



ELASTOMERIC
BRIDGE
BEARINGS

DynamexTM
BY REDWOOD PLASTICS AND RUBBER

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About Us

Redwood Plastics and Rubber manufactures and distributes many grades of industrial plastic and rubber in-stock for quick delivery. We also have in-house engineering and fabrication to produce custom components that often replace steel, aluminum, and wood for longer wear life, decreased downtime, increased production, lighter weight, cost effectiveness and increased safety.

We supply plastic sheet, rod and tube as well as rubber sheet, rubber profiles, rubber rollers and molded rubber in an assortment of standard and specialty grades to solve a variety of problems including; shock, abrasion, noise, weight, mold & mildew, wear, and friction.

Redwood Plastics and Rubber has the manufacturing capabilities to mold, machine, and fabricate, a wide-range of high-quality parts in prototype and production volumes. We distribute and manufacture; UHMW, Acetal, Nylon, Sheet Rubber, Rubber Rollers, Polycarbonate, Acrylic, Polyurethane, PEEK, Tuffkast, Industrial Laminates, PTFE, FRP Wall Panels, FRP Grating and many more.

Quality Management

Redwood Plastics is committed to supplying high quality products and services to all of our customers. Strict quality management procedures have been put in place to ensure customer satisfaction. All material lots are individually tested according to full specification requirements. In addition, each and every order shipped out is accompanied with material certifications which detail the properties of the materials used during manufacturing.



Plain Bearings

DYNAMEX™ SR



Figure 1- Plain Bearing Pad - DYNAMEX™ SR

Overview

DYNAMEX™ SR plain bearing pads (Figure 1 above) consist solely of virgin Natural Rubber (polyisoprene) or Chloroprene Rubber (polychloroprene) materials. These are available in various durometer ratings and shear moduli depending on the specification required. They may be used in bridges, railway, buildings and vibration isolation applications.

Redwood Plastics and Rubber is able to supply materials which meet specification requirements for a number of different standards. Table 1 and 2 provide an outline of the material properties and values expected for various specifications.

Product Details

REDCO™ SR can be supplied in sheets or readily cut to size, including hole patterns if required and comes in thickness ranging from 1/8" (3mm) to 1 3/16" (30mm).



Table 1 - Typical Material Requirements for Various Standards for Natural Rubber

NATURAL RUBBER							
PROPERTY	TEST METHOD	CAN/CSA S6-19	OPSS	AASHTO GR3/ AASHTO GR5	AASHTO GR3/	AREMA	
Hardness [°Shore A]	ASTM D 2240	55 ± 5	-	50 ± 5	60 ± 5	50 ± 5	60 ± 5
Tensile Strength [MPa]	ASTM D 412, (Method A)	Min 17.0	Min 17.0	Min 15.5	Min 15.5	Min 15.5	Min 15.5
Ultimate Elongation [%]	ASTM D 412, (Method A)	Min 400	Min 400	Min 450	Min 400	Min 450	Min 400
Heat Resistance	ASTM D 573	70h at 70°C	70h at 70°C	168h at 70°C	168h at 70°C	70h at 70°C	70h at 70°C
Change in Hardness [°Shore A]		Max +10	Max +10	Max +10	Max +10	Max +10	Max +10
Change in Tensile Strength [%]		Max -25	Max -25	Max -25	Max -25	Max -25	Max -25
Change in Ultimate Elongation [%]		Max -25	Max -25	Max -25	Max -25	Max -25	Max -25
Compression Set [%]	ASTM D 395, Method B, 22h at 70°C	Max 25	Max 25	Max 25	Max 25	Max 25	Max 35
Ozone Resistance	ASTM D 1149, Mounting Procedure A, 20% Strain , 40±2 °C. 25 pphm, 48h	No Cracks	No Cracks	-	-	Optional	Optional
Bond Between Steel and Elastomer Laminae [N•mm-1]	ASTM D 429, Method B	Min 7.0	Min 7.0	-	-	-	-
Low Temperature Brittleness	ASTM D746, Procedure B	No Failure at -40°C	-	No Failure at -40°C / No Failure at -57°C	No Failure at -40°C / No Failure at -57°C	Optional	Optional
Low Temperature Crystallization Increase in Hardness [°Shore A]	ASTM D 2240, 168h at -25°C	Max +15	-	-	-	-	-
Low Temperature Compression Set [%]	ASTM D 1229	-	-	-	-	Optional	Optional
Shear Modulus, G_{RT} @ 20°C [MPa]	ASTM D 4014, Annex A1, as modified by AASHTO M251	-	-	-	-	0.7±0.1 Optional	1.0±0.1 Optional
Shear Modulus, G_{LT} @ -40°C [MPa]	ASTM D 4014, Annex A1, as modified by AASHTO M251	-	-	-	-	-	-

Table 2 - Typical Material Requirements for Various Standards for Chlorprene Rubber

NEOPRENE							
PROPERTY	TEST METHOD	CAN/CSA S6-14	OPSS	AASHTO GR3/ AASHTO GR5	AASHTO GR3/	AREMA	
Hardness [°Shore A]	ASTM D 2240	55 ± 5	-	50 ± 5	60 ± 5	50 ± 5	60 ± 5
Tensile Strength [MPa]	ASTM D 412, (Method A)	Min 17.0	Min 17.0	Min 15.5	Min 15.5	Min 15.5	Min 15.5
Ultimate Elongation [%]	ASTM D 412, (Method A)	Min 400	Min 400	Min 400	Min 350	Min 400	Min 400
Heat Resistance	ASTM D 573	70h at 100°C	70h at 100°C	70h at 100°C	70h at 100°C	70h at 100°C	70h at 100°C
Change in Hardness [°Shore A]		Max +15	Max +15	Max +15	Max +15	Max +15	Max +15
Change in Tensile Strength [%]		Max -15	Max -15	Max -15	Max -15	Max -15	Max -15
Change in Ultimate Elongation [%]		Max -40	Max -40	Max -40	Max -40	Max -40	Max -40
Compression Set [%]	ASTM D 395, Method B, 22h at 100°C	Max 35	Max 35	Max 35	Max 35	Max 25	Max 35
Ozone Resistance	ASTM D 1149, Mounting Procedure A, 20% Strain , 40±2 °C. 100 pphm, 100h	No Cracks	No Cracks	-	-	Optional	Optional
Bond Between Steel and Elastomer Laminae [N•mm-1]	ASTM D 429, Method B	Min 7.0	Min 7.0	-	-	-	-
Low Temperature Brittleness	ASTM D746, Procedure B	No Failure at -40°C	-	No Failure at -40°C / No Failure at -57°C	No Failure at -40°C / No Failure at -57°C	Optional	Optional
Low Temperature Crystallization Increase in Hardness [°Shore A]	ASTM D 2240, 168h at -10°C	Max +15	-	-	-	-	-
Low Temperature Compression Set [%]	ASTM D 1229	-	-	-	-	Optional	Optional
Shear Modulus, G_{RT} @ 20°C [MPa]	ASTM D 4014, Annex A1, as modified by AASHTO M251	-	0.8±0.15	-	-	0.7±0.1 Optional	1.0±0.1 Optional
Shear Modulus, G_{LT} @ -40°C [MPa]	ASTM D 4014, Annex A1, as modified by AASHTO M251	-	$G_{LT} \leq 3$ G_{RT}	-	-	-	-

Laminated Bearings

DYNAMEX™ RS



Figure 21- Laminated Bearing Pad - DYNAMEX™ RS

Overview

Laminated bearings consist of elastomer material vulcanized to layers of unexposed steel shims. These bearing pads allow for more rotation and movement capabilities than plain bearing pads. Vertical load and rotations are accommodated through vertical deflection while horizontal movement is accommodated through shear deformation. Redwood Plastic's expertise in elastomers guarantees the best material choices for structural applications in both urban and arctic environments.

All DYNAMEX™ RS bearings (Figure 2 above) are made in a single manufacturing step, including the vulcanization of top and bottom plates to rubber if required. Our stringent manufacturing process results in a high quality product with excellent bond strength (typically higher than the rubber material strength) and exceptionally precise parallelism of the internal shims.

Product Details

DYNAMEX™ laminated bearings can be manufactured from Natural Rubber or Chloroprene Rubber to meet CAN/CSA S6-14, OPSS 1202, AASHTO or other standards. Table 3 and 4 show a number of generic bearing configurations that Redwood Plastics and Rubber produces. Please note that the configurations listed are for consideration purposes only. Our team of engineers will be happy to assist you to design plain and laminated bearings according to you project and jurisdictional requirement.

Besides manufacturing, Redwood Plastics and Rubber can support you with a number of additional technical services:

- Destructive and Non-destructive testing
- Consulting for material selection, special provisions or test requirements
- Bearing design approval
- Supply of full bearing assemblies including steelwork (top plate, masonry plate, keeper angles/bar, etc.) and hardware. See Figure 3 for example.
- On-site inspections of existing bearings and elastomeric components
- Rehabilitation of elastomeric construction elements

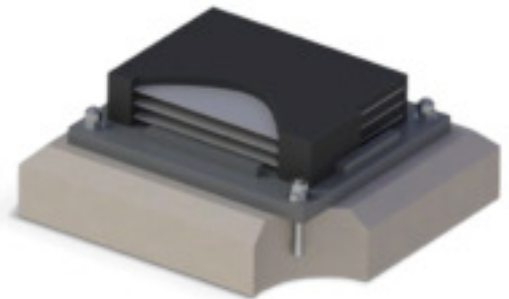


Figure 3 - Laminated Bearing – DYNAMEX™ RS With Steelwork

Table 3 - Sample Configurations* for REDCO™ RS According to CAN/CSA S6-14

DIMENSIONS			MAXIMUM				CAN/CSA S6-14				
LENGTH		THICKNESS	SLS		ULS		PRODUCT NAME	MOVEMENT	ROTATION UNDER SLS TL**	SHEAR STIFFNESS @ 20°C	COMPRESSION STIFFNESS
[mm]	[mm]	[mm]	DL	TL	DL	TL					
[mm]	[mm]	[mm]	[kN]	[kN]	[kN]	[kN]	REDCO™	[±mm]	[rad]	[kN/mm]	[kN/mm]
300 X 200	50	270	420	420	600	RS-C 502030	19.5	0.0133	1.19	236.46	
	75					RS-C 752030	28.5	0.0219	0.82	159.53	
	90					RS-C 902030	33	0.0250	0.71	142.78	
350 X 250	50	394	613	613	875	RS-C 502535	20.5	0.0116	1.66	312.52	
	75					RS-C 702535	30	0.0182	1.13	218.95	
	100					RS-C 1002535	39.5	0.0249	0.86	167.63	
400 X 300	50	540	840	840	1200	RS-C 503040	20.5	0.0085	2.27	449.32	
	75					RS-C 753040	31.5	0.0170	1.48	268.16	
	120					RS-C 1203040	49.5	0.0279	0.94	175.60	
450 X 350	50	709	1103	1103	1575	RS-C 503545	20.5	.0058	2.98	631.66	
	75					RS-C 753545	31.5	0.0134	1.94	365.08	
	120					RS-C 1203545	51	0.0250	1.20	217.63	
500 X 400	75	900	1400	1400	2000	RS-C 754050	33	0.0123	2.35	428.68	
	100					RS-C 1004050	42.5	0.0154	1.83	359.53	
	150					RS-C 1504050	64.5	0.0290	1.20	213.62	
550 X 450	75	1114	1733	1733	2475	RS-C 754555	33	0.0101	2.91	547.06	
	100					RS-C 1004555	44	0.0152	2.18	400.95	
	150					RS-C 1504555	66	0.0255	1.45	261.34	
600 X 500	75	1350	2100	2100	3000	RS-C 755060	33	0.0089	3.53	665.24	
	120					RS-C 1205060	52.5	0.0158	2.22	427.40	
	170					RS-C1705060	76	0.0272	1.53	269.28	
600 X 600	75	1620	2520	2520	3600	RS-C 756060	33	0.0066	4.23	808.85	
	120					RS-C 1206060	54	0.0141	2.59	465.71	
	180					RS-C 1806060	81	0.0237	1.72	303.18	

* For reference only. Please contact Redwood Plastics for additional dimensions.

Table 4 - Sample Configurations** for REDCO™ RS According to OPSS 1202

DIMENSIONS			MAXIMUM								
LENGTH	THICKNESS	SLS		ULS		PRODUCT NAME	MOVEMENT	ROTATION UNDER SLS TL**	SHEAR STIFFNESS @ 20°C	COMPRESSION STIFFNESS	
		DL	TL	DL	TL						
[mm]	[mm]	[kN]	[kN]	[kN]	[kN]	REDCO™	[± mm]	[rad]	[kN/mm]	[kN/mm]	
300 X 200	50	270	420	420	600	RS-C 502030	13.5	0.0076	1.72	244.21	
	75					RS-C 752030	22.5	0.0162	1.03	159.53	
	90					RS-C 902030	28.5	0.0223	0.82	129.34	
350 X 250	50	394	613	613	875	RS-C 502535	13.5	0.0044	2.51	383.85	
	75					RS-C 702535	25	0.0153	1.36	210.87	
	100					RS-C 1002535	34.5	0.0214	0.98	166.84	
400 X 300	50	540	840	840	1200	RS-C 503040	15	0.0054	3.10	432.08	
	75					RS-C 753040	5	0.0105	1.86	316.02	
	120					RS-C 1203040	43.5	0.0239	1.07	175.60	
450 X 350	50	709	1103	1103	1575	RS-C 503545	15.5	0.0033	3.94	627.51	
	75					RS-C 753545	25.5	0.0099	2.40	365.08	
	120					RS-C 1203545	43.5	0.0183	1.40	245.56	
500 X 400	75	900	1400	1400	2000	RS-C 754050	26.25	0.0057	3.66	650.69	
	100					RS-C 1004050	37	0.0129	2.10	357.47	
	150					RS-C 1504050	58.5	0.0259	1.33	213.62	
550 X 450	75	1114	1733	1733	2475	RS-C 754555	26.25	0.0057	3.66	650.69	
	100					RS-C 1004555	37	0.0104	2.59	461.21	
	150					RS-C 1504555	58.5	0.019	1.64	291.46	
600 X 500	75	1350	2100	2100	3000	RS-C 755060	26.25	0.0042	4.43	826.35	
	120					RS-C 1205060	47	0.0142	2.48	414.80	
	170					RS-C1705060	69	0.0224	1.69	295.73	
600 X 600	75	1620	2520	2520	3600	RS-C 756060	26.5	0.0042	5.27	808.85	
	120					RS-C 1206060	47	0.0099	2.97	537.42	
	180					RS-C 1806060	73.5	0.0187	1.90	341.30	

** Rotational values given are based on maximum allowable loads being applied at SLS TL. If less loading is applied, rotational capacities may be limited.

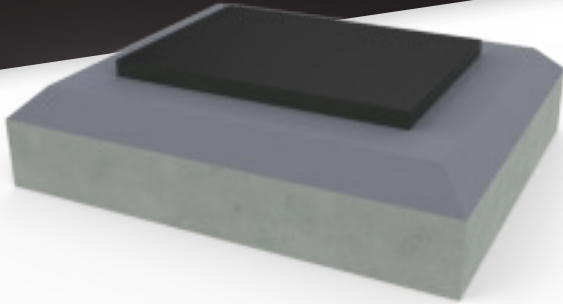


Figure 4 - Fiber Reinforced Rubber Pads
- DYNAMEX™ LOAD+™

Fiber Reinforced Rubber Pads

DYNAMEX™ LOAD+™

Overview

DYNAMEX™ LOAD+™ fiber reinforced rubber pads are structural bearings with higher stiffness (see Figure 4). They are commonly used in applications involving higher load requirements and less rotational needs. Consisting of high-strength, weather resistant elastomers and vulcanized with synthetic reinforcing fibres, our pads are designed for structural projects with typical design loads of 2000psi.

Applications

DYNAMEX™ LOAD+™ is widely used in pre-cast concrete structural applications. Examples include beams, Tees, hollow core slabs or girders in precast and prestressed concrete structures such as parking garages, pedestrian overpasses, masonry pads and many more.

Product Details

Stocked from 3/8" thickness through to 1" thickness, DYNAMEX™ LOAD+™ pads can be supplied in full sheet, strips or cut-to-size. The material can be moulded and fully fabricated to meet additional requirements. Table 5 displays the material properties for these pads.

Table 5 Typical Material Properties for REDCO™ LOAD+™

MATERIAL	TEST METHOD	SPECIFICATION
Hardness, Shore A	ASTM D 2240	75 +/- 5
Density [g/cm ³]	ASTM D 297	1.2
Tensile Strength [MPa]	ASTM D 412, Die C	+/- 10% 7.0
Ultimate Elongation [%]	ASTM D 412	Minimum 40
Heat Resistance 1. Change in Hardness [Δ Shore 'A'] 2. Change in Tensile Strength [Δ %] 3. Change in Ultimate Elongation [Δ %]	ASTM D 573, 70 h @ 70°C	Maximum +/- 10 Maximum +/- 25 Maximum +/- 25
Ultimate Compressive Strength [psi]	ASTM D 412	Typical 14,500
Tear Strength [lb/in]	ASTM D 624, Die B	Minimum 400
Ozone Resistance	ASTM D 518 B	PASS
Low Temperature Brittleness @ -40°C	ASTM D 2137	PASS

PTFE Attachment

DYNAMEX™ SLIDE BEARING

Overview

DYNAMEX™ bearings have the option to include a PTFE top layer which equips the bearing with a sliding surface. PTFE pads are specified in situations where higher horizontal movements are present. Usually on the situation, a stainless steel layer which serves as a stiffener and a bonding substrate is required between the PTFE and elastomer.

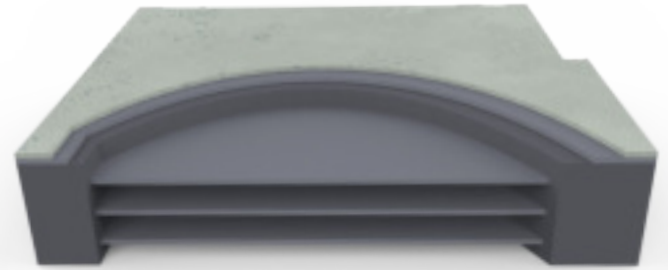


Figure 5 - Laminated Slide Bearing – DYNAMEX™ RS-CS (Unconfined PTFE)

Product Details

PTFE sliding surfaces may be attached to plain bearing pads, laminated bearing pads (Figure 5) or random oriented fiber pads (Figure 6). Stainless steel #8 mirror finish mating surfaces ranging from 1/16" to 3/16" are readily available and complete the slide bearing assembly.



Figure 6 - Fiber Reinforced Sliding Pads - REDCO™ LOAD+™ S

Seismic and Vibration Isolation

The use of seismic and vibration isolation bearings can be a cost effective way to protect structures from the harmful effects of earthquakes and other ground motions. Redwood Plastics has supplied a wide range of isolation systems utilizing elastomer materials. For more information about these applications, please contact Redwood Plastics and Rubber.





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