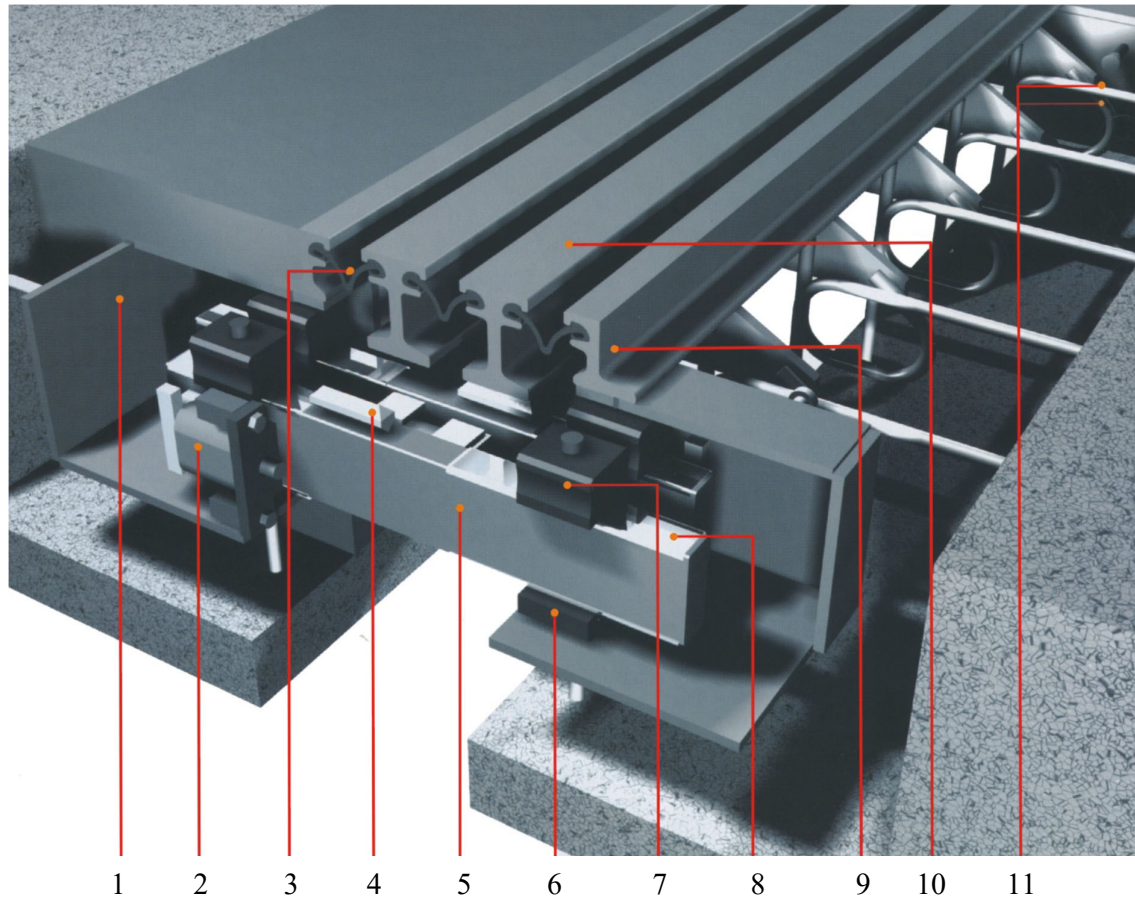
L = recommended cutting of asphalt pavement

# Expansion Joints - Steel

Modular type expansion joints are designed according to ETAG 032 and other Int'l standards.

Movement expansion & contraction (mm)

## Modular Expansion Joint type MOD



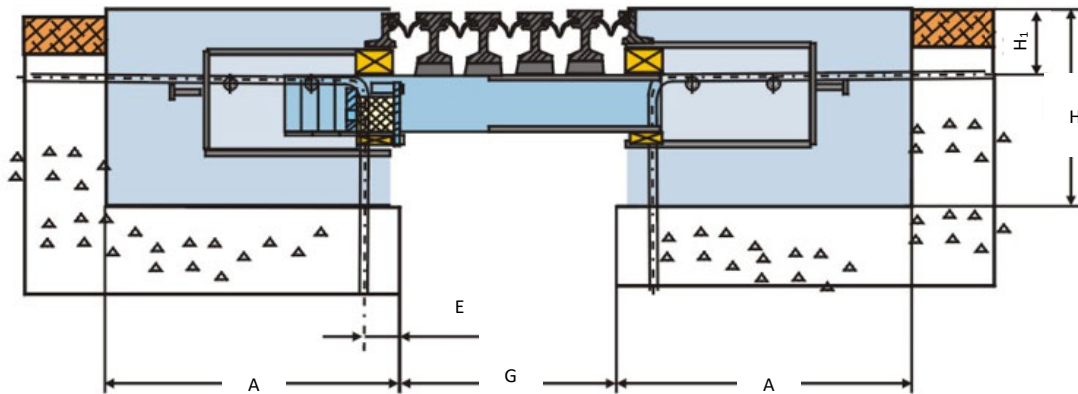
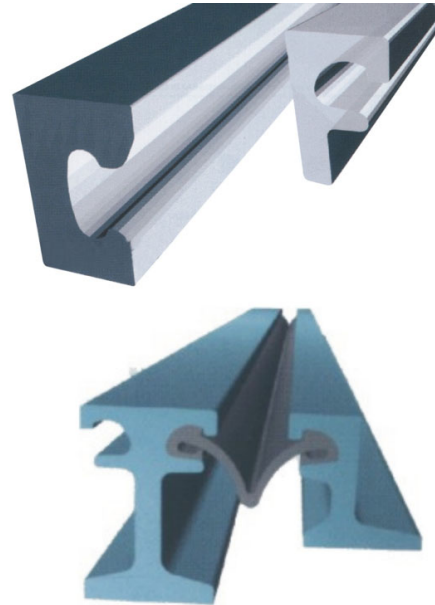
- |                      |                       |
|----------------------|-----------------------|
| 1. Movement Case     | 7. Deflection Element |
| 2. Spring            | 8. Sliding Plate      |
| 3. Rubber Gasket     | 9. Edge Modules       |
| 4. Connection System | 10. Inner Modules     |
| 5. Transverse Beam   | 11. Anchoring System  |
| 6. Sliding Bearing   |                       |

# Modular Expansion Joint – Typical Range

Type	Number of Median Modules	Movement mm
160	1	± 160
240	2	± 240
320	3	± 320
400	4	± 400
480	5	± 480
560	6	± 560
640	7	± 640
720	8	± 720
800	9	± 800

Note:

- Each rubber gasket can absorb movement of ±80 mm



Type	Number of Rubber Gasket	Movement mm	G mm	H mm	A mm	E mm	H <sub>1</sub> mm
160	2	± 160	160	400	350	60	145
240	3	± 240	280	420	440	90	145
320	4	± 320	400	450	525	95	145
400	5	± 400	520	470	690	100	145
480	6	± 480	640	470	780	105	145
560	7	± 560	760	500	870	110	145
640	8	± 640	880	500	960	115	145
720	9	± 720	1000	520	1050	120	145
800	10	± 800	1120	520	1140	125	145

Notes:

- Construction gap width at median temperature.

- Above sizes are typical. Additional movement capacities can also be manufactured.

# Modular Expansion Joint – Typical Elements

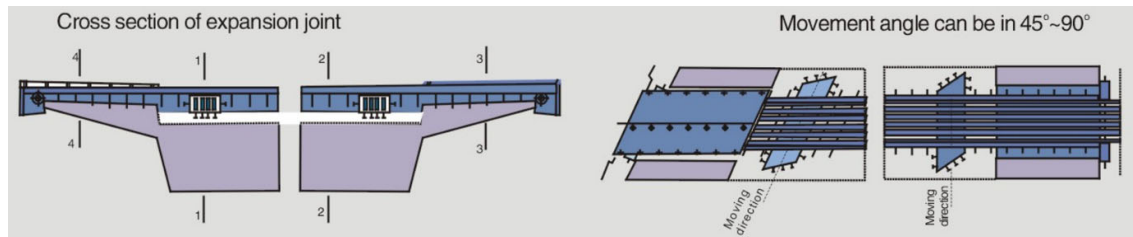
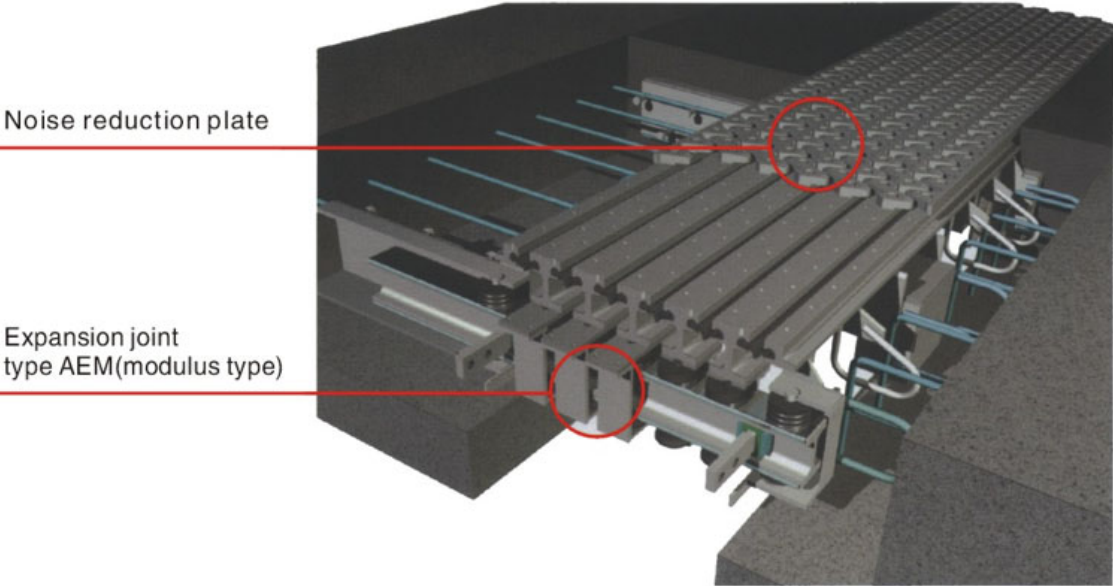


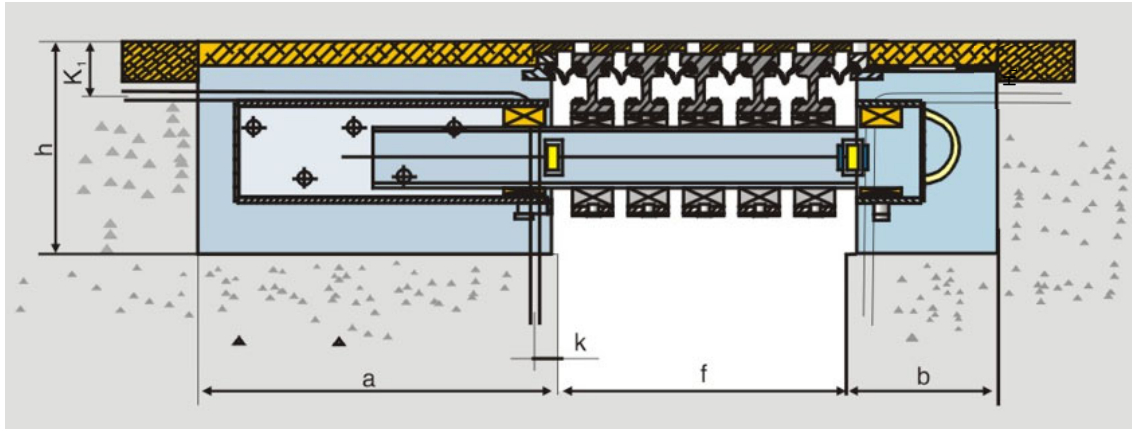
Photo	Element	Function	Notes
	Edge Module	To bear the traffic load, and transfer it to the superstructure.	Dimensional accuracy and good welding performance.
	Inner Module		
	Transverse Beam	To bear the traffic load, and transfer it to the displacement case box.	Its shape has a special design and is suitable for welding. High strength materials are used. The stainless plate with welding and machining performance can provide good sliding surface.
	Deflection Element (Bearing)	To bear the traffic load and transfer it to the sliding bearing.	Made of chloroprene rubber reinforced with inner steel plate. The PTFE plate can provide high elasticity and smooth sliding surface.
	Sliding Bearing	To provide the sliding surface for the beam and bear the vertical traffic load.	Made of chloroprene rubber reinforced with inner steel plate. The PTFE plate can provide high elasticity and smooth sliding surface. The sliding bearing and deflection bearing jointly constitute
	Spring	To allow each module to keep the same clearance and have a buffer action on impact forces.	Made of high polymer materials, it has a high resistance tear strength, it's insensitive to grease, gasoline and ozone, it has ageing and fatigue resistance performance.
	Flashing	To waterproof the construction gap.	Made of chloroprene rubber with high resistance tear strength, it has resistance in salt water, grease and ageing performances. Can be fabricated in customized lengths.



# Modular Expansion Joint with Noise Reduction



# Modular Expansion Joint with Noise Reduction – Typical Range



Type	Number of Rubber Gasket	Movement mm	f mm	h mm	a mm	b mm	k mm	k <sub>1</sub> mm
160	2	± 160	160	400	400	400	80	115
240	3	± 240	280	400	480	400	80	115
320	4	± 320	400	400	560	400	80	115
400	5	± 400	520	400	640	400	90	115
480	6	± 480	640	400	720	400	90	115
560	7	± 560	760	420	800	400	90	115
640	8	± 640	880	440	880	400	90	115
720	9	± 720	1000	450	960	400	90	115
800	10	± 800	1120	460	1040	400	90	115
880	11	± 880	1240	500	1120	400	90	115
960	12	± 960	1360	500	1200	400	90	115

**Notes:**

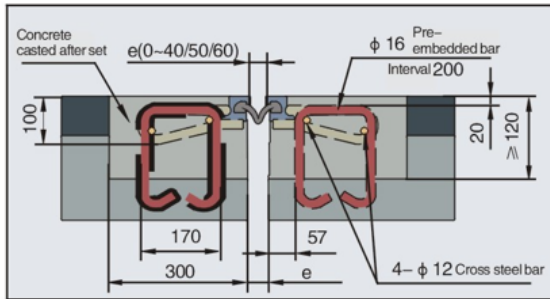
- Construction gap width at median temperature.
- Above sizes are typical. Additional movement capacities can also be manufactured.



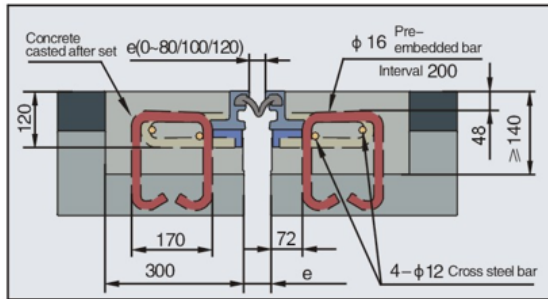
# Rubber Gasket Expansion Joint type RUG

Single rubber gasket type expansion joints are designed according to ETAG 032 and other Int'l standards.

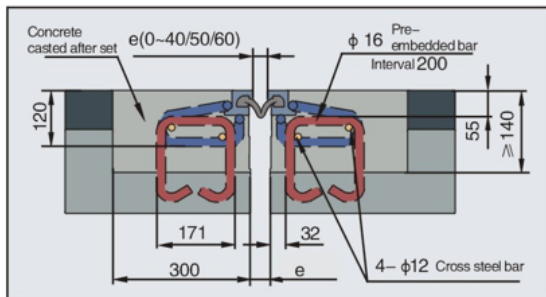
Typical range movement from 40mm up to 120mm.



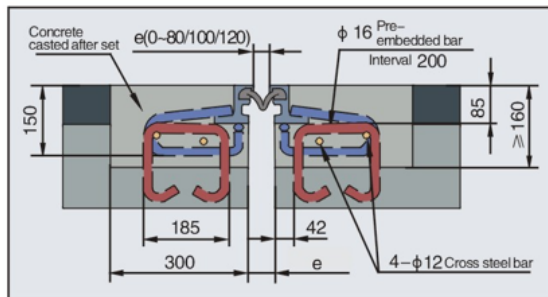
Typical cross section for types A40/50/60



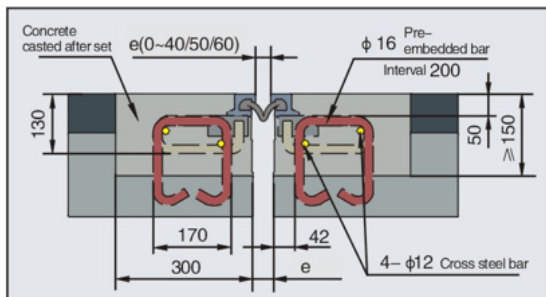
Typical cross section for types A80/100/120



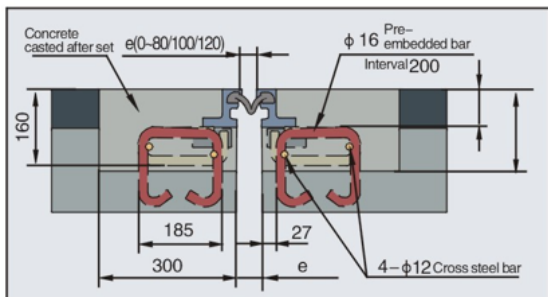
Typical cross section for types B40/50/60



Typical cross section for types B80/100/120



Typical cross section for types C40/50/60

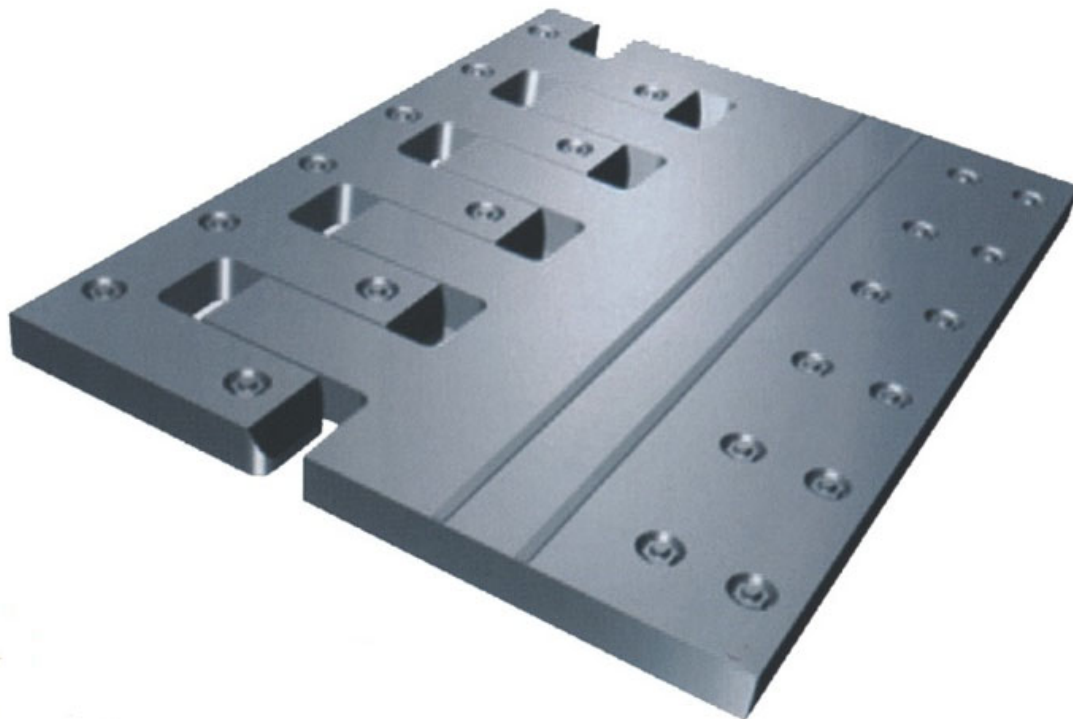
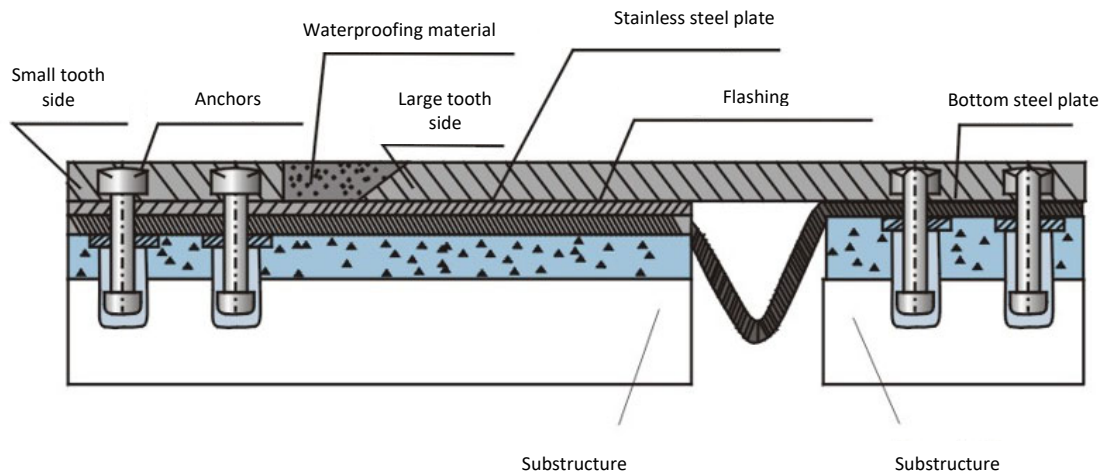


Typical cross section for types C80/100/120

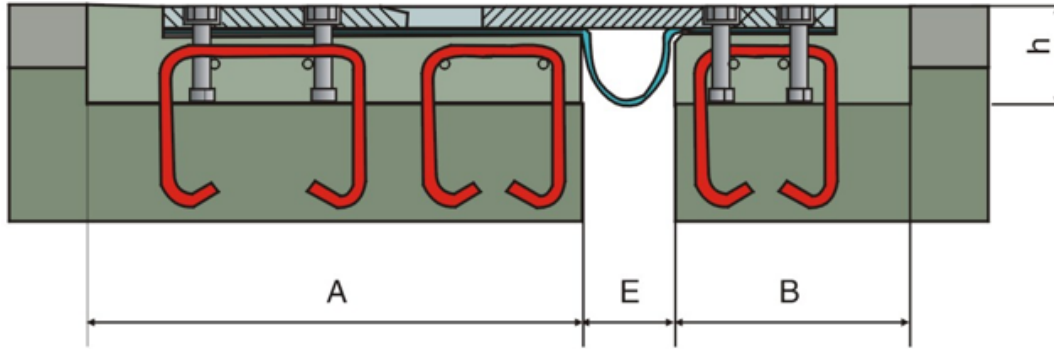
## Cantilever Expansion Joint type COM

Cantilever type expansion joints are designed according to ETAG 032 and other Int'l standards. Consists of large & small teeth steel plates, stainless steel plates, flashing, and anchoring system

It has a long design life, having weather resistance materials. The two sides of the expansion joints are embedded in high strength concrete providing good rigidity of the joint function.



# Cantilever Expansion Joint type COM – Typical Range

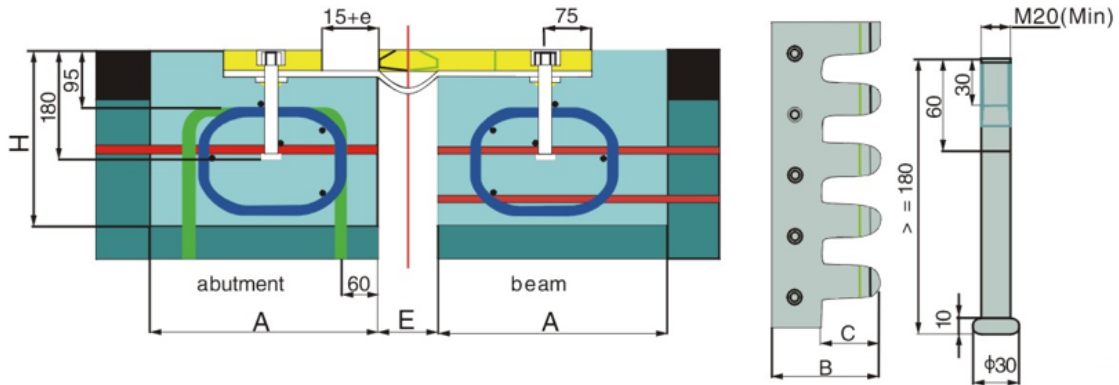


Type	Movement mm	H-min mm	A mm	G mm	B mm
40	± 40	120	315	70	300
80	± 80	120	395	90	300
120	± 120	120	475	110	300
160	± 160	120	555	130	300
200	± 200	150	635	150	350
240	± 240	150	715	170	350
280	± 280	150	795	190	350
320	± 320	150	875	210	350
360	± 360	150	955	240	400
400	± 400	180	1035	260	400
440	± 440	180	1115	280	400
480	± 480	180	1195	300	400
520	± 520	180	1275	320	450
560	± 560	180	1355	350	450
600	± 600	210	1435	370	450
640	± 640	210	1505	390	450
680	± 680	210	1595	410	500
720	± 720	210	1675	430	500
760	± 760	210	1755	450	500
800	± 800	240	1835	480	500
840	± 840	240	1915	500	550
880	± 880	240	1995	520	550
920	± 920	240	2075	540	550
960	± 960	240	2155	560	550
1000	± 1000	270	2235	580	550

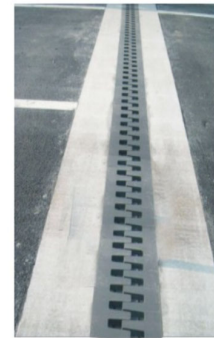
Notes:

- Construction gap width at median temperature.
- Above sizes are typical. Additional movement capacities can also be manufactured.

# Cantilever Expansion Joint type COM(B)– Typical Range

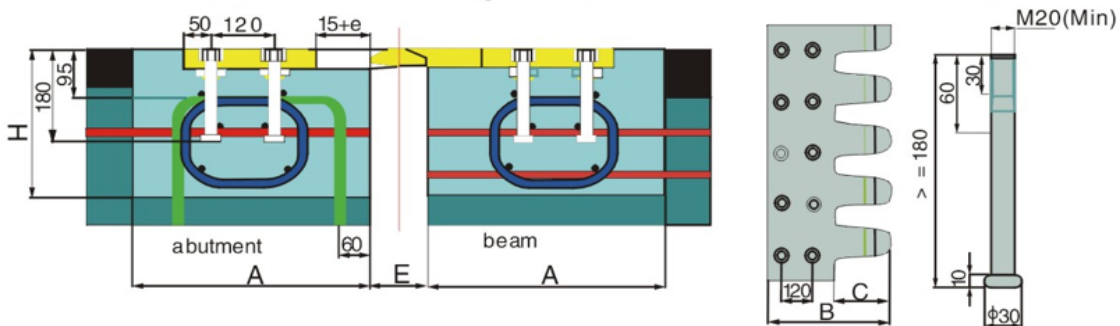


Type	Movement max - mm	H-min mm	A-min mm	B mm	C mm	E mm
40B	± 40	220	290	230	70	40
60B	± 60	220	300	250	90	50
80B	± 80	220	310	270	110	60
100B	± 100	220	320	290	130	70
120B	± 120	220	330	310	150	80
140B	± 140	220	340	330	170	90
160B	± 160	220	350	350	190	100

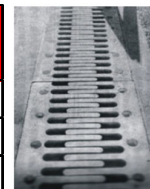


**Notes:**

- Construction gap width at median temperature.
- Above sizes are typical. Additional movement capacities can also be manufactured.
- e (actual movement) =  $C_m \times (T_{max}-T)/(T_{max}-T_{min})$ , where T: actual temperature



Type	Movement max - mm	H-min mm	A-min mm	B mm	C mm	E mm
160B	± 160	220	440	440	190	100
180B	± 180	220	450	460	210	110
200B	± 200	220	460	480	230	120



**Notes:**

- Construction gap width at median temperature.
- Above sizes are typical. Additional movement capacities can also be manufactured.
- e (actual movement) =  $C_m \times (T_{max}-T)/(T_{max}-T_{min})$ , where T: actual temperature