

With a successful service record for over 3½ decades, HERCULES LAMINATED ELASTOMERIC BEARINGS are finding ever increasing application in today's construction industry. Although used extensively in Bridges, bearing pads are being specified in a wide variety of applications where flexible structural support and / or vibration isolation is required. The typical application range is from concrete buildings and parking garages to heavy industrial equipment, storage tanks and pipe supports. Their popularity is understandable in view of the following advantages:

- a) Performs required functions efficiently
- b) Totally maintenance free
- c) No moving parts and therefore no wear & tear
- d) No corrosion
- e) Absorbs shocks & vibrations
- f) Cheaper than Mechanical Bearings
- g) Simple to install
- h) Capable to accommodate small irregularities in the loading surface.
- i) No static friction to overcome.

1. BEARING FUNCTION

A bridge bearing must perform the following basic functions:

- a) Support vertical loads with a minimum of deflection
- b) Allow horizontal movement with minimal resistance thereby reducing detrimental effects of creep, shrinkage and temperature change.
- c) Allow rotational movement with minimum resistance.
- d) Obtain uniform distribution of loads.

2. STANDARDS

Plain un – reinforced pads are simple rectangular blocks of rubber that are hot molded individually, cut from large molded sheets or extruded and cut to length.

Steel reinforced bearings consist of horizontal laminated of steel plate molded as a complete unit under pressure and heat. With the exception of top and bottom dowel holes the steel plates are completely embedded and bonded on both sides to the Elastomer. The bond between the steel shims and the Elastomer is formed during vulcanization.

Hercules Elastomeric Bearings can be designed and manufactured to the dimensional tolerances using Natural Rubber or Neoprene to the requirement of Quality Management Systems MS ISO 9001 : 2000 and the following Standards:

BS 5400: PART – 9
AASTHO
Austoroads '92
MS 671
JIS (JRA)

..... And many more

3. MATERIAL**ELASTOMER**

Elastomeric Bearings have no moving parts to perform their required functions. Instead, they achieve this through deformation of the Elastomer. Obviously then, the properties of the Elastomer largely determine the behavior of the bearing.

Although a wide variety of elastomers are available, only two types are allowed in Bridge bearings.

- a) Natural Rubber (100% virgin natural polyisoprene)
- b) Neoprene (100% virgin synthetic polychloroprene)

Each of these materials has their advantages.

Natural Rubber (Polyisoprene) does not stiffen at drastically low temperatures
Neoprene (Polychloroprene) will exhibit more creep but has a greater resistance to Ozone and chemical deterioration.

Elastomers with less than 100% of the above material is referred to as "Commercial Grade"

Hercules Elastomeric Bearing Pads use only "Bridge Bearing" quality elastomers with Shore A Hardness of approximately 50 – 70 durometer and can be specified to meet the current material requirements of specified bridge design standards.

Elastomeric bearings can be used at temperatures ranging from -30° C to +50° C though it can work at +70° C for short periods.

STEEL

The steel used for reinforcing plates confirm to BS 1449 / BS 4360 or its equivalent with a minimum shim thickness of 2 mm.

POLY TETRA FLOURO ETHYLENE (PTFE)

In cases where a very low friction coefficient is required, virgin PTFE can be either bonded to the top of the bearing or recessed and bonded to a intermediate steel plate and then mated with a stainless steel surface to accept both vertical loads and horizontal movements.

TABLE 7.1 TECHNICAL DATA OF SOME LAMINATED ELASTOMERIC BEARINGS

Part No.	Plan Size (mm)	Overall Height (mm)	Maximum Load Zero Rotation (kN)*		Maximum Load Full Rotation (kN)*		Shear Movement (mm)	Shear Stiffness (kN/mm)	Rotation about Longer axis (rad/100kN)
			no shear	Max. shear	no shear	Max. shear			
1203	229 × 152	36	297	214	112	92	19	1.06	0.01960
1205		62	226	164	104	83	32	0.62	0.03660
1207		87	160	98	101	77	45	0.44	0.05350
1104		39	441	318	173	140	19	1.05	0.01080
1107		68	333	241	170	129	32	0.62	0.01890
1110		96	235	143	169	119	45	0.44	0.02710
2203	305 × 152	36	447	327	143	119	19	1.41	0.01180
2205		62	340	253	133	108	32	0.83	0.02210
2207		87	240	154	129	101	45	0.58	0.03230
2140		39	663	484	225	184	19	1.40	0.00660
2107		68	500	372	221	173	32	0.82	0.01150
2110		96	354	225	219	162	45	0.58	0.01650
3203	279 × 229	36	798	69	323	269	19	1.94	0.00350
3205		62	798	555	302	246	32	1.14	0.00650
3207		87	666	486	294	234	45	0.81	0.00950
3104		39	1184	903	481	396	19	1.93	0.00200
3107		68	1184	822	473	376	32	1.13	0.00350
3110		96	979	712	470	358	45	0.80	0.00500
4303	406 × 279	43	1441	1108	446	377	23	2.78	0.00190
4304		58	1441	1058	424	356	32	2.01	0.00280
4305		74	1441	1008	412	344	41	1.58	0.00370
4203		36	1926	1515	682	575	19	3.44	0.00095
4205		62	1926	1415	639	532	32	2.02	0.00170
4207		87	1926	1315	623	510	45	1.43	0.00250
5402	406 × 356	35	1711	1357	780	657	20	4.13	0.00100
5403		54	1711	1294	706	588	31	2.66	0.00180
5404		73	1711	1231	675	556	42	1.96	0.00260
5302		32	2142	1715	991	832	18	4.65	0.00065
5304		64	2142	1589	901	740	35	2.33	0.00140
5305		79	2142	1526	885	718	44	1.86	0.00190
6402	610 × 305	38	2369	1882	816	690	20	5.32	0.00082
6403		59	2369	1795	733	616	31	3.42	0.00140
6404		80	2369	1709	699	583	42	2.52	0.00210
6302		35	2966	2377	1056	892	18	5.98	0.00052
6304		70	2966	2205	953	791	35	3.00	0.00120
6305		87	2966	2119	935	769	44	2.40	0.00150
7402	610 × 406	38	3848	3107	1485	1259	20	7.08	0.00032
7403		59	3848	2995	1344	1133	31	4.55	0.00057
7404		80	3848	2883	1286	1076	42	3.36	0.00082
7304		70	4817	3694	1714	1430	35	3.99	0.00048
7305		87	4817	3582	1684	1394	44	3.19	0.00061

* Assuming dead load effect = live load effect



Typical Fixing of Hercules Elastomeric Bearing

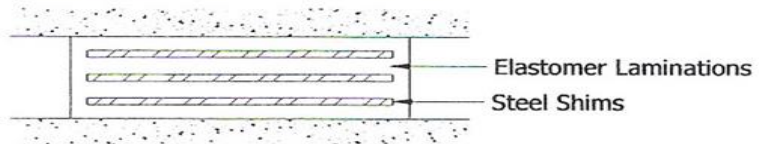


Figure 1 Typical Cross Section of Laminated Elastomeric Bearing

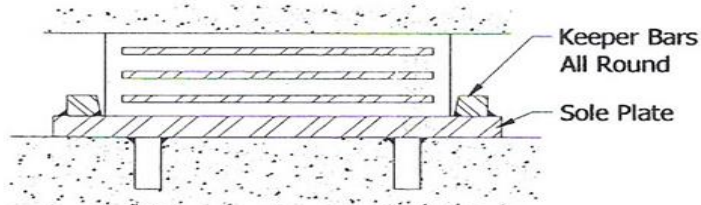


Figure 2 Elastomeric Bearing Pad (EBP) with Keeper Bars

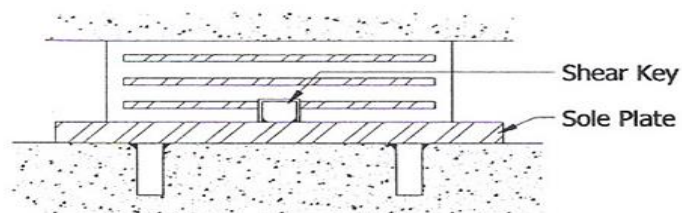


Figure 3 Elastomeric Bearing Pad (EBP) with Shear Key

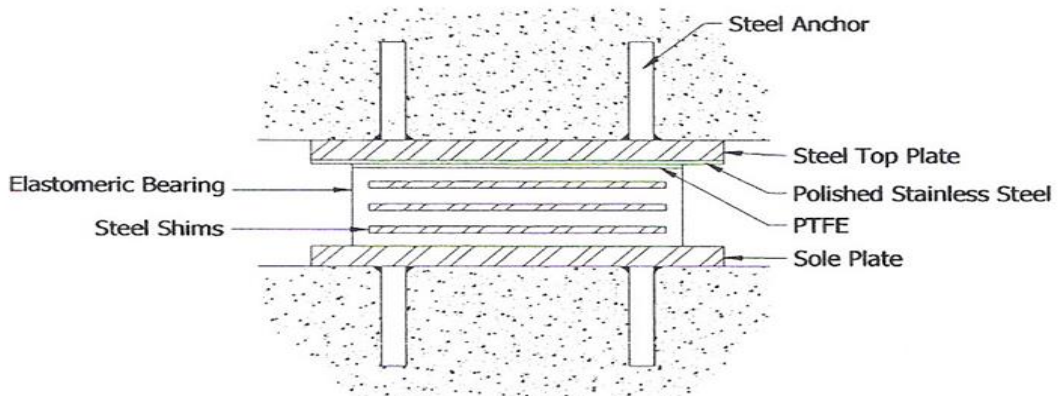


Figure 4 Elastomeric Bearing Shoes (EBS) with PTFE sliding Surface

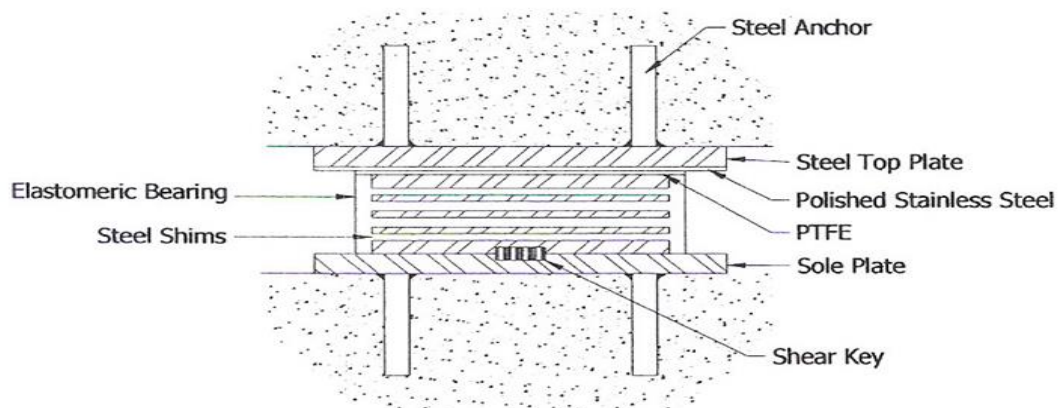
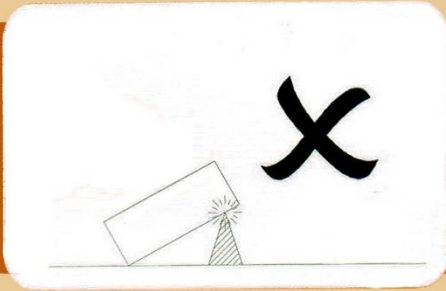
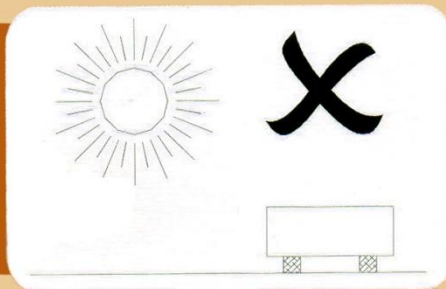


Figure 5 Elastomeric Bearing Shoes (EBS) with Shear Key

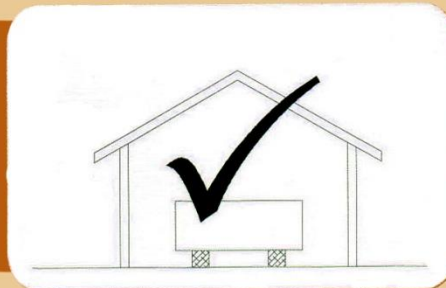
Handling and Storage



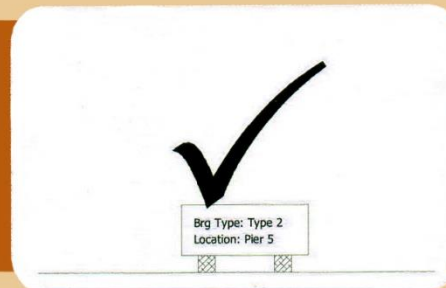
Avoid bearings in contact with sharp objects. This can damage the surface of bearings.



Avoid exposure to direct sunlight.



Store under cover, away from sunlight, oils, chemicals, etc..



All bearings should be clearly identified by a type reference number and location.