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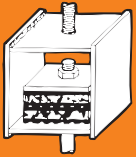
SPRING, NEOPRENE and COMBINATION HANGERS

HANGERS

H-610-6 BULLETIN



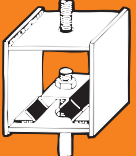
BLOCK OF CORK



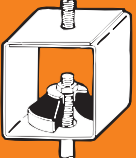
LAYERS OF RUBBER PADS



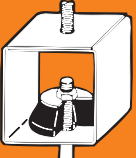
BLOCK OF FELT



STRIP RUBBER-IN-SHEAR



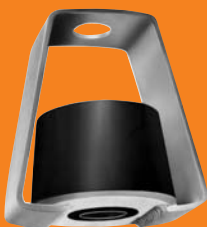
ROUND RUBBER-IN-SHEAR



SINGLE COMPRESSION ELEMENT



2 SINGLE COMPRESSION ELEMENTS



HD DOUBLE DEFLECTION NEOPRENE HANGER

HANGER DEVELOPMENT – PAST TO PRESENT

Over fifty years ago, vibration control hangers were in their infancy and it was not uncommon to use isolation materials such as a block of cork with a hole drilled through the center, two or three layers of rubber and cork pads or felt within the hanger frame. These products all gave way to the lower frequency bonded steel strip rubber-in-shear elements and then to round rubber-in-shear designs which were lower in cost and higher in capacity. The next step was equivalent deflection in compression.

The compression elements were designed with straight line deflection curves, so that for a given deflection the frequency would be about the same as the rubber-in-shear. The advantages were greater capacity for the same size and a fail safe feature. The upper steel washer in the rubber element is still made larger than the hole in the hanger box, so that if the rubber burns or fails, the piping, equipment, or suspended ceiling remains captive.

Both the round rubber-in-shear and the round compression hangers were also merchandised with a single deflection element in the top and bottom of the box to provide twice the deflection and lower the frequency. Our company went on to develop a larger taller double deflection element capable of providing this same deflection in one piece.

Up until 1965 we manufactured a complete range of 0.2”(5mm) single deflection hangers. They were in the same frequency range as fiberglass and very competitive but we found their performance so limited that we no longer wished to manufacture them although others still do. The only exception to this is the WHR which is still offered for ceiling suspension as a fiberglass substitute or improvement when fiberglass is specified by others.

HD Hangers are double deflection units with average static deflections of 0.4”(10mm). They are molded in Neoprene or EPDM compounds because of their excellent aging characteristics. If you wish to isolate primary vibration, they should only be considered for smaller equipment running above 800 RPM in non-critical areas. The principle function of HD Hangers is noise isolation.

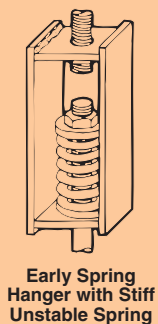


TYPE 30 SPRING HANGER

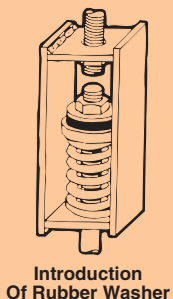


TYPE 30N COMBINATION SPRING and DOUBLE DEFLECTION NEOPRENE HANGER

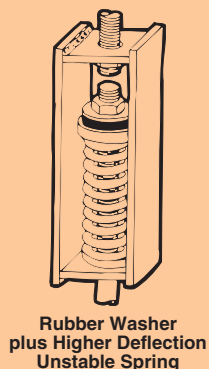
Spring Hangers followed their own evolution. As in the case of mountings, early spring hangers had very stiff, tall, unstable springs and it was not unusual to sell hangers with 0.375" (10mm) deflection. Spring Hangers contained no rubber for high frequencies and the first improvement was the introduction of a rubber washer. This was normally located under the top of the box, or later on against the spring cup on top of the spring. A steel washer over the rubber washer spread the load to the outside of the steel spring so a cheaper steel cup could be used. When the rubber washer was located under the top of the box or over the steel spring, the design was still extremely poor as there was nothing to keep the rubber washer centered on the steel cup. Thus, the steel hanger rod would rub the steel cup or the steel hanger box and short circuit the action of the rubber. This was not recognized as a worry in that era, so the next step was to increase the deflection. Since spring stability was not clearly understood increased deflection was accomplished by making the springs taller, but not necessarily larger in diameter. The springs could not collapse or fall over because the lower hole in the box continued to be conveniently small. When the spring tended to topple, the rod would hit the side of the box and stop. Of course, the rubber continued to be short circuited and often the rods would lock vertically (especially if they were fully threaded) so that the springs were bypassed as well.



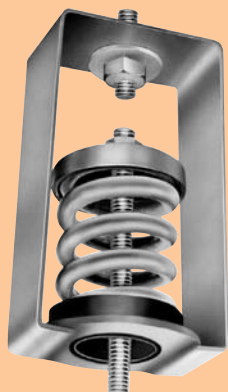
Early Spring Hanger with Stiff Unstable Spring



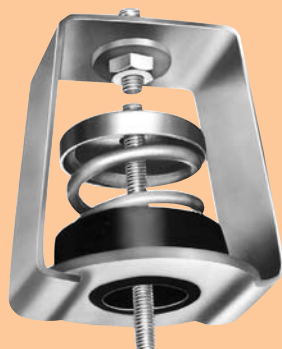
Introduction Of Rubber Washer



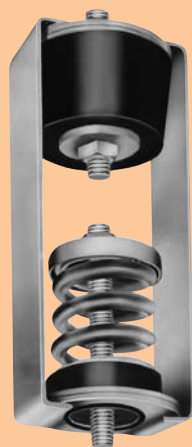
Rubber Washer plus Higher Deflection Unstable Spring



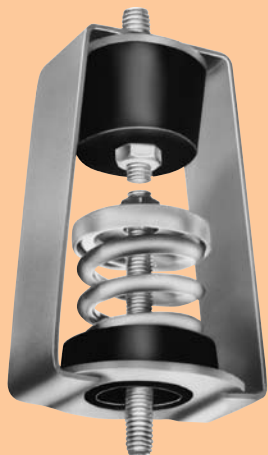
HS Hanger



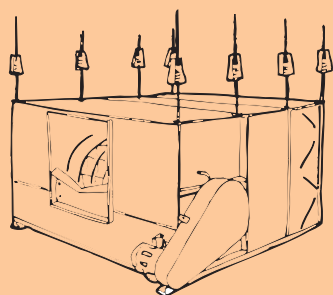
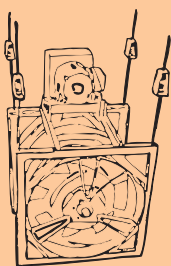
Series 30 Hanger



DNHS Hanger



Series 30N Hanger



We reduced these problems by writing specifications and manufacturing hangers with the hole in the bottom of the hanger box as large as the I.D. of the spring. The HS Spring Hangers evolved using our standard A, B and C Springs and seating them in neoprene or EPDM cups with projecting bushings to line the hole in the lower end of the box. A, B and C Springs are designed for horizontal stiffness as described on Page 1, 4, 5 and 8 of Bulletin SLF-200-3, so they do not fall over or buckle. Centering the spring in the acoustical cup made steel-to-steel contact of the rod and the top steel cup unimportant and put the rubber in the right location on the leaving end of the spring.

The Series 30 was designed in recognition of a consultant's field criticism that he was tired of walking job sites and seeing the hanger rods rubbing on the neoprene bushings. This happened because standard hangers allow for only limited rod angularity. The only way to solve the problem was to design a whole new series of springs which would be larger in diameter and shorter. To the best of our knowledge this was the first time that a group of hangers were designed to provide a specific angular capability. The designation 30 means the rod can swing through an arc of 30 degrees from side to side in any direction before contacting the neoprene bushing. The photographs show HS and series 30 hangers. The difference in the proportion of the springs and the angular capability is quite apparent. Spring hangers provide good vibration isolation where there is very little high frequency noise. They are generally recommended for applications like ductwork suspension or for suspending pipe lines where twin-sphere rubber connectors were used to take out the high frequencies first.

The Series 30 design solved the short circuiting problem, but we were still dealing with a design having poor high frequency control. The elastomeric cup is a much improved washer that cannot short circuit, but still a washer. The idea of placing a steel spring in series with a neoprene or EPDM hanger element started about 1957. Our DNHS Series was the first improvement on early designs, and the 30N configuration was the obvious advance on the DNHS as they incorporate the 30 degree swing capacity. Series 30N are the top-of-the-line and recommended for all highly critical locations where it is equally important to isolate both noise and vibration.

HS and DNHS designs using our standard A, B, C and multiple C designs are nominal 1"(25mm) and 1.35"(34mm) deflection hangers respectively. The Series 30 and 30N are grouped out with similar deflections, but then go on to our Series 30N-100 utilizing the 2"(50mm), 3"(76mm), 4"(102mm) and 5"(127mm) deflection springs used in the SLF-100 Mountings. The 3"(76mm) & 4"(102mm) Series 30N-1000 were introduced to satisfy lighter capacity needs. The newer B2 and C2 designs are nominal 2"(50mm) and 2.35"(60mm) deflection hangers meeting lower cost competitive criteria.

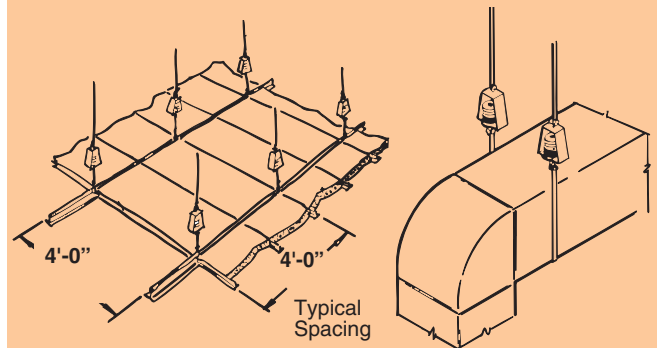
While most problems are addressed by the hangers listed above, we have need for one more variation. This is a precompressed PCHS, PCDNHS, PC-30 and PC-30N. When these hangers are released, they have the same vibration isolation characteristics as the standard versions. They have the advantage, however, of being preloaded in our shop by means of the washer and adjustment nut on the bottom. The spring deflection is shown on a scale inside the box so you know both the rated load and the deflection. A precompressed 1000 pound hanger acts as a rigid connection during installation unless the load exceeds the 1000 pounds(454kgs). Therefore, the installation may proceed in much the same manner as one with solid rods. This is particularly important when installing large diameter (6"(152mm) and over) pipe where the changes in elevation that would occur with ordinary spring hangers have forced contractors to install the piping systems solidly and then cut the rods and install the spring hangers later.

When the PC designs are used the whole run is completed and then the nuts below the lower washer are released to allow the spring to act freely. Any minor errors in load assignment results in negligible elevation changes and any major error would be noticed on the deflection scale and corrected by adjustment. In addition to installations as described above these hangers are recommended for the first three suspension points near the equipment so loads can be accurately determined to eliminate the effects of the piping weight and stress on the equipment flanges. They are also recommended for seismic applications where the precompression washers act as upward limit stops when cable restraints are used. Hanger housings must be strong enough to accept the compressive force.

With the exception of a few very low capacity hangers and welded high-capacity and multiple-spring designs all of our hanger boxes are made by bending steel flats into an inverted U shape with return bends on the bottom, and arc welding them to thick American Standard or special steel washers. We believe that this construction is far better in appearance and safer than the more common spot welded, overlapped sheet metal designs favored by our competitors. That is why we continue to use this more expensive construction.

Most of the hanger types mentioned above are furnished in W designs. The designation W is an arbitrary letter standing for wire. It means that the hangers are furnished with eyes so they may be wired in place. In many cases rather than using wire the Series W hangers are fastened by means of a horizontal bolt as shown in the illustrations. The W designs are used primarily for ceiling suspension and ductwork systems. Spring ceiling hangers are normally precompressed 60% of the assigned load so that as ceiling weight is added they will only descend 40% of the designed deflection. Thus a 1"(25mm) deflection hanger will only descend 0.40"(10mm) under load rather than the full 1"(25mm). This simplifies ceiling installations as it is much easier for the ceiling contractor to install and level his grillwork from hangers that have no initial give and then have the ceiling descend minimally as gypsum board, ceiling tile or plaster is added.

The following pages detail all of our current designs. Please call us when special designs are needed.

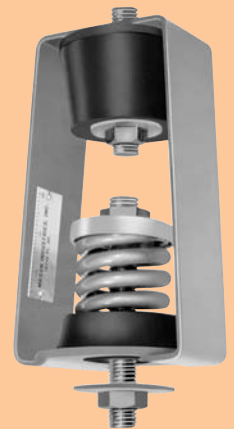


TYPE W as Ceiling Hangers

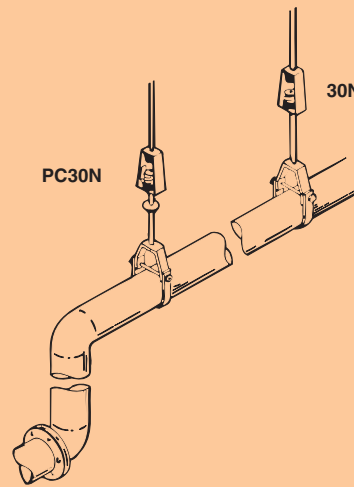
TYPE W As Duct Hangers



PC30 Hanger

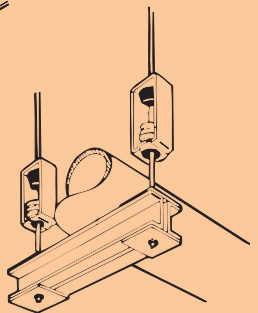


PC30N Hanger

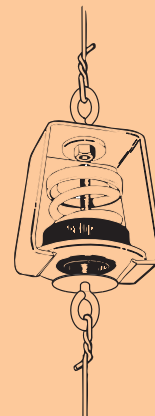


PC30N

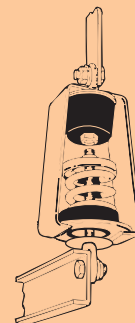
30N



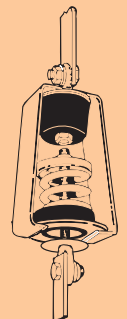
Trapeze Hung Pipe



TYPE W30 Secured by Wire



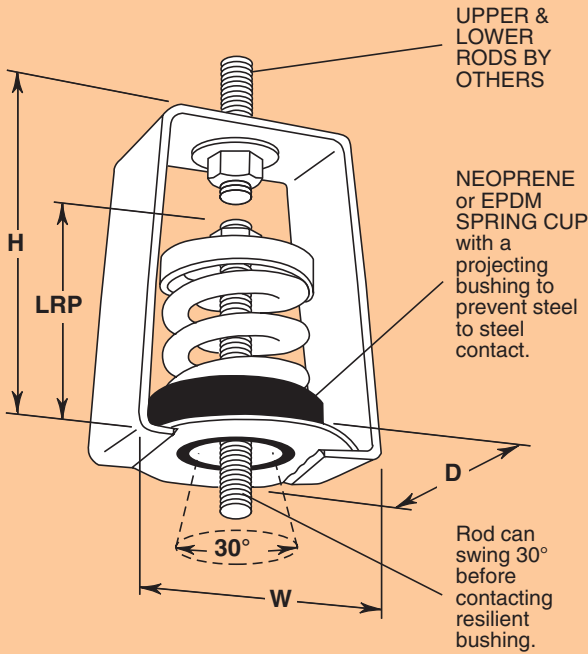
TYPE W30N Bolted to Ceiling Channel



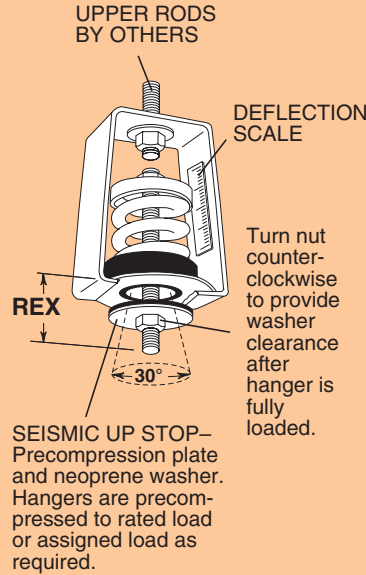
TYPE W30N Bolted to Straps

1"(25mm) DEFLECTION 30° SWING – X, A, B, C, D & F SPRING HANGERS

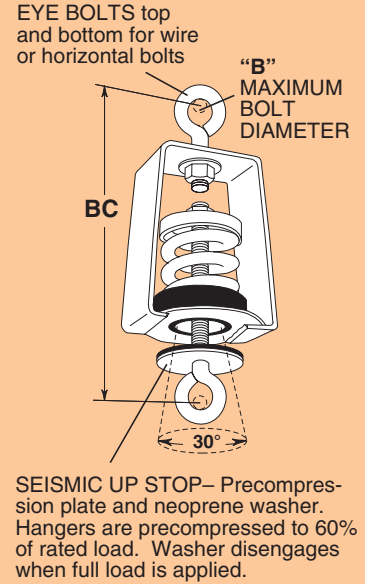
30 FOR ROD ATTACHMENT



PC30 TYPE 30 PRECOMPRESSED



W30 TYPE 30 PRECOMPRESSED FOR WIRE OR HORIZONTAL BOLT ATTACHMENT



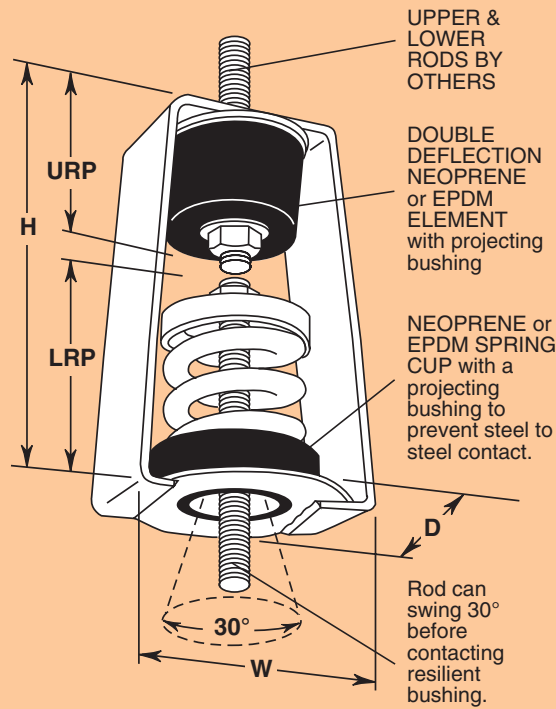
Ratings & Dimensions for 1"(25mm) Deflection Spring Hangers (inches millimeters)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. [†] (in) (mm)	Spring Constant (lbs/in) (kg/cm)	Spring Color/Stripe	Spring Only Spring OD	Spring Only Free Height	B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	
30-	X-23	23 10	1.30 33	18 0.30	Brown											
	X-33	33 15	1.10 28	30 0.54	Copper											
	X-54	54 24	1.20 30	45 0.80	White											
	X-76	76 34	1.02 25	73 1.36	Black	11/2	21/2	1/4	21/2	41/4	27/8	57/8	31/2	3/8	13/4	
	X-113	113 51	1.00 25	113 2.04	Brass	38	64	6	64	108	73	149	89	10	44	
	X-130	130 59	1.00 25	130 2.36	Purple											
	X-175	175 79	1.00 25	175 3.16	Silver											
X-210	210 95	1.00 25	210 3.80	Blue												
PC30-	A-12	12 5	1.00 25	12 0.20	Copper	13/4	17/8	3/8	23/4	53/4	31/4	71/8	31/2	5/8	21/4	
	A-18	18 8	1.00 25	18 0.32	Gray	44	48	10	70	146	83	181	89	16	57	
	A-25	25 11	1.00 25	25 0.44	Orange											
W30-	A-41	41 19	1.18 30	35 0.63	Pink											
	A-56	56 25	1.14 30	49 0.83	Black	13/4	21/4	3/8	23/4	53/4	31/4	71/8	4	5/8	21/4	
	A-73	73 33	1.06 27	69 1.22	Tan	44	57	10	70	146	83	181	102	16	57	
	A-95	95 43	1.01 26	94 1.65	Green											
	B-138	138 63	1.32 34	105 1.85	White											
B-222	222 101	1.16 29	191 3.48	Blue												
B-278	278 126	1.09 28	255 4.50	Purple	23/8	27/8	1/2	4	71/4	43/4	81/2	41/4	5/8	21/4		
B-336	336 152	1.00 25	336 6.08	Silver	60	73	13	102	184	121	216	108	16	57		
B-410	410 186	1.07 27	385 6.89	Black												
B-540	540 245	1.00 25	540 9.80	Yellow												
30-	C-630	630 286	1.13 29	558 9.86	Gray											
	C-800	800 363	1.00 25	800 14.52	Orange	27/8	35/8	—	4	83/4	51/4	—	5	3/4	21/4	
	C-1010	1010 458	1.10 28	920 16.36	Green	73	92	—	102	222	132	—	127	19	70	
	C-1265	1265 574	1.00 25	1265 22.96	Red											
PC30-	D-1575	1575 714	1.23 31	1280 23.03	Pink	33/4	47/8	—	43/4	121/2	53/4	—	7	7/8	21/2	
	D-2150	2150 975	1.03 26	2095 37.50	Purple	95	124	—	121	318	146	—	178	22	69	
	F-2760	2760 1252	1.00 25	2760 50.08	Silver	41/2	51/8	—	6	12	61/4	—	7	7/8	21/2	
								—	152	305	159	—	178	22	64	

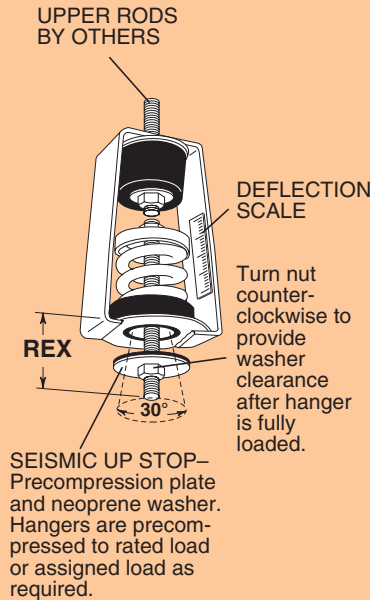
†All springs have additional travel to solid equal to 50% of Rated Deflection.

1"(25mm) DEFLECTION 30° SWING – X, A, B, C, D & F SPRING and DOUBLE DEFLECTION NEOPRENE HANGERS

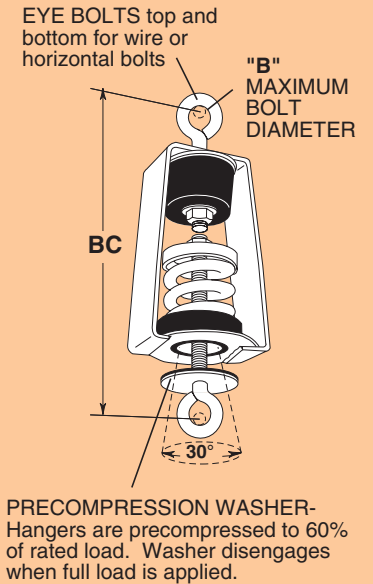
30N FOR ROD ATTACHMENT



PC30N TYPE 30N PRECOMPRESSED



W30N TYPE 30N PRECOMPRESSED FOR WIRE OR HORIZONTAL BOLT ATTACHMENT



Ratings & Dimensions for 1"(25mm) Deflection Spring and Double Deflection Neoprene Hangers (inches mm)

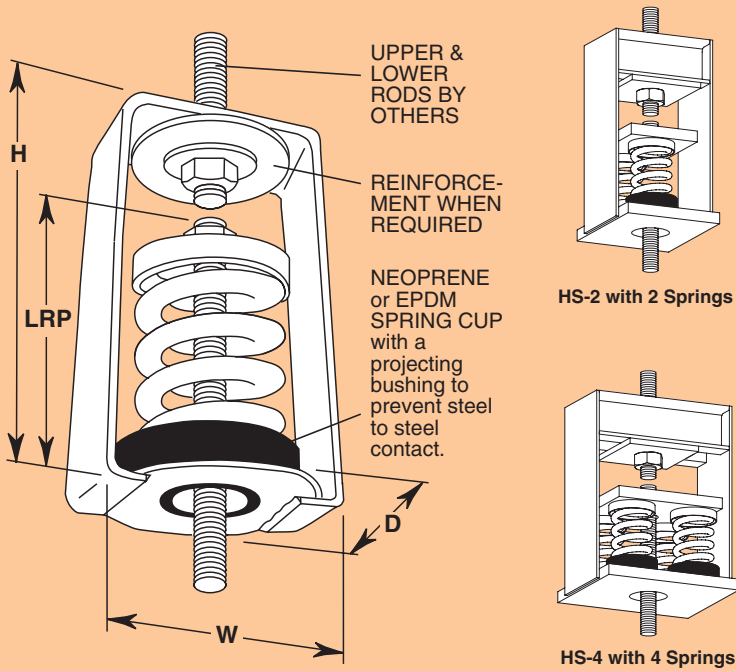
Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. [†] (in) (mm)	Spring Constant ^{††} (lbs/in)(kg/mm)	Average Defl. Neo-prene	Spring Color/Stripe	Spring Only		B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Upper Rod Penetration URP
							Spring Free OD	Height									
30N-	X-23	23 10	1.50 38	18 0.26		Brown											
	X-33	33 15	1.30 33	30 0.45		Copper											
	X-54	54 24	1.40 36	45 0.67		White											
	X-76	76 34	1.22 31	73 1.10	0.20	Black	11/2 38	21/2 64	3/8 10	21/2 64	51/2 140	27/8 73	10 254	31/4 83	3/8 10	21/4 57	13/4 44
	X-113	113 51	1.20 30	113 1.70	5	Brass											
	X-130	130 59	1.20 30	130 1.97		Purple											
	X-175	175 79	1.20 30	175 2.63		Silver											
X-210	210 95	1.20 30	210 3.17		Blue												
PC30N-	A-12	12 5	1.35 34	12 0.15	0.35	Copper	13/4 44	17/8 48	3/8 10	23/4 70	63/4 171	31/4 82	111/4 284	31/4 83	5/8 16	21/4 57	21/4 57
	A-18	18 8	1.35 34	18 0.24	9	Gray											
	A-25	25 11	1.35 34	25 0.32		Orange											
W30N-	A-41	41 19	1.53 39	35 0.49		Pink											
	A-56	56 25	1.49 38	49 0.66	0.35	Black	13/4 44	2c 57	3/8 10	23/4 70	63/4 171	31/4 82	111/4 284	35/8 92	5/8 16	21/4 57	21/4 57
	A-73	73 33	1.41 36	69 0.92	9	Tan											
	A-95	95 43	1.36 35	94 1.23		Green											
30N-	B-138	138 63	1.67 42	105 1.50		White											
	B-222	222 101	1.51 38	191 2.66		Blue											
	B-278	278 126	1.44 37	255 3.41	0.35	Purple	23/8 60	27/8 73	3/8 10	4 102	63/4 171	43/4 121	113/4 298	33/4 95	5/8 16	21/4 57	23/4 70
	B-336	336 152	1.35 34	336 4.47	9	Silver											
	B-410	410 186	1.42 36	385 5.17		Black											
	B-540	540 245	1.35 34	540 7.21		Yellow											
30N-	C-630	630 286	1.53 39	558 7.33	0.40	Gray	27/8 73	35/8 92	—	43/4 121	9 229	51/4 133	—	5 127	3/4 19	21/2 64	3 76
	C-800	800 363	1.40 36	800 10.08		Orange											
	C-1010	1010 458	1.50 38	20 12.05	10	Green											
	C-1265	1265 574	1.40 36	1265 15.94		Red											
PC30N-	D-1575	1575 714	1.63 41	1280 17.41	0.40	Pink	33/4 95	47/8 124	—	43/4 121	121/2 318	53/4 146	—	7 178	7/8 22	21/2 64	41/4 108
	D-2150	2150 975	1.43 36	2095 27.08	10	Purple											
	F-2760	2760 1252	1.40 36	2760 34.78	0.40	Silver	41/2 114	51/8 130	—	6 152	141/2 368	61/4 159	—	7 178	7/8 22	21/2 64	5 127

All springs have additional travel to solid equal to 50% of Rated Deflection. Hanger elements have straight line deflection curves.

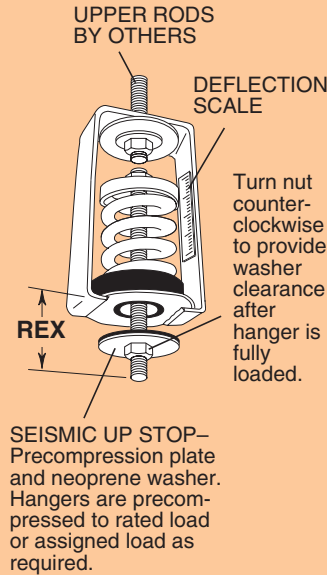
[†]includes double deflection neoprene element. ^{††}applies to spring only.

1"(25mm) Deflection X, A & B SPRING HANGERS

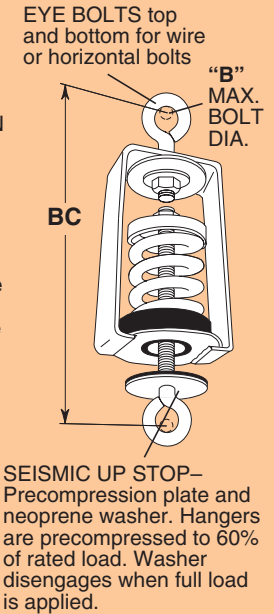
HS FOR ROD ATTACHMENT



PCHS TYPE HS PRECOMPRESSED



WHS TYPE HS PRECOMPRESSED FOR WIRE OR HORIZONTAL BOLT ATTACHMENT



Ratings & Dimensions for 1"(25mm) Deflection Spring Hangers (inches millimeters)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. ¹ (in) (mm)	Spring Constant (lbs/in) (kg/mm)	Spring Color/Stripe	Spring Only Spring OD	Free Height	B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	
1" 25mm Defl.	X-23	23 10	1.30 33	18 0.30	Brown											
	X-33	33 15	1.10 28	30 0.54	Copper											
	X-54	54 24	1.20 30	45 0.80	White											
	X-76	76 34	1.02 25	73 1.36	Black	11/2	21/2	1/4	21/2	41/4	27/8	57/8	31/2	3/8	13/4	
	X-113	113 51	1.00 25	113 2.04	Brass	38	64	6	64	108	73	149	89	10	44	
	X-130	130 59	1.00 25	130 2.36	Purple											
	X-175	175 79	1.00 25	175 3.16	Silver											
	X-210	210 95	1.00 25	210 3.80	Blue											
HS-	A-12	12 5	1.00 25	12 0.20	Copper	13/4	17/8	3/8	23/4	53/4	31/4	61/2	31/2	5/8	21/4	
	A-18	18 8	1.00 25	18 0.32	Gray	44	48	10	70	146	83	165	89	16	57	
	A-25	25 11	1.00 25	25 0.44	Orange											
	A-41	41 19	1.18 30	35 0.63	Pink											
PCHS-	A-56	56 25	1.14 30	49 0.83	Black	13/4	21/4	3/8	23/4	53/4	31/4	61/2	4	5/8	21/4	
	A-73	73 33	1.06 27	69 1.22	Tan	44	57	10	70	146	83	165	102	16	57	
	A-95	95 43	1.01 26	94 1.65	Green											
	A-45	45 20	1.60 41	28 0.49	Blue											
WHS-	A-75	75 34	1.50 38	50 0.89	Orange											
	A-125	125 57	1.33 34	94 1.68	Brown	13/4	3	3/8	23/4	53/4	31/4	65/8	4	5/8	21/2	
	A-200	200 91	1.15 29	174 3.14	Black	44	76	10	70	146	83	168	102	16	64	
	A-310	310 141	1.00 25	310 5.64	Yellow											
	A-400	400 181	1.00 25	400 7.24	Green											
	A-510	510 231	1.00 25	510 9.24	Red	13/4	31/8	3/8	23/4	53/4	31/4	65/8	4	5/8	21/2	
	A-625	625 283	1.00 25	625 11.32	White	44	79	10	70	146	83	168	102	16	64	
	A-625	625 283	1.00 25	625 11.32	White	44	86	10	70	146	83	168	102	16	64	
HS-PCHS-	B-65	65 29	2.10 53	31 0.55	Brown											
	B-85	85 39	2.10 53	40 0.74	White/Black											
	B-115	115 52	2.00 51	57 1.02	Silver											
	B-150	150 68	2.00 51	75 1.33	Orange	23/8	4	1/2	4	71/4	43/4	10	41/4	3/4	21/4	
	B-280	280 127	1.60 41	174 3.10	Green	60	102	13	102	184	121	254	108	19	57	
	B-450	450 204	1.31 33	344 6.18	Red											
B-750	750 340	1.12 28	670 12.14	White												
HS-PCHS-	B-1000	1000 454	1.00 25	1000 18.16	Blue	23/8	4	—	4	71/4	4 3/4	—	41/4	3/4	21/4	
						60	102	—	102	184	121	—	108	14	57	

1”(25mm) DEFLECTION C AND MULTIPLE C SPRING HANGERS

Ratings & Dimensions for 1”(25mm) Deflection Spring Hangers (inches millimeters)

Type	Size	Rated Capacity		Rated Defl. ¹		Spring Constant		Spring Color/Stripe	Spring Only		B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)		Spring OD	Free Height								
1” 25mm Defl.	1-1000	1000	454	1.00	25	1000	18.16	Black	27/8 73	41/8 105	—	4	83/4 222	51/4 133	—	5 127	7/8 22	21/4 57
	1-1350	1350	612	1.00	25	1350	24.48	Yellow										
	1-1750	1750	794	1.00	25	1750	31.76	Black*										
	1-2100	2100	953	1.00	25	2100	38.12	Yellow*										
	1-2385	2385	1082	1.00	25	2385	43.28	Yellow**										
	1-2650	2650	1202	1.00	25	2650	48.08	Red*										
1-2935	2935	1331	1.00	25	2935	53.24	Red**											
HS-	2-2700	2700	1225	1.00	25	2700	49.00	Yellow	27/8 73	41/8 105	—	9	10 254	51/4 133	—	7 178	1 25	41/4 108
	2-3500	3500	1588	1.00	25	3500	63.52	Black*										
	2-4200	4200	1905	1.00	25	4200	76.20	Yellow*										
PCHS-	4-5400	5400	2449	1.00	25	5400	97.96	Yellow	27/8 73	41/8 105	—	7	13 330	87/8 225	—	7 178	11/4 32	41/2 114
	4-7000	7000	3175	1.00	25	7000	127.00	Black*										
	4-8400	8400	3810	1.00	25	8400	152.40	Yellow*										
PCHS-	4-9540	9540	4327	1.00	25	9540	173.08	Yellow**	27/8 73	41/8 105	—	7	13 330	87/8 225	—	7 178	11/4 32	41/2 114
	4-10600	10600	4808	1.00	25	10600	192.32	Red*										
	4-11740	11740	5325	1.00	25	11740	213.00	Red**										

¹All springs have additional travel to solid equal to 50% of the rated deflection.

*with Red inner spring **with Green inner spring

2”(51mm) DEFLECTION B, B2, C2 AND MULTIPLE C2 SPRING HANGERS

Ratings & Dimensions for 2”(51mm) Deflection Spring Hangers (inches millimeters)

Type	Size	Rated Capacity		Rated Defl. ¹		Spring Constant		Spring Color/Stripe	Spring Only		B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)		Spring OD	Free Height								
2” 51mm Defl.	B-20	20	9	2.40	61	8	0.15	Tan	23/8 60	4 102	1/2 13	4	71/4 184	43/4 121	10 254	51/8 130	3/4 19	21/4 57
	B-26	26	12	2.18	55	12	0.22	White/Blue										
	B-35	35	16	2.20	56	16	0.29	Purple										
	B-50	50	23	2.20	56	24	0.41	White/Red										
	B-65	65	29	2.10	53	31	0.55	Brown										
	B-85	85	39	2.10	53	40	0.74	White/Black										
HS-	B-115	115	52	2.00	51	57	1.02	Silver	23/8 60	41/2 114	1/2 13	4	71/4 184	43/4 121	10 254	51/8 130	3/4 19	21/4 57
	B-150	150	68	2.00	51	75	1.33	Orange										
	B2-210	210	95	2.12	54	99	1.76	Silver										
WHS-	B2-290	290	132	2.00	51	144	2.59	Blue	23/8 60	41/2 114	1/2 13	4	71/4 184	43/4 121	10 254	51/8 130	3/4 19	21/4 57
	B2-450 [‡]	450	204	2.00	51	224	4.00	Tan										
	B2-680 [‡]	680	308	2.00	51	340	6.04	Gray										
	C2-125	125	57	2.50	64	50	0.89	Purple										
HS-	C2-170	170	77	2.40	61	70	1.26	Brown	27/8 73	5 127	—	4	83/4 222	51/4 133	—	51/4 133	7/8 22	21/4 57
	C2-210	210	95	2.30	58	90	1.64	Red										
	C2-260	260	118	2.20	56	120	2.11	White										
	C2-330	330	150	2.00	51	165	2.94	Black										
	C2-460	460	209	2.00	51	230	4.10	Blue										
	C2-610	610	277	2.00	51	305	5.43	Green										
	C2-880 [‡]	880	399	2.00	51	440	7.82	Gray										
	C2-1210 [‡]	1210	549	2.00	51	605	10.76	Silver										
	C2-1540 [‡]	1540	699	2.00	51	770	13.71	Gray*										
	C2-1870 [‡]	1870	848	2.00	51	935	16.63	Silver*										
PCHS-	2-C2-2420 [‡]	2420	1098	2.00	51	605	21.53	Silver	27/8 73	5 127	—	9	10 254	51/4 133	—	6 152	1 25	41/4 108
	2-C2-3080 [‡]	3080	1397	2.00	51	770	27.39	Gray*										
	2-C2-3740 [‡]	3740	1696	2.00	51	935	33.25	Silver*										
	4-C2-3520 [‡]	3520	1597	2.00	51	440	31.31	Gray										
PCHS-	4-C2-4840 [‡]	4840	2195	2.00	51	605	43.04	Silver	27/8 73	5 127	—	7	13 330	87/8 225	—	8 203	11/4 32	41/2 114
	4-C2-6160 [‡]	6160	2794	2.00	51	770	54.78	Gray*										
	4-C2-7480 [‡]	7480	3393	2.00	51	935	66.53	Silver*										

All springs without “[‡]” have additional travel to solid equal to 50% of the rated deflection.

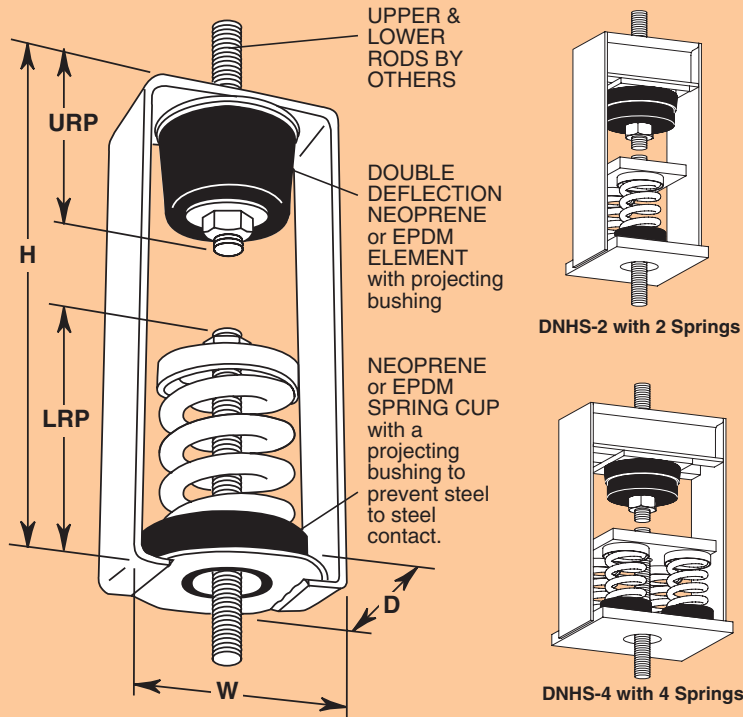
*with Red inner spring

[‡]Published ratings allow minimum 25% additional travel to solid. For a full 50% specified minimum use the following ratings:

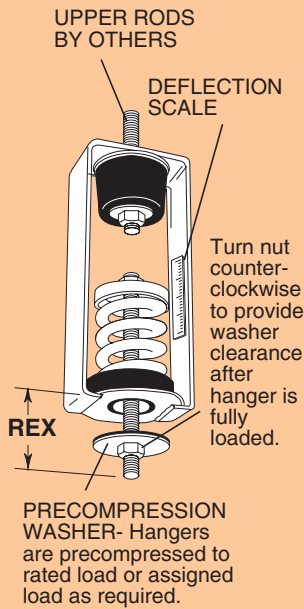
Size	Derated Capacity (lbs) (kg)	Defl. (in) (mm)	Size	Derated Capacity (lbs) (kg)	Defl. (in) (mm)	Size	Derated Capacity (lbs) (kg)	Defl. (in) (mm)
B2-450	410 186	1.83 46	C2-1870	1560 708	1.67 42	2-C2-3740	3120 1415	1.67 42
B2-680	565 256	1.66 42	2-C2-1760	1600 726	1.82 46	4-C2-4840	4040 1833	1.67 42
C2-880	800 363	1.82 46	2-C2-2420	2020 916	1.67 42	4-C2-6160	5145 2334	1.67 42
C2-1210	1010 458	1.67 42	2-C2-3080	2570 1166	1.67 42	4-C2-7480	6245 2833	1.67 42
C2-1540	1285 583	1.67 42						

1"(25mm) DEFLECTION X, A & B SPRING and DOUBLE DEFLECTION NEOPRENE HANGERS

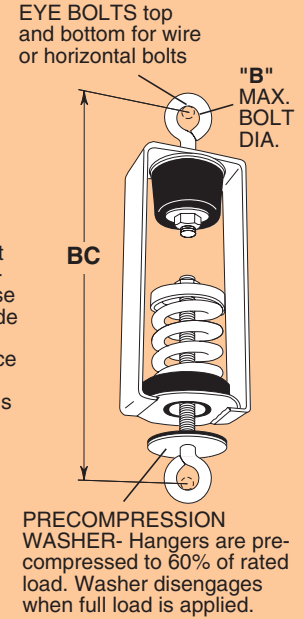
DNHS FOR ROD ATTACHMENT



PCDNHS TYPE DNHS PRECOMPRESSED



WDNHS TYPE DNHS PRECOMPRESSED FOR WIRE OR HORIZONTAL BOLT ATTACHMENT



Ratings & Dimensions for 1"(25mm) Deflection Spring and Double Deflection Neoprene Hangers (inches mm)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. [†] (in) (mm)	Spring Constant ^{††} (lbs/in)(kg/mm)	Average Defl. Neo-prene	Spring Color/Stripe	Spring Only Spring OD	Spring Only Free Height	B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Upper Rod Penetration URP												
1" 25mm Defl.	X-23	23 10	1.50 38	18 0.26	0.20 5	Brown	11/2 25	21/2 64	3/8 10	21/2 64	51/2 140	27/8 73	71/4 184	31/4 83	3/8 10	13/4 44	13/4 44												
	X-33	33 15	1.30 33	30 0.45		Copper																							
	X-54	54 24	1.40 36	45 0.67		White																							
	X-76	76 34	1.22 31	73 1.10		Black																							
	X-113	113 51	1.20 30	113 1.70		Brass																							
	X-130	130 59	1.20 30	130 1.97		Purple																							
	X-175	175 79	1.20 30	175 2.63		Silver																							
	X-210	210 95	1.20 30	210 3.17		Blue																							
DNHS-	A-12	12 5	1.35 34	12 0.15	0.35 9	Copper	13/4 44	17/8 48	3/8 10	23/4 70	63/4 171	31/4 83	91/4 235	31/2 89	fi* 16	21/4 57	21/4 57												
	A-18	18 8	1.35 34	18 0.24		Gray																							
	A-25	25 11	1.35 34	25 0.32		Orange																							
	A-41	41 19	1.53 39	35 0.49		Pink																							
PCDNHS-	A-56	56 25	1.49 38	49 0.66	0.35 9	Black	13/4 44	21/4 57	3/8 10	23/4 70	63/4 171	31/4 83	91/4 235	4 102	5/8 16	21/4 57	21/4 57												
	A-73	73 33	1.41 36	69 0.92		Tan																							
	A-95	95 43	1.36 35	94 1.23		Green																							
	A-45	45 20	1.95 50	28 0.40		0.35 9												Blue	13/4 44	3 76	3/8 10	23/4 70	63/4 171	31/4 83	91/4 235	4 102	5/8 16	21/2 64	21/4 57
A-75	75 34	1.85 47	50 0.72	Orange																									
A-125	125 57	1.68 43	94 1.33	Brown																									
A-200	200 91	1.50 38	174 2.39	Black																									
WDNHS-	A-310	310 141	1.35 34	310 4.15	0.35 9	Yellow	13/4 44	31/8 79	3/8 10	23/4 70	63/4 171	31/4 83	91/4 235	4 102	5/8 16	21/2 64	21/4 57												
	A-400	400 181	1.35 34	400 5.32		Green																							
DNHS-PCDNHS	A-510	510 231	1.35 34	510 6.79	0.35 9	Red	13/4 60	31/8 102	3/8 13	23/4 102	63/4 229	31/4 121	91/4 279	4 108	5/8 19	21/2 57	21/4 76												
	A-625	625 283	1.35 34	625 8.32		White																							
	B-65	65 29	2.45 62	31 0.47		0.35 9												Brown*	23/8 60	4 102	1/2 13	4 102	9 229	43/4 121	11 279	41/4 108	3/4 19	21/4 57	3 76
	B-85	85 39	2.45 62	40 0.63														White*											
	B-115	115 52	2.35 60	57 0.87														Silver											
	B-150	150 68	2.35 60	75 1.13														Orange											
	B-280	280 127	1.95 50	174 2.54														Green											
	B-450	450 204	1.66 42	344 4.86														Red											
B-750	750 340	1.47 37	670 9.19	White																									
DNHS-PCDNHS	B-1000	1000 454	1.35 34	1000 13.35	0.35 9		Blue	23/8 60	4 102	— 102	4 229	9 121	43/4 121	— 108	3/4 19	21/4 57	3 76												

8 All springs have additional travel to solid equal to 50% of Rated Deflection. Neoprene elements have straight line deflection curves. [†]includes double deflection neoprene element. ^{††}applies to spring only. *with Black Color Stripe

1”(25mm) DEFLECTION C & MULTIPLE C SPRING and DOUBLE DEFLECTION NEOPRENE HANGERS

Ratings & Dimensions for 1” (25mm) Deflection Spring and Double Deflection Neoprene Hangers

Type	Size	Rated Capacity		Rated Defl.†		Spring Constant††		Average Defl. Neoprene	Spring Color/Stripe	Spring Only		B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Upper Rod Penetration URP	
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)			Spring OD	Free Height										
1” 25mm Defl.	1-1000	1000	454	1.40	36	1000	12.61	0.40	Black	27/8	41/8	—	4	11	51/4	—	5	7/8	21/4	31/4	
	1-1350	1350	612	1.40	36	1350	17.00														Yellow
	1-1750	1750	794	1.40	36	1750	22.06														Black*
	1-2100	2100	953	1.40	36	2100	26.47														Yellow*
	1-2385	2385	1082	1.40	36	2385	30.06														Yellow**
	1-2650	2650	1202	1.40	36	2650	33.30														Red*
1-2935	2935	1331	1.40	36	2935	36.97	Red**														
DNHS-	2-2700	2700	1225	1.40	36	2700	34.03	0.40	Yellow	27/8	41/8	—	9	12	51/4	—	7	1	41/4	33/4	
PCDNHS-	2-3500	3500	1588	1.40	36	3500	44.11														Black*
	2-4200	4200	1905	1.40	36	4200	52.92														Yellow*
	4-5400	5400	2449	1.40	36	5400	68.03														Yellow
	4-7000	7000	3175	1.40	36	7000	88.19														Black*
4-8400	8400	3810	1.40	36	8400	105.83	Yellow*														
4-9540	9540	4327	1.40	36	9540	20.19	Yellow**	27/8	41/8	—	7	15	87/8	—	7	11/4	41/2	6			
4-10600	10600	4808	1.40	36	10600	133.56	Red*	73	105	—	178	381	225	—	178	32	114	152			
4-11740	11740	5325	1.40	36	11740	147.92	Red**	73	105	—	178	381	225	—	178	32	114	152			

All springs have additional travel to solid equal to 50% of Rated Deflection. Neoprene elements have straight line deflection curves.
 *with Red inner spring **with Green inner spring †includes double deflection neoprene element. ††applies to spring only.

2”(51mm) DEFLECTION B, B2, C2 & MULTIPLE C2 SPRING and DOUBLE DEFL. NEOPRENE HANGERS

Ratings & Dimensions for 2”(51mm) Deflection Spring and Double Deflection Neoprene Hangers (inches mm)

Type	Size	Rated Capacity		Rated Defl.†		Spring Constant††		Average Defl. Neoprene	Spring Color/Stripe	Spring Only		B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Upper Rod Penetration URP	
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)			Spring OD	Free Height										
2” 51mm Defl.	B-20	20	9	2.75	70	8	0.13	0.35	Tan	23/8	4	1/2	4	9	43/4	11	51/8	3/4	21/4	3	
	B-26	26	12	2.53	64	12	0.19														White ¹
	B-35	35	16	2.55	65	16	0.25														Purple
	B-50	50	23	2.55	62	24	0.35														White ²
	B-65	65	29	2.45	62	31	0.47														Brown
	B-85	85	39	2.45	62	40	0.63														White ³
DNHS-	B-115	115	52	2.35	60	57	0.87	Silver	60	102	13	102	229	121	279	130	19	57	76		
B-150	150	68	2.35	60	75	1.13	Orange														
PCDNHS-	B2-210	210	95	2.47	63	99	1.51	0.35	Silver	23/8	41/2	1/2	4	9	43/4	131/2	51/8	3/4	21/4	3	
WDNHS-	B2-290	290	132	2.35	60	144	2.20														Blue
	B2-450†	450	204	2.35	60	224	3.40														Tan
	B2-680†	680	308	2.35	60	340	5.13														Gray
DNHS-	C2-125	125	57	2.90	74	50	0.77	0.40	Purple	27/8	5	—	4	11	51/4	—	51/4	7/8	21/4	31/4	
	C2-170	170	77	2.80	71	70	1.08														Brown
	C2-210	210	95	2.70	69	90	1.38														Red
	C2-260	260	118	2.60	66	120	1.79														White
	C2-330	330	150	2.40	61	165	2.46														Black
	C2-460	460	209	2.40	61	230	3.43														Blue
	C2-610	610	277	2.40	61	305	4.54														Green
	C2-880†	880	399	2.40	61	440	6.54														Gray
	C2-1210†	1210	549	2.40	61	605	5.72														Silver
	C2-1540†	1540	699	2.40	61	770	11.46														Gray*
	C2-1870†	1870	848	2.40	61	935	13.90														Silver*
PCDNHS-	2-C2-2420†	2420	1098	2.40	61	605	18.00	0.40	Silver	27/8	5	—	9	12	51/4	—	6	1	41/4	33/4	
	2-C2-3080†	3080	1397	2.40	61	770	22.90														Gray*
	2-C2-3740†	3740	1696	2.40	61	935	27.80														Silver*
	4-C2-3520†	3520	1597	2.40	61	440	26.18														Gray
	4-C2-4840†	4840	2195	2.40	61	605	35.98														Silver
	4-C2-6160†	6160	2794	2.40	61	770	45.80														Gray*
	4-C2-7480†	7480	3393	2.40	61	935	55.62														Silver*

All springs without “†” have additional travel to solid equal to 50% of Rated Deflection. Neoprene elements have straight line deflection curves.
¹with Blue stripe ²with Red stripe ³with Black stripe *with Red inner spring

†includes double deflection neoprene element. ††applies to spring only.

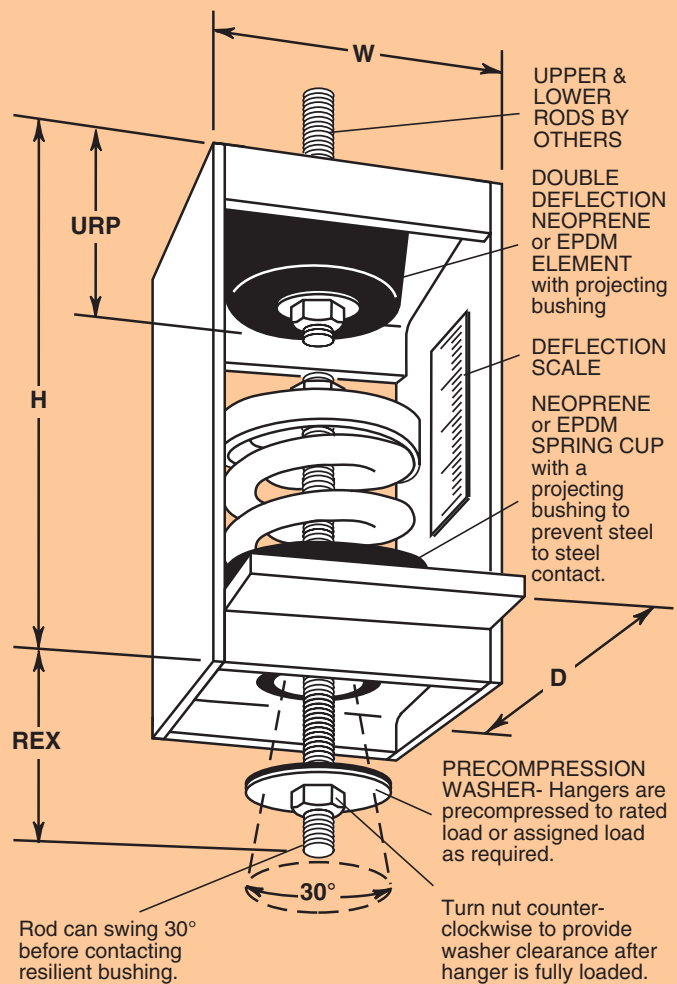
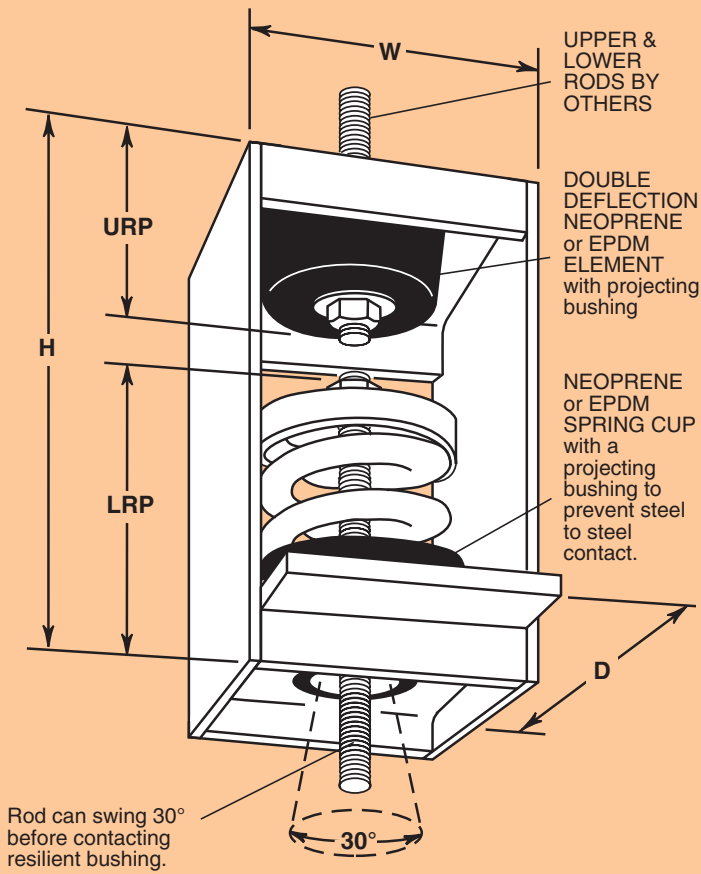
*Published ratings allow minimum 25% additional travel to solid. For a full 50% specified minimum use the following ratings:

Size	Derated Capacity (lbs)	Derated Capacity (kg)	Defl. (in)	Defl. (mm)	Size	Derated Capacity (lbs)	Derated Capacity (kg)	Defl. (in)	Defl. (mm)	Size	Derated Capacity (lbs)	Derated Capacity (kg)	Defl. (in)	Defl. (mm)
B2-450	410	186	1.83	46	C2-1870	1560	708	1.67	42	2-C2-3740	3120	1415	1.67	42
B2-680	565	256	1.66	42	2-C2-1760	1600	726	1.82	46	4-C2-4840	4040	1833	1.67	42
C2-880	800	363	1.82	46	2-C2-2420	2020	916	1.67	42	4-C2-6160	5145	2334	1.67	42
C2-1210	1010	458	1.67	42	2-C2-3080	2570	1166	1.67	42	4-C2-7480	6245	2833	1.67	42
C2-1540	1285	583	1.67	42										

2"(51mm), 3"(76mm), 4"(102mm) & 5"(127mm) DEFLECTION 30° SWING - 100 SERIES SPRING and DOUBLE DEFLECTION NEOPRENE HANGERS

30N-100 FOR ROD ATTACHMENT

PC30N-100 TYPE 30N PRECOMPRESSED



NOTE – Illustration shows typical construction. Components vary depending on capacity.

SRD is the Smallest (Minimum) Rod Diameter which will maintain spring stability.

Ratings & Dimensions for 2"(51mm) Deflection Spring and Double Deflection Neoprene Hangers (inches mm)

Type	Size	Rated Capacity		Rated Defl. [†]		Spring Constant ^{††}		Spring Color/Stripe	Spring Only			Lower Rod Penetration LRP	Max. Rod Dia. MRD	Min. Rod Dia. SRD	Rod Extension REX	Upper Rod Penetration URP				
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)		Spring OD	Free Height	D						H	W		
2" 51mm Defl. 30N-	101	125	57	2.90	74	50	0.77	Purple	33/4	95	53/4	146								
	102	200	91	2.90	74	80	1.23	Brown	33/4	95	53/4	146								
	103	310	141	2.90	74	125	1.91	Pink	33/4	95	53/4	146	5	131/2	6	71/2	7/8	5/8	41/2	31/4
	104	500	227	2.90	74	200	3.07	Green	33/4	95	53/4	146	127	343	152	191	22	16	114	83
	105	740	336	2.80	71	310	4.73	Red	33/4	95	53/4	146								
	106	1050	476	2.50	64	500	7.44	White	33/4	95	57/8	149								
	107	1400	635	2.40	61	700	10.41	Blue	33/4	95	57/8	149								
PC30N-	108	1660	753	2.45	62	810	12.15	Silver	41/2	114	63/4	171	6	153/8	71/4	11	7/8	5/8	5	31/4
	109	2250	1021	2.40	61	1125	16.74	Orange	41/2	114	71/2	191	152	391	184	279	22	16	127	83
	110	3000	1361	2.40	61	1500	22.31	Gray	5	127	71/2	191	6	16	71/4	111/2	7/8	3/4	5	31/4
	111	4000	1814	2.40	61	2000	29.74	Tan	5	127	71/2	191	152	406	184	292	22	19	127	83
	112	5300	2404	2.40	61	2665	39.41	Black	51/2	140	81/2	216	7	17	91/4	121/4	11/8	7/8	51/2	31/4
	113	7100	3221	2.40	61	3550	52.80	Yellow	6	152	83/4	222	178	432	235	311	29	22	140	83
	114	9300	4218	2.40	61	4650	69.15	Blue/Orng	63/4	171	10	254	8	22	10	151/2	11/8	1	51/2	61/2
115	12600	5715	2.40	61	6300	93.69	Blue/Red	63/4	171	10	254	203	559	254	394	29	25	140	165	

All springs have additional travel to solid equal to 50% of Rated Deflection. Neoprene elements have straight line deflection curves.

[†]includes double deflection neoprene element.

^{††}applies to spring only.

Ratings & Dimensions for 3"(76mm), 4"(102mm) & 5"(127mm) Deflection Spring and Double Deflection Neoprene Hangers (inches/mm)

Type	Size	Rated Capacity		Rated Defl. [†]		Spring Constant ^{††}		Spring Color/Stripe		Spring Only			Lower Rod Penetration LRP	Max. Rod Dia. MRD	Min. Rod Dia. SRD	Rod Extension REX	Upper Rod Penetration URP			
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)	Spring OD	Free Height	D	H	W								
3" 76mm Defl.	See 3" 76mm Low Capacity Hangers Page 12																			
	126	195	88	3.65	93	60	0.95	Purple	33/4	95	63/8	162	5	131/2	6	8	7/8	5/8	41/2	31/4
	127	280	127	3.65	93	85	1.37	Brown	33/4	95	61/2	165	127	343	152	203	22	16	114	83
	128	390	177	3.65	93	120	1.90	Orange	4	102	61/2	165								
	129	520	236	3.65	93	160	2.54	Green	4	102	7	178	5	131/2	6	81/2	5/8	5/8	41/2	31/4
	130	710	322	3.65	93	220	3.46	Red	41/2	114	71/4	184	127	343	152	203	22	16	114	83
	131	940	426	3.65	93	290	4.58	White	41/2	114	71/2	191	6	153/8	71/4	101/4	7/8	5/8	41/2	31/4
	132	1280	581	3.65	93	395	6.25	Blue	41/2	114	71/2	191	152	391	184	260	22	16	114	83
	133	1770	803	3.65	93	545	8.63	Black	5	127	77/8	200	6	153/8	71/4	11	7/8	5/8	41/2	31/4
	134	2490	1129	3.65	93	765	2.14	Yellow	5	127	77/8	200	152	391	184	279	22	16	114	83
	135	3300	1497	3.65	93	1000	16.10	Gray	5	127	77/8	200	6	153/8	71/4	111/4	7/8	5/8	41/2	31/4
	136	4500	2041	3.65	93	1370	21.95	Blue/Brown	63/4	171	93/4	235	8	20	9	14	7/8	7/8	5	31/2
	137	6200	281	3.65	93	1900	30.24	Blue/Orng	73/4	197	107/8	276	203	508	229	356	22	22	127	89
138	8300	3765	3.65	93	2560	40.48	Blue/Red	73/4	197	11	279	9	24	11	16	11/8	1	51/2	61/2	
139	11400	5171	3.65	93	3500	55.60	Blue/White	73/4	197	121/4	311	229	610	279	445	29	25	140	165	
4" 102mm Defl.	See 4" 102mm Low Capacity Hangers Page 12																			
	150	240	109	4.78	121	55	0.16	Purple	5	127	83/8	213	6	153/8	71/4	11	7/8	5/8	5	31/4
	151	330	150	4.78	121	75	1.24	Brown	5	127	81/2	213	152	391	184	279	22	16	127	83
	152	420	191	4.78	121	95	1.58	Orange	5	127	83/8	213								
	153	530	240	4.78	121	120	1.98	Green	5	127	83/8	213								
	154	680	308	4.78	121	155	2.55	Red	6	152	87/8	225	71/2	171/2	81/4	131/4	7/8	5/8	5	31/4
	155	880	399	4.78	121	200	3.30	White	6	152	91/8	232	181	445	210	337	22	16	127	83
	156	1120	508	4.78	121	255	4.20	Blue	6	152	97/8	251								
	157	1420	644	4.78	121	325	5.32	Black	6	152	10	254	8	20	9	141/4	7/8	5/8	5	31/4
	158	1840	835	4.78	121	420	5.32	Yellow	63/4	171	103/8	264	203	508	229	362	22	16	127	83
	159	2370	1075	4.78	121	540	6.90	Gray	63/4	171	111/8	283								
	160	3000	1361	4.78	121	695	11.25	Blue/Brwn	73/4	197	107/8	276	9	24	11	17	11/8	3/4	51/2	61/2
	161	3900	1769	4.78	121	895	14.62	Blue/Red	73/4	197	113/8	289	229	610	279	432	29	19	140	165
162	5100	2313	4.78	121	1155	19.52	Blue/Orng	83/4	222	111/2	292	9	24	11	17	11/8	3/4	51/2	61/2	
163	6500	2948	4.78	121	1485	24.38	Blue/White	83/4	222	131/4	337	241	673	311	483	29	25	165	165	
164	8400	3810	4.78	121	1910	31.49	Blue/Silver	83/4	222	133/8	340									
165	10800	4899	4.78	121	2455	40.49	Blue/Gray	93/8	238	141/8	359	10	28	121/4	21	11/8	1	61/2	61/2	
174	70	122	5.71	145	50	0.84	Purple	6	152	97/8	251	7	16	91/4	121/2	3/4	5/8	5	31/4	
175	320	145	5.71	145	60	1.00	Brown	6	152	101/16	256	178	406	235	318	19	16	127	83	
176	370	168	5.71	145	70	1.16	Orange	6	152	10	254									
177	460	209	5.78	147	85	1.42	Green	6	152	101/2	267									
178	560	254	5.78	147	105	1.73	Red	6	152	103/4	273									
179	670	304	5.78	147	125	2.07	White	63/4	171	111/16	281	8	19	10	15	3/4	5/8	51/2	31/2	
180	830	376	5.78	147	155	2.56	Blue	63/4	171	113/8	289	203	483	254	381	19	16	140	89	
181	1000	454	5.78	147	185	3.09	Black	63/4	171	111/8	283									
182	1240	562	5.77	147	230	3.82	Yellow	63/4	171	113/8	289									
183	1500	680	5.77	147	280	4.63	Gray	73/4	197	127/16	316	9	21	111/4	17	7/8	3/4	6	31/2	
184	1830	830	5.77	147	340	5.65	Pink	73/4	197	117/8	302	229	533	286	432	22	19	152	89	
185	2230	1012	5.77	147	415	6.88	Silver	73/4	197	12	305									
186	2710	1229	5.77	147	505	8.36	Tan	73/4	197	123/4	324									
187	3300	1497	5.77	147	615	10.18	Blue/Orng	83/4	222	123/4	324	91/2	261/2	121/4	19	7/8	7/8	6	61/2	
188	4100	1860	5.77	147	755	12.65	Blue/Red	83/4	222	133/8	340	241	673	311	483	22	22	152	165	
189	4900	2223	5.77	147	915	15.12	Blue/White	91/16	230	137/16	341									
190	6000	1852	5.77	147	1120	18.52	Blue/Yelw	91/2	241	145/8	371	10	28	121/4	21	11/8	1	61/2	61/2	
191	7300	2252	5.77	147	1365	22.52	Blue/Silvr	91/2	241	153/16	386	254	711	311	533	291	29	165	165	
192	9000	2777	5.77	147	1670	27.77	Blue/Gray	101/4	260	155/8	397	101/2	30	131/4	23	11/8	1	61/2	61/2	
193	11000	3395	5.77	147	2040	33.95	Blue/Tan	101/4	260	16	406	267	762	337	584	29	25	165	165	

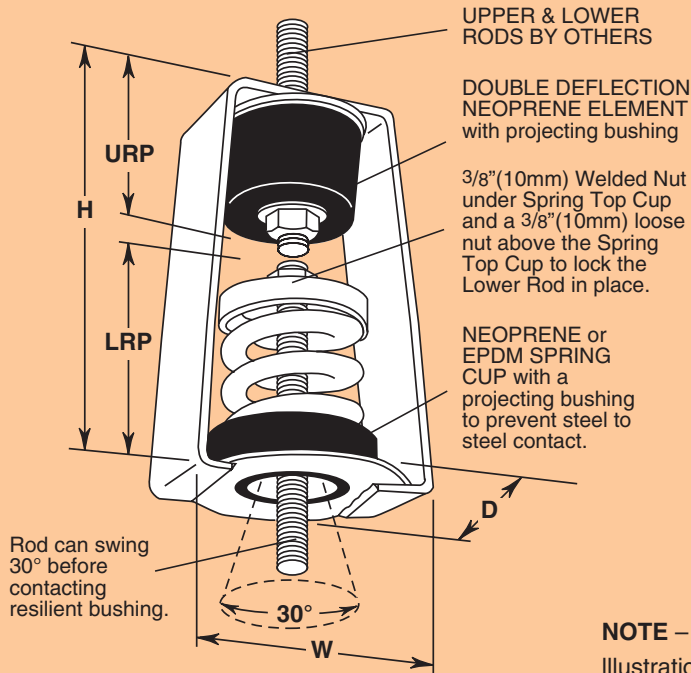
All springs have additional travel to solid equal to 50% of Rated Deflection. Neoprene elements have straight line deflection curves.

[†]includes double deflection neoprene element.

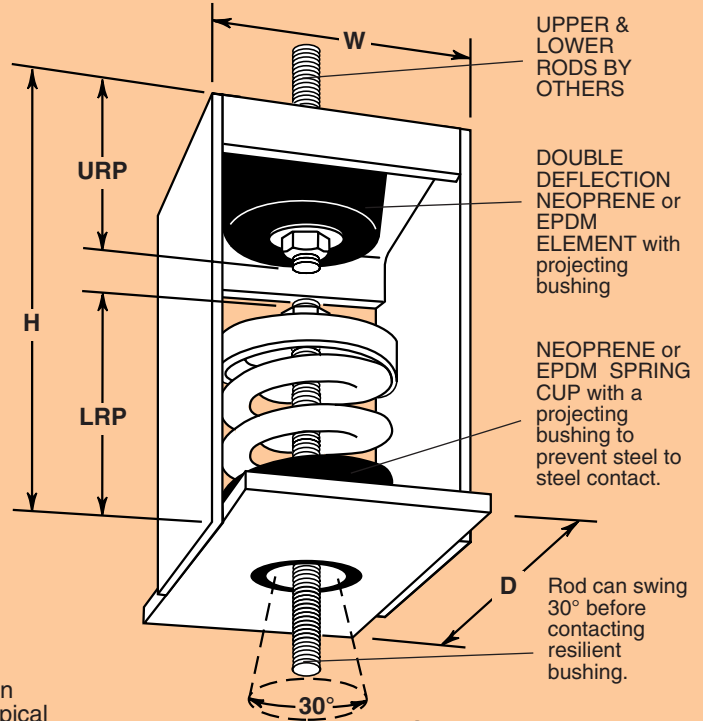
^{††}applies to spring only.

3"(76mm) & 4"(102mm) DEFLECTION 30° SWING – LOW CAPACITY 1000 SERIES SPRING and DOUBLE DEFLECTION NEOPRENE HANGERS

30N-1000 3" FOR ROD ATTACHMENT



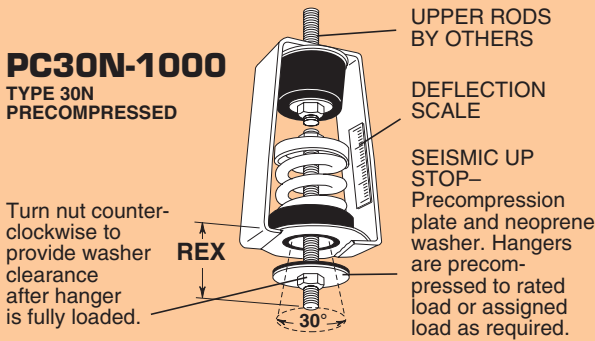
30N-1000 4" FOR ROD ATTACHMENT



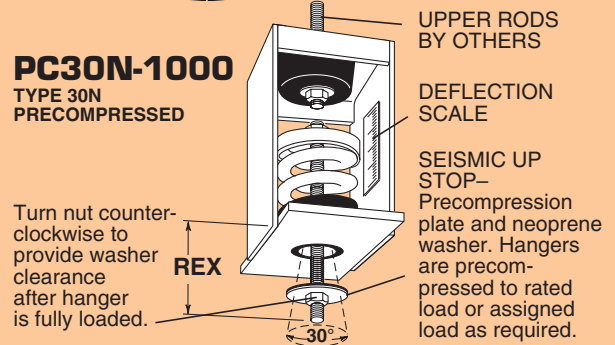
NOTE –
Illustration shows typical construction. Components may vary with deflection and capacity.

SRD is the Smallest (Minimum) Rod Diameter which will maintain spring stability.

PC30N-1000 TYPE 30N PRECOMPRESSED



PC30N-1000 TYPE 30N PRECOMPRESSED



Ratings & Dimensions for 3"(76mm)& 4"(102mm) Deflection Spring and Double Deflection Neoprene Hangers

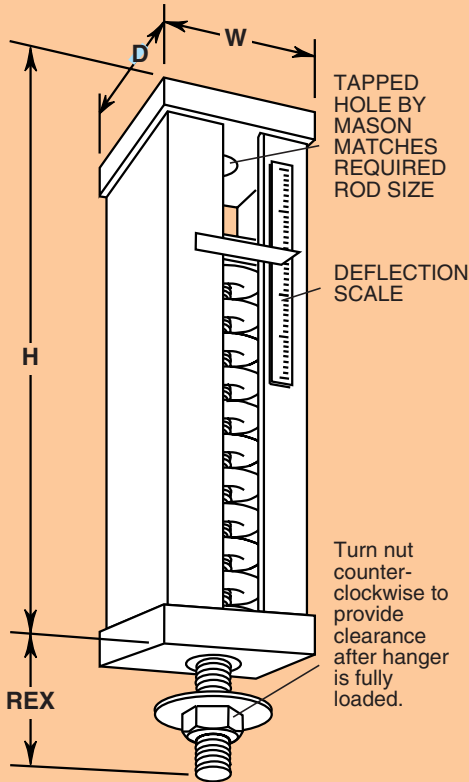
Type	Size	Rated Capacity		Rated Defl. [†] (in) (mm)	Spring Constant ^{††} (lbs/in)(kg/mm)	Spring Color/ Stripe	Spring Only		D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Min. Rod Dia. SRD	Rod Extension REX	Upper Rod Penetration URP		
		(lbs)	(kg)				Spring OD	Free Height										
3" 76mm Defl.	1082	15	7		5	0.09	Silver/Red		5	127								
	1083	24	11		8	0.14	Silver/Blue		51/8	130								
	1084	33	15		11	0.20	Silver/Green		51/8	130								
	1085	48	22		16	0.29	Black		51/8	130								
	1086	60	27	3.40	20	0.35	Grey	27/8	51/4	133	43/4	10	51/4	7	3/8	3/8	23/4	2
30N- PC30N-	1087	75	34	86	25	0.45	Blue	73	51/4	133	120	254	133	178	10	10	70	51
	1088	111	50		37	0.66	Green		51/4	133								
	1089	150	68		50	0.90	Purple		51/2	140								
	1090	195	89		65	1.17	Tan		57/8	149								
	1091	270	123		90	1.62	Yellow		6	152								
4" 102mm Defl.	1006	50	23		11	0.19	Black/Brown		71/4	184								
	1007	65	29		15	0.24	Black/Orange		73/8	187								
	1008	80	36		18	0.30	Black/Green		71/2	191								
	1009	100	45	4.78	23	0.37	Black/Red	41/2	75/8	194	6	14	71/4	10	3/4	5/8	5	31/4
	1010	130	59	114	30	0.49	Black/White	114	73/4	197	152	356	184	254	19	16	127	83
30N- PC30N-	1011	160	73		37	0.60	Black/Yellow		8	203								
	1012	190	86		46	0.71	Black/Silver		81/4	210								

All springs have additional travel to solid equal to 50% of Rated Deflection. Neoprene elements have straight line deflection curves.

[†]includes double deflection neoprene element.

^{††}applies to spring only.

HES PIPE EXPANSION HANGERS (Not suitable for vibration isolation)



HES hangers are designed with A, B or C springs in series.

Ratings & Dimensions for 4"(102mm) Deflection Expansion Hangers (in mm)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. (in) (mm)	Spring Constant (lbs/in)(kg/mm)	Spring Color/Stripe	D	H	W	REX	Required Rod Dia. RRD
HES-	A-45	45 20	6.40 163	7 0.12	Blue	31/2 89	153/4 400	4 102	6 152	5/8 16
	A-75	75 34	6.00 152	13 0.22	Orange					
	A-125	125 57	5.32 135	23 0.42	Brown					
	A-200	200 91	4.60 117	43 0.78	Black					
	A-310	310 141	4.00 102	78 1.38	Yellow					
	A-400	400 181	4.00 102	100 1.77	Green					
	A-510	510 231	4.00 102	128 2.26	Red	4 102	201/2 521	41/2 114	51/2 140	3/4 19
	A-625	625 283	4.00 102	156 2.77	White					
	B-750	750 340	4.50 114	167 2.98	White					
	B-1000	1000 454	4.00 102	250 4.45	Blue					
HES-	C-1350	1350 612	4.00 102	338 6.00	Yellow	4 102	201/2 521	41/2 114	51/2 140	3/4 19
	C-1750	1750 794	4.00 102	438 7.78	Black					
	C-2100	2100 953	4.00 102	525 9.34	Yellow*					
	C-2385	2385 1082	4.00 102	596 10.61	Yellow**					
	C-2650	2650 1202	4.00 102	663 11.78	Red*					
	C-2935	2935 1331	4.00 102	734 13.05	Red**					

All springs have additional travel to solid equal to 50% of Rated Deflection. Hangers may overtravel rated deflections by 40%. Hangers are preset at factory for specified loads.

*with Red inner spring
**with Green inner spring

HES HANGER SELECTION PROCEDURE

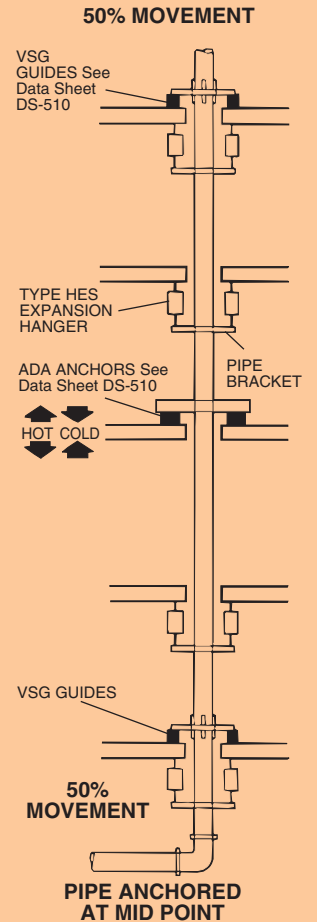
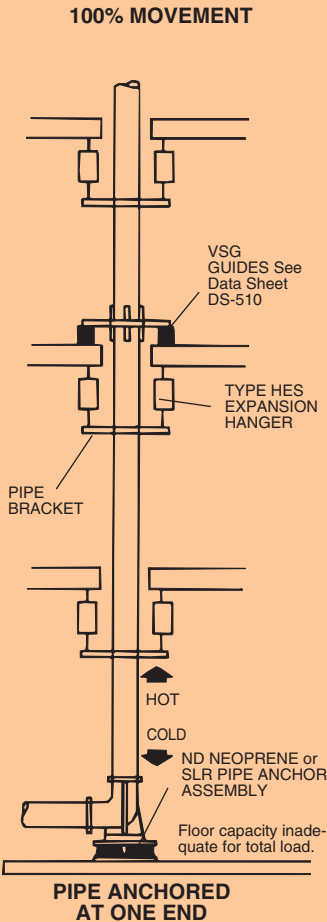
HES Hangers are installed at riser suspension points to control load shifts as the riser expands or contracts. If a 120 foot(37m) steel riser goes through a temperature increase of 150 F(66 C), the piping will expand 1.4"(36mm). If the piping had an anchor point in the basement, the piping bracket at the 60'(18m) elevation and the top bracket would rise 0.7"(18mm) and 1.4"(36mm), respectively. This travel would transfer the entire piping weight to the basement as the piping would lift off non-resilient support points. Standard 1"(25mm) deflection hangers would lose 70% of their load at the 60 foot(18m) point and the complete load at the top of the run. Therefore, HES Hangers are needed because of their higher initial deflection and travel capability. If HES Hangers with 4"(102mm) initial deflection were selected, the hanger at the top would lose only 35% of its load and the intermediate hanger only 18%. This would substantially reduce the load shift to the basement anchor.

Special larger deflection hangers would be even more effective. In handling this type of problem, it is preferable to anchor the riser at the center of the run. If this had been done in the piping problem described above, each end would have expanded outward only 0.7"(18mm) instead of the 1.4"(36mm). The upper hangers would have lost 18% of their load since the springs would be unloaded the 0.7(18mm) of an inch.

The springs in the hangers on the lower end of the piping would have been compressed 0.7(18mm) of an inch thereby increasing their load by 18%. With this loss and gain situation, the piping always remains balanced at the neutral point.

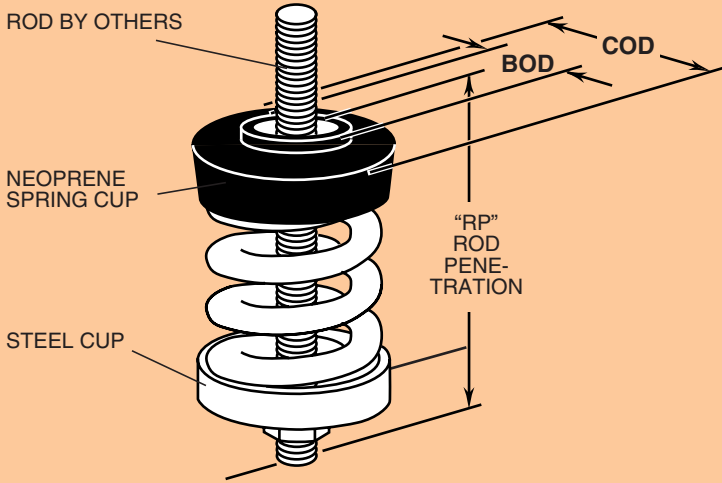
EXAMPLE-

6"(152mm) Schedule 40 piping weighing 36 pound per foot(4.94kg/m) with water. The run of 120 feet(37m) would weigh a total of 4320 pounds (1960 kgs). If the piping is anchored at the center we might select support points at the lower end, the 30(9m) and 90 foot(27m) marks and at the top. Therefore, we would have 4 locations or a total of 8 hangers supporting 504 pounds(229kg) each. The preliminary selection would be 8 HESB-750 Hangers. The initial hanger deflection would be 540 pounds(245kg) divided by the spring constant of 167 pound/inch(2.98 kg/mm) which equals 3.23"(82mm). The total spring deflection would be the initial deflection plus the expansion travel or 3.23"(82mm) plus 0.7"(18mm) which equals 3.93"(100mm). The hanger must then be checked to see if this deflection is within the range of the selected hanger. Since the HES Hangers can overtravel the rated deflection by 40% the HESB-750 can travel 4.50(114mm) X 1.4(36mm) or 6.30"(160mm). Therefore, the selection is correct. If this number were smaller than the required 3.93(100mm) it would be necessary to use the next larger hanger and check again. (Actually this hanger needed no checking as the 4.50"(114mm) rated deflection already met the conditions).

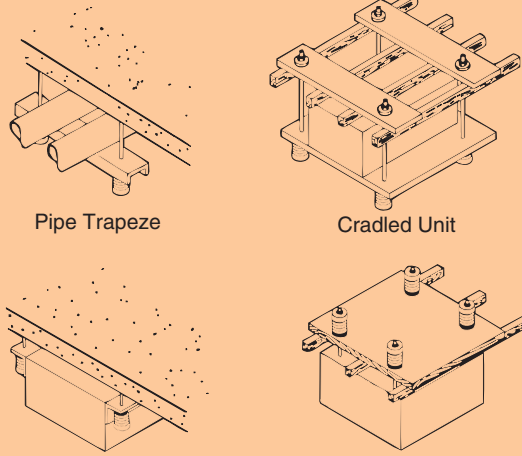


Piping installed at ambient temperature, expansion movement is directed away from the anchor at higher steam or water temperatures and toward the anchor when chilled water is circulated.

IM 1”(25mm) DEFLECTION SIMPLE SPRING HANGERS



TYPICAL IM EQUIPMENT INSTALLATION AND PIPE HANGER ARRANGEMENTS



Unit with Large Angle Clips Unit Suspended From Above

Ratings & Dimensions for 1”(25mm) Deflection Simple Spring Hangers (inches mm)

Type	Size	Rated Capacity		Rated Defl.		Spring Constant		Spring Color/Stripe	Spring Only		Bushing Outside Dia. BOD	Cup Outside Dia. COD	Max. Rod Dia. MRD	Rod Penetration RP
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)		Spring OD	Free Height				
1” 25mm Defl. IM-	X-23	23	10	1.30	33	18	0.30	Brown	1 1/2 25	2 1/2 64	1 1/8 29	2 51	3/8 10	2 3/4 69
	X-33	33	15	1.10	28	30	0.54	Copper						
	X-54	54	24	1.20	30	45	0.80	White						
	X-76	76	34	1.02	25	73	1.36	Black						
	X-113	113	51	1.00	25	113	2.04	Brass						
	X-130	130	59	1.00	25	130	2.36	Purple						
	X-175	175	79	1.00	25	175	3.16	Silver						
	X-210	210	95	1.00	25	210	3.80	Blue						
	A-12	12	5	1.00	25	12	0.20	Copper	13/4 44	17/8 48	11/4 32	21/2 38	3/8 10	2 1/4 57
	A-18	18	8	1.00	25	18	0.32	Gray						
	A-25	25	11	1.00	25	25	0.44	Orange						
	A-45	45	20	1.60	41	28	0.49	Blue	13/4 44	3 76	11/4 32	21/2 64	1/2 13	3 3/8 86
	A-75	75	34	1.50	38	50	0.89	Orange						
	A-125	125	57	1.33	34	94	1.68	Brown						
	A-200	200	91	1.15	29	174	3.14	Black						
	A-310	310	141	1.00	25	310	5.64	Yellow						
	A-400	400	181	1.00	25	400	7.24	Green						
	A-510	510	231	1.00	25	510	9.24	Red	13/4 44	3 1/8 79	11/4 32	21/2 64	1/2 13	3 1/2 89
	A-625	625	283	1.00	25	625	11.32	White						
	B-65	65	29	2.10	53	31	0.55	Brown	2 3/8 60	4 102	1 7/8 48	3 1/8 79	3/4 19	5 127
	B-85	85	39	2.10	53	40	0.74	White/Blk						
	B-115	115	52	2.00	51	57	1.02	Silver						
	B-150	150	68	2.00	51	75	1.33	Orange						
	B-280	280	127	1.60	41	174	3.10	Green						
	B-450	450	204	1.31	33	344	6.18	Red						
	B-750	750	340	1.12	28	670	12.14	White						
	B-1000	1000	454	1.00	25	1000	18.16	Blue						
	B-1250	1250	567	1.00	25	1250	22.68	Gray						
B-1650	1650	748	1.00	25	1650	29.92	Black							
C-1000	1000	454	1.00	25	1000	18.16	Black	2 3/8 13	4 1/8 105	2 3/8 60	3 5/8 92	3/4 19	5 127	
C-1350	1350	612	1.00	25	1350	24.48	Yellow							
C-1750	1750	794	1.00	25	1750	31.76	Black*							
C-2100	2100	953	1.00	25	2100	38.12	Yellow*							
C-2385	2385	1082	1.00	25	2385	43.28	Yellow**							
C-2650	2650	1202	1.00	25	2650	48.08	Red*							
C-2935	2935	1331	1.00	25	2935	53.24	Red**							

All springs have additional travel to solid equal to 50% of Rated Deflection.

*with Red inner spring

**with Green inner spring

IM 2”(51mm) DEFLECTION B, B2, C2 & MULTIPLE C2 SIMPLE SPRING HANGERS

Ratings & Dimensions for 2”(51mm) Deflection Simple Spring Hangers (inches millimeters)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. (in) (mm)	Spring Constant (lbs/in) (kg/mm)	Spring Color/Stripe	Spring Only		Bushing Outside Dia. BOD	Cup Outside Dia. COD	Max. Rod Dia MRD	Rod Penetration RP
						Spring OD	Free Height				
2” 51mm Defl.	B-20	20 9	2.40 61	8 0.15	Tan						
	B-26	26 12	2.18 55	12 0.22	White/Blue						
	B-35	35 16	2.20 56	16 0.29	Purple						
	B-50	50 23	2.20 56	24 0.41	White/Red	23/8	4	17/8	31/8	3/4	47/8
	B-65	65 29	2.10 53	31 0.55	Brown	60	102	48	79	19	124
	B-85	85 39	2.10 53	40 0.74	White/Black						
	B-115	115 52	2.00 51	57 1.02	Silver						
IM-	B-150	150 68	2.00 51	75 1.33	Orange						
	B2-210	210 95	2.12 54	99 1.76	Silver						
	B2-290	290 132	2.00 51	144 2.59	Blue	23/8	41/2	17/8	31/8	3/4	53/8
	B2-450 [†]	450 204	2.00 51	224 4.00	Tan	60	114	48	79	19	137
	B2-680 [†]	680 308	2.00 51	340 6.04	Gray						
	C2-125	125 57	2.50 64	50 0.89	Purple						
	C2-170	170 77	2.40 61	70 1.26	Brown						
	C2-210	210 95	2.30 58	90 1.64	Red						
	C2-260	260 118	2.20 56	120 2.11	White						
	C2-330	330 150	2.00 51	165 2.94	Black						
IM-	C2-460	460 209	2.00 51	230 4.10	Blue	27/8	5	23/8	35/8	3/4	57/8
	C2-610	610 277	2.00 51	305 5.43	Green	73	127	60	92	19	149
	C2-880 [†]	880 399	2.00 51	440 7.83	Gray						
	C2-1210 [†]	1210 549	2.00 51	605 10.76	Silver						
	C2-1540 [†]	1540 699	2.00 51	770 13.71	Gray*						
	C2-1870 [†]	1870 848	2.00 51	935 16.63	Silver*						

*Published ratings allow minimum 25% additional travel to solid. For a full 50% specified minimum use the following ratings:

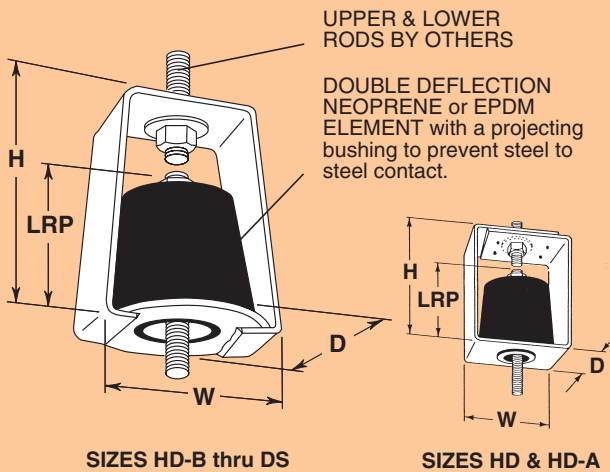
Size	Derated Capacity (lbs)	Defl. (in)
B2-450	410	1.83
B2-680	565	1.66
C2-880	800	1.82
C2-1210	1010	1.67
C2-1540	1285	1.67
C2-1870	1560	1.67

Size	Derated Capacity (kg)	Defl. (mm)
B2-450	186	46
B2-680	256	42
C2-880	363	46
C2-1210	458	42
C2-1540	583	42
C2-1870	708	42

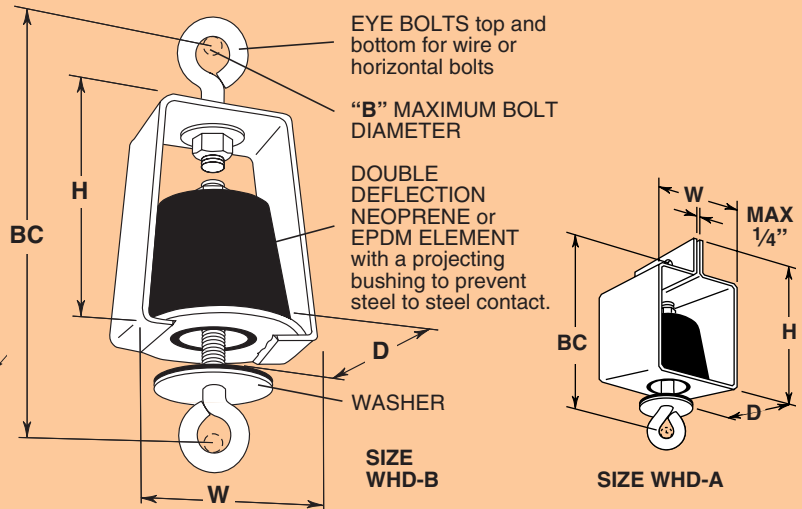
All springs without “[†]” have additional travel to solid equal to 50% of Rated Deflection.
*with Red inner spring

DOUBLE DEFLECTION NEOPRENE HANGERS

HD FOR RODS



WHD FOR WIRE OR HORIZONTAL BOLTS



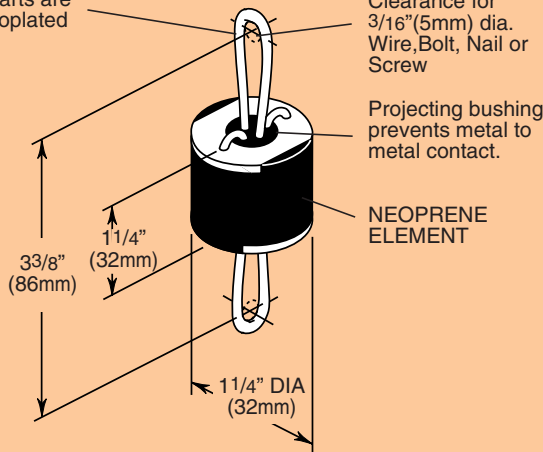
Ratings & Dimensions for Neoprene Hangers (inches millimeters)

Type	Size (Color Mark)	Duro-meter	Rated Capacity Range (lbs) (mm)		Max Rated Defl [†] (in) (mm)	B	D	H	W	Bolt Centers BC	Lower Rod Penetration LRP	Max. Rod Dia. MRD
			(lbs)	(mm)								
HD- WHD-	Green	40	Up to 35	Up to 16	0.20 5	3/8 10	13/4 44	21/4 57	17/8 48	33/8 86	11/4 32	3/8 10
	White	60	35-75	16-34	0.20 5							
	A-Black	30	Up to 45	Up to 20	0.35 9							
	A-Green	40	30-75	14-34	0.35 9	3/8 10	2 51	23/4 70	21/4 57	33/8 86	21/4 57	1/2 13
HD-	A-Red	50	60-125	27-57	0.35 9							
	B-Red	50	Up to 235	Up to 107	0.40 10							
	B-White	60	180-380	82-172	0.40 10	3/8 10	31/4 83	41/2 114	41/4 108	7 178	3 76	3/4 19
	B-Yellow	70	320-650	145-295	0.40 10							
HD-	BS-Blue	70	500-1000	227-454	0.40 10	—	31/4 83	41/2 114	41/4 108	—	3 76	3/4 19
	CS-Blue	70	1000-2100	454-953	0.40 10	—	31/4 83	5 127	41/4 108	—	31/4 83	7/8 22
	DS-Blue	70	2100-4200	953-1905	0.40 10	—	4 102	61/4 159	43/4 121	—	31/4 83	7/8 22

[†]includes double deflection neoprene element. Hanger elements have straight line deflection curves.

WHR 0.2”(5mm) DEFLECTION NEOPRENE CEILING HANGERS for Wire or Horizontal Attachment

All Metal Parts are Zinc Electroplated



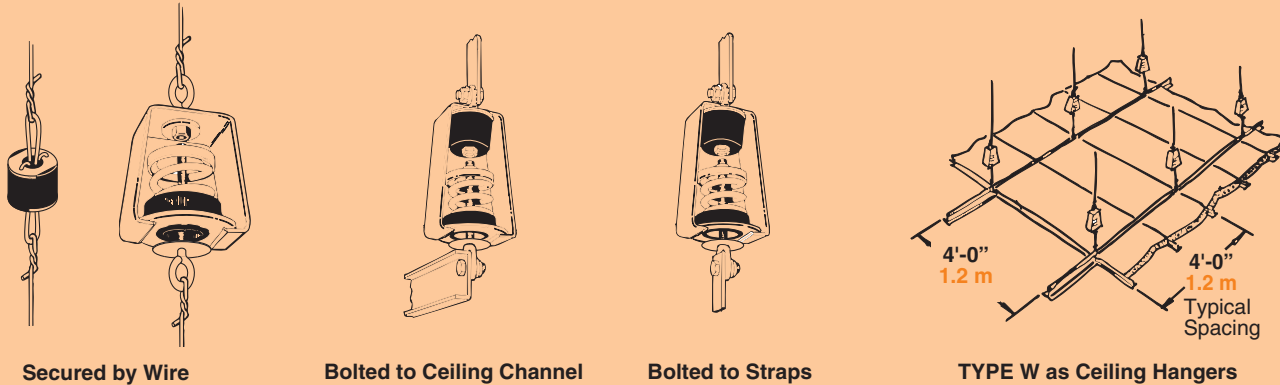
NOTE –
Tested to Failure at 1200 lbs.(544 kgs)

Ratings for Neoprene Ceiling Hangers

Type	Size (Duro-meter)	Rated Capacity Range (lbs) (kgs)	Rated Defl. (in) (mm)	Color Mark	
WHR-	40	Up to 60	Up to 27	0.20 5	Green
	50	55-95	25-43	0.20 5	Red
	60	90-155	41-70	0.20 5	White
	70	150-220	68-100	0.20 5	Yellow

Hanger elements have straight line deflection curves.

W HANGER INSTALLATION METHODS



W Hanger Selections Based on Ceiling Weight

Ceiling Description	Ceiling Wt. (lbs/ft ²) (kg/m ²)		Load Per Hanger (48"oc) (lbs) (kgs)		W30 W30N WHS WDNHS Hanger Selections		
					WHD	WHR	
1”(25mm) Acoustical Ceiling Tile	2.5	12	40	18	X54	WHITE or A-BLACK	40
1 1/2”(38mm) Metal Lath and Gypsum Plaster	10.0	49	160	73	X175	B-RED	70
2 Layers 1/2” (13mm) Gypsum Board	5.0	24	80	36	X113	A-RED	50
2 Layers 3/4” (19mm) Gypsum Board	7.5	37	120	54	X130	A-RED	60

PRODUCT FINISHES

All standard products have a painted or powder coated finish unless otherwise indicated. Springs are powder coated or zinc electroplated.

Special finishes include:

- Zinc Chromate
- Neoprene Dipping
- Cold Galvanized Paint
- Epoxy Finish
- Hot Dipped Galvanized Holders with Electro-Galvanized Plated Hardware, depending on size and method of attachment. Springs in these holders will be made rust resistant.



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