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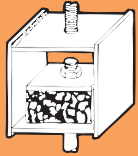
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SPRING, RUBBER and COMBINATION HANGERS

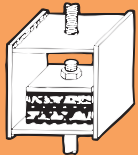
HANGERS

H-610-9 BULLETIN

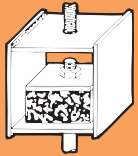
All rubber parts are LDS (Low Dynamic Stiffness) Rubber. For information on LDS Rubber, see Bulletin ACS-102, page 6.



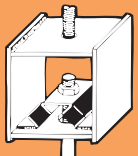
BLOCK OF CORK



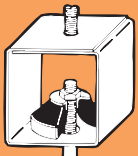
LAYERS OF RUBBER PADS



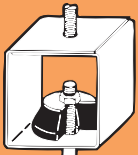
BLOCK OF FELT



STRIP RUBBER-IN-SHEAR



ROUND RUBBER-IN-SHEAR



SINGLE COMPRESSION ELEMENT



2 SINGLE COMPRESSION ELEMENTS



HD DOUBLE DEFLECTION LDS 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.

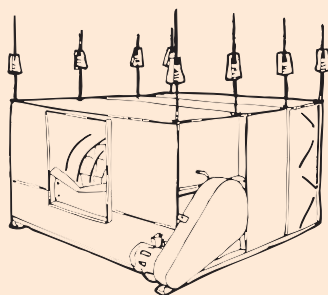
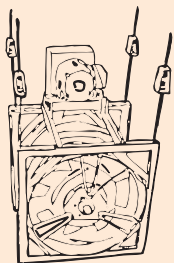
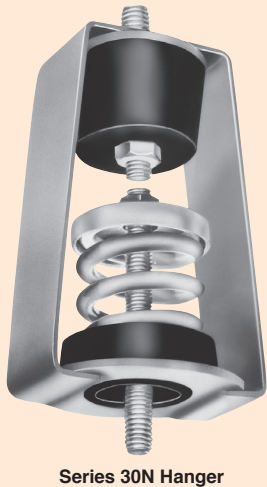
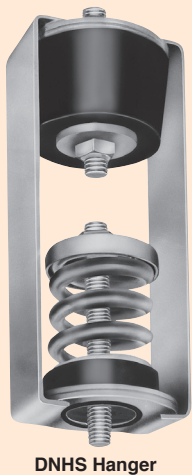
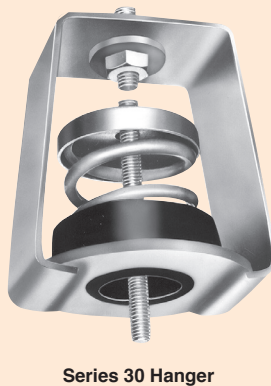
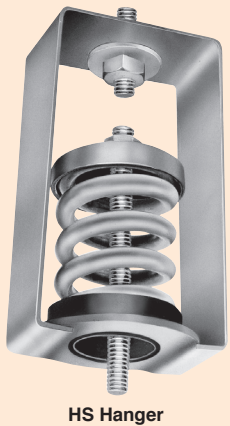
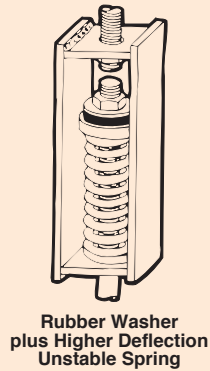
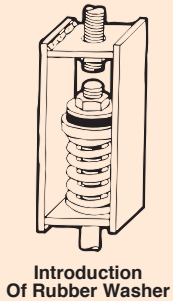
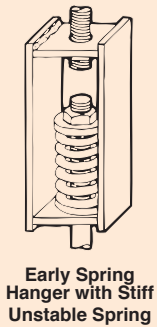
HD Hangers are double deflection units with average static deflections of 0.4"(10mm). They are molded in LDS because of its excellent aging characteristics. If you wish to isolate primary vibration, they should only be considered for smaller equipment running above 800 RPM in non-critical areas. The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



TYPE 30
SPRING HANGER



TYPE 30N
COMBINATION SPRING
and
DOUBLE DEFLECTION
LDS 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.

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 LDS 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, 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 rubber 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 rubber 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 rubber 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 capability. 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 had need for one more variation. This is a precompressed PCHS, PCDNHS, PC-30 or 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 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 and transfer it to the 1/4" rebound washer on top.

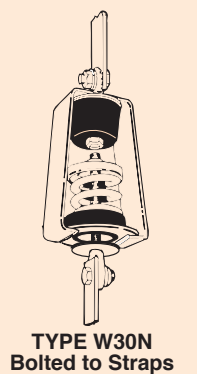
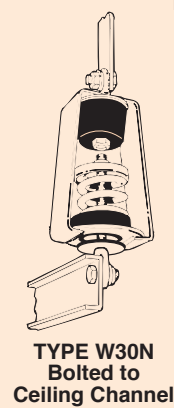
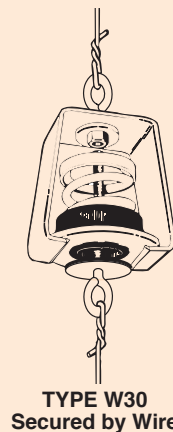
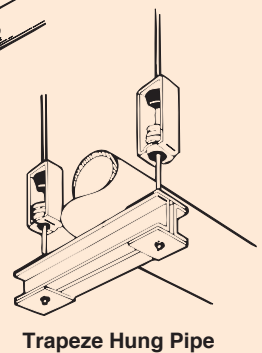
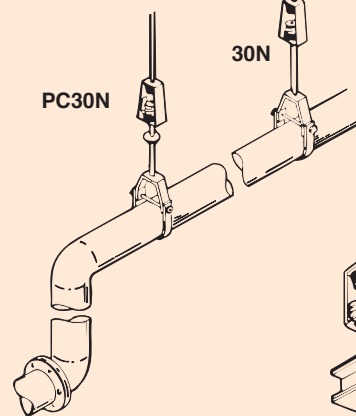
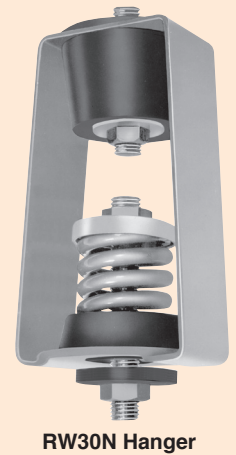
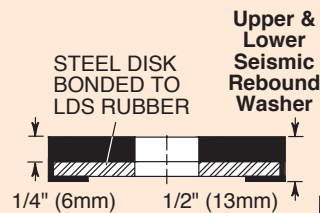
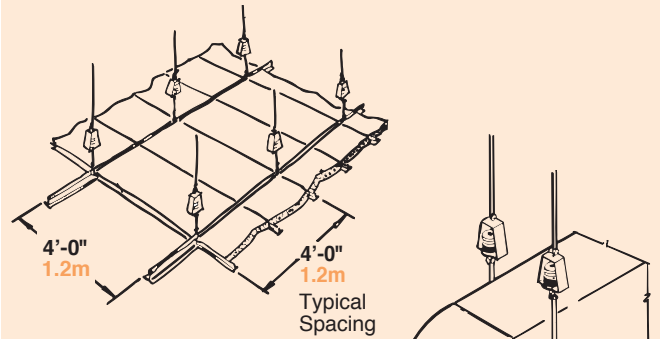
With the exception of a few very low capacity hangers and welded high-capacity and multiple-spring designs all of our hanger boxes are made by bending steel flats into an inverted U shape with return bends on the bottom, and arc welding them to thick American Standard or special steel washers. We believe 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.

This heavy box construction serves another purpose in seismic zones. When an earthquake occurs, the spring allows vertical pipe motion. Wherever cable cross bracing is used, the piping tends to swing upward as well. In order to control this motion, we use the "RW" design. "RW" stands for Rebound Washer. It is an oversized molded assembly with 1/4"(6mm) LDS Rubber bonded to a steel washer that is set 1/4"(6mm) below the bottom. As motion becomes excessive, it pushes the box upward. The upward motion is cushioned by a 1/4"(6mm) rebound washer between the hanger and the overhead. See page 5 for a typical installation. The hanger box must have the strength to withstand major forces. Our schedules call out the vertical G ratings. The competition doesn't bother.

On the bottom of this page, we illustrate "W" hangers originally designed for suspending ceilings by means of wire. Many ceilings are supported by bolted arrangements, but we have continued with the "W" designation. For information on these hangers, please refer to Bulletin CH-620 in our Architectural section.

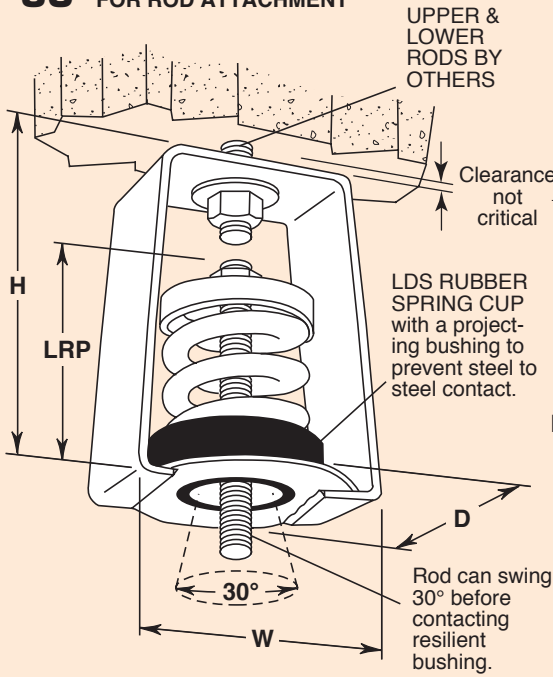
The following pages detail all of our current designs. Please call us when special designs are needed.

Type 30	30° Swing Spring Hangers – 1"(25mm) Defl.	4
Type 30N	30° Swing Spring & LDS Hangers – 1.2"(30mm) Defl.	5
Type HS	Spring Hangers – 1"(25mm) Defl.	6-7
Type DNHS	Spring and LDS Hangers – 1.2"(30mm) Defl.	8-9
Type 30N-100	30° Swing Spring & LDS Hangers – 2"(50mm), 3"(75mm), 4"(100mm) & 5"(125mm) Defl.	10-11
Type 30N-1000	30° Swing Light Capacity Spring & LDS Hangers – 3"(75mm) & 4"(100mm) Defl.	12
Type HES	Pipe Expansion Hangers	13
Type IM	Simple Spring Hangers.....	14-15
Type HD	Double Deflection LDS Hangers.....	15
Type WHR	LDS Ceiling Hangers	16

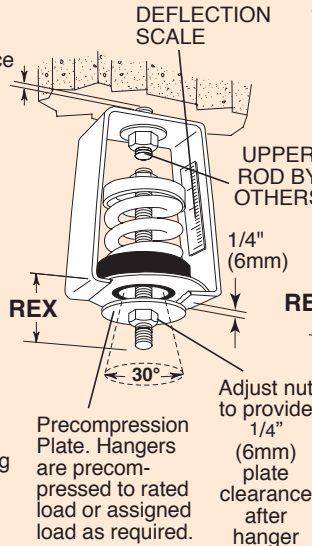


1" (25mm) DEFLECTION 30° SWING – X, A, B, C, D & F SPRING HANGERS

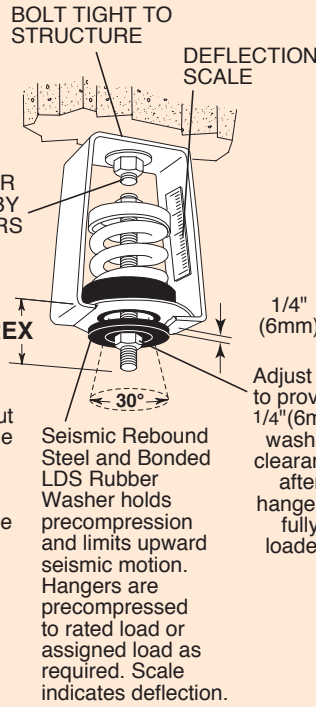
30 FOR ROD ATTACHMENT



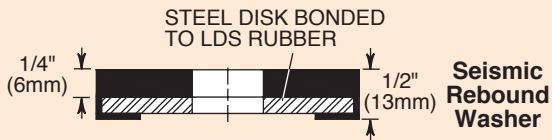
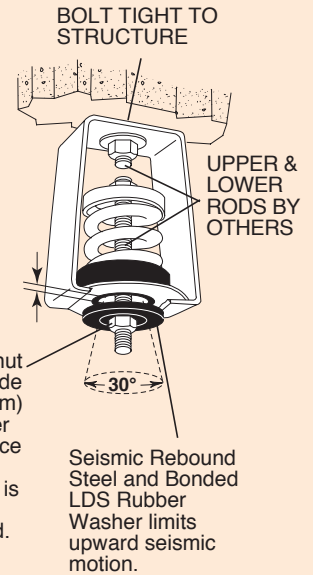
PC30 TYPE 30 PRECOMPRESSED



PC30S TYPE 30 PRECOMPRESSED & SEISMIC RESTRAINT



RW30 TYPE 30 SEISMIC RESTRAINT



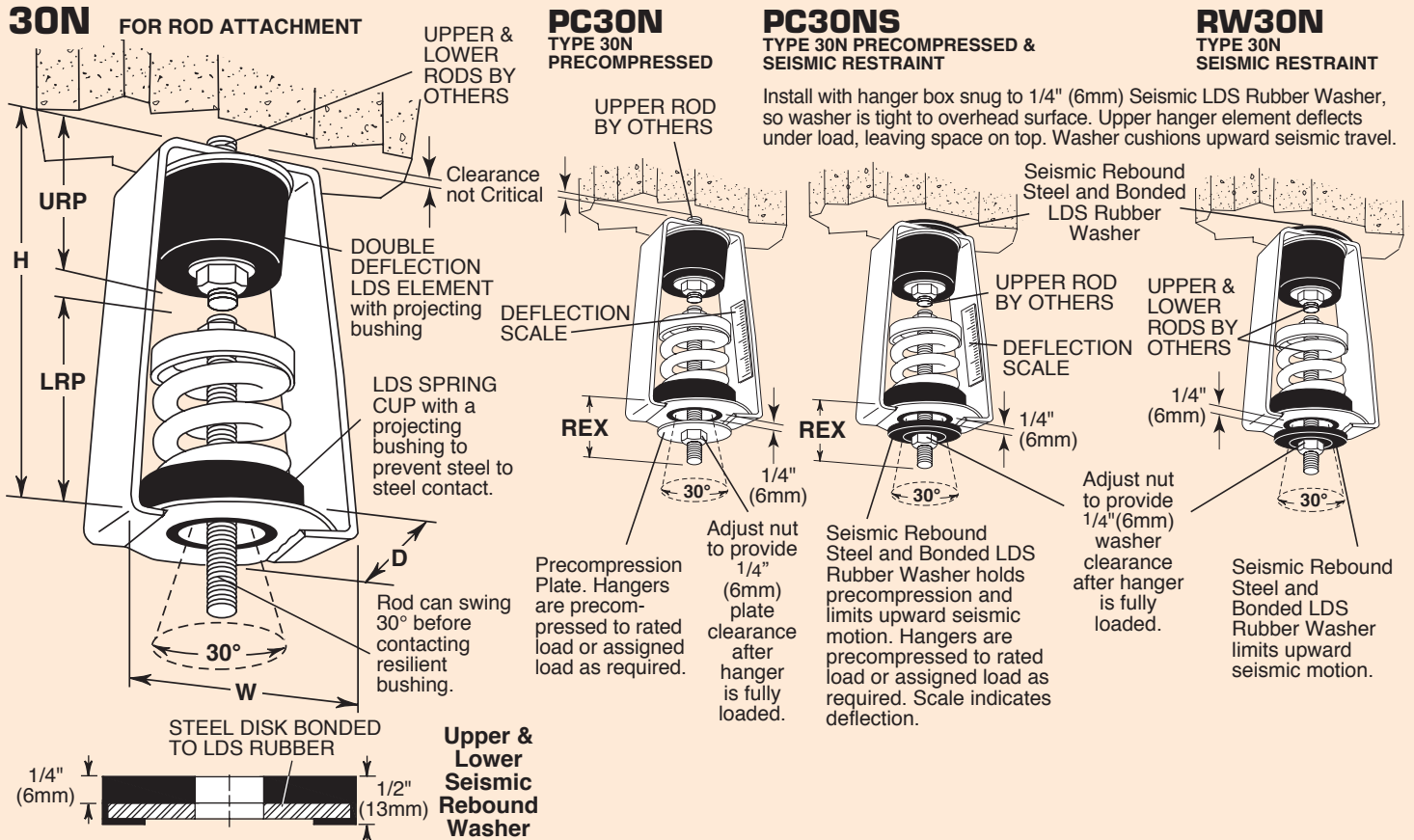
Ratings & Dimensions for 1" (25mm) Deflection Spring Hangers (inches mm)

Type	Size	Rated Capacity (lbs)(kg)	Rated Defl. [†] (in)(mm)	Spring Constant (lbs/in)(kg/mm)	Spring Color	Spring Only			Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Vertical 'G' Ratings			
						OD	Free Height	D				H	W	Tension	Compression
30-	X-12	12 5	1.25 32	10 0.18	Orange							10.0*	10.0*		
	X-23	23 10	1.30 33	18 0.30	Brown							10.0*	10.0*		
	X-33	33 15	1.10 28	30 0.54	Copper							10.0*	10.0*		
	X-54	54 24	1.20 30	45 0.80	White							10.0*	10.0*		
	X-76	76 34	1.02 25	73 1.36	Black	11/2	21/2	21/2	41/4	27/8	31/2	3/8	13/4	10.0*	10.0*
	X-113	113 51	1.00 25	113 2.04	Brass	38	64	64	108	73	89	10	44	10.0*	7.6
	X-130	130 59	1.00 25	130 2.36	Purple									10.0*	6.6
	X-175	175 79	1.00 25	175 3.16	Silver									10.0*	4.9
X-210	210 95	1.00 25	210 3.80	Blue									9.0	4.1	
PC30-	A-12	12 5	1.00 25	12 0.20	Copper									10.0*	10.0*
	A-18	18 8	1.00 25	18 0.32	Gray	13/4	17/8	23/4	53/4	31/4	31/2	5/8	21/4	10.0*	10.0*
	A-25	25 11	1.00 25	25 0.44	Orange	44	48	70	146	83	89	16	57	10.0*	10.0
	A-41	41 19	1.18 30	35 0.63	Pink									10.0*	10.0*
	A-56	56 25	1.14 30	49 0.83	Black	13/4	21/4	23/4	53/4	31/4	4	5/8	21/4	10.0*	10.0*
PC30S-	A-73	73 33	1.06 27	69 1.22	Tan	44	57	70	146	83	102	16	57	10.0*	10.0*
	A-95	95 43	1.01 26	94 1.65	Green									10.0*	10.0*
	B-138	138 63	1.32 34	105 1.85	White									10.0*	10.0*
	B-222	222 101	1.16 29	191 3.48	Blue									10.0*	6.6
	B-278	278 126	1.09 28	255 4.50	Purple	23/8	27/8	4	71/4	43/4	41/4	5/8	21/4	10.0*	5.2
RW30-	B-336	336 152	1.00 25	336 6.08	Silver	60	73	102	184	121	108	16	57	10.0*	4.3
	B-410	410 186	1.07 27	385 6.89	Black									10.0*	3.6
	B-540	540 245	1.00 25	540 9.80	Yellow									10.0*	2.7
	C-630	630 286	1.13 29	558 9.86	Gray									10.0*	5.4
	C-800	800 363	1.00 25	800 14.5	Orange	27/8	35/8	4	83/4	51/4	5	3/4	21/4	7.9	4.0
RW30-	C-1010	1010 458	1.10 28	920 16.4	Green	73	92	102	222	132	127	19	70	6.3	3.1
	C-1265	1265 574	1.00 25	1265 23.0	Red									5.0	2.5
	D-1575	1575 714	1.23 31	1280 23.0	Pink	33/4	47/8	43/4	121/2	53/4	7	7/8	21/2	10.0*	6.0
	D-2150	2150 975	1.03 26	2095 37.5	Purple	95	124	121	318	146	178	22	69	9.0	4.4
	F-2760	2760 1252	1.00 25	2760 50.1	Silver	41/2	51/8	6	12	61/4	7	7/8	21/2	5.0	4.3
						114	130	152	305	159	178	22	64		

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

*10.0 indicates a rating of 10 G's or greater

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



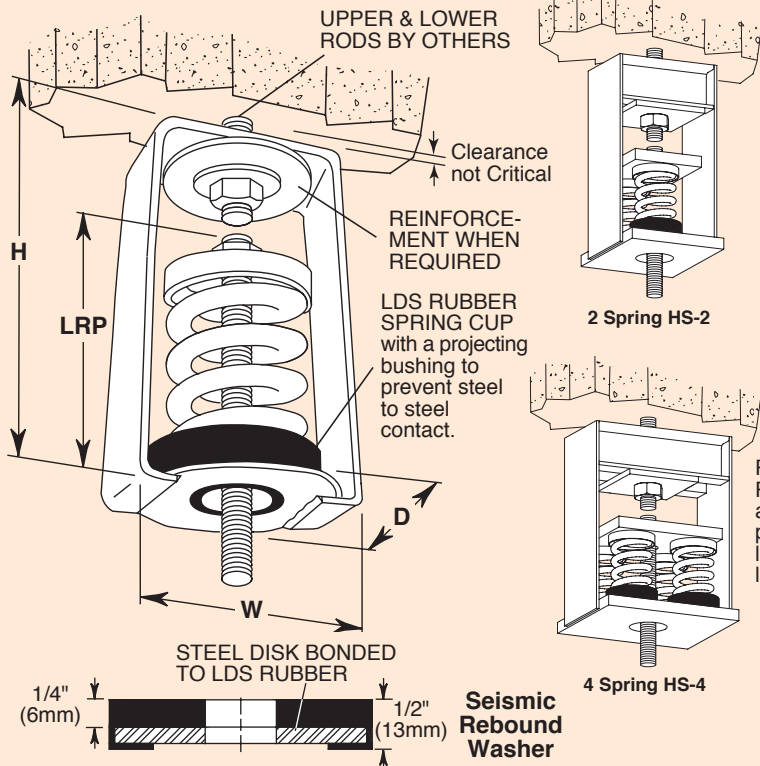
Ratings & Dimensions for 1" (25mm) Deflection Spring and Double Deflection LDS Hangers (inches mm)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. [†] (in) (mm)	Spring Constant ^{††} (lbs/in) (kg/mm)	Average Defl. LDS Rubber	Spring Color	Spring Only		MRD– Max. Rod Diameter				REX– Rod Extension URP– Upper Rod Penetration			Vertical G Ratings	
							OD	Free Height	D	H	W	LRP	MRD	REX	URP	Tension	Compression
30N-	X-12	12 5	1.45 37	10 0.18		Orange										10.0 ⁺	10.0 ⁺
	X-23	23 10	1.50 38	18 0.26		Brown										10.0 ⁺	10.0 ⁺
	X-33	33 15	1.30 33	30 0.45		Copper										10.0 ⁺	10.0 ⁺
	X-54	54 24	1.40 36	45 0.67		White										10.0 ⁺	10.0 ⁺
	X-76	76 34	1.22 31	73 1.10	0.20	Black	11/2	21/2	21/2	51/2	27/8	31/4	3/8	21/4	13/4	10.0 ⁺	10.0 ⁺
	X-113	113 51	1.20 30	113 1.70	5	Brass	38	64	64	140	73	83	10	57	44	10.0 ⁺	6.7
	X-130	130 59	1.20 30	130 1.97		Purple										10.0 ⁺	5.8
	X-175	175 79	1.20 30	175 2.63		Silver										10.0 ⁺	4.3
X-210	210 95	1.20 30	210 3.17		Blue										10.0 ⁺	3.6	
PC30N-	A-12	12 5	1.35 34	12 0.15		Copper										10.0 ⁺	10.0 ⁺
	A-18	18 8	1.35 34	18 0.24	0.35	Gray	13/4	17/8	23/4	63/4	31/4	31/4	5/8	21/4	21/4	10.0 ⁺	10.0 ⁺
	A-25	25 11	1.35 34	25 0.32	9	Orange	44	48	70	171	82	83	16	57	57	10.0 ⁺	10.0 ⁺
	A-41	41 19	1.53 39	35 0.49		Pink										10.0 ⁺	10.0 ⁺
	A-56	56 25	1.49 38	49 0.66	0.35	Black	13/4	21/4	23/4	63/4	31/4	35/8	5/8	21/4	21/4	10.0 ⁺	10.0 ⁺
PC30NS-	A-73	73 33	1.41 36	69 0.92	9	Tan	44	57	70	171	82	92	16	57	57	10.0 ⁺	10.0 ⁺
	A-95	95 43	1.36 35	94 1.23		Green										10.0 ⁺	10.0 ⁺
	B-138	138 63	1.67 42	105 1.50		White										10.0 ⁺	10.0 ⁺
	B-222	222 101	1.51 38	191 2.66		Blue										10.0 ⁺	7.3
	B-278	278 126	1.44 37	255 3.41	0.35	Purple	23/8	27/8	4	63/4	43/4	33/4	5/8	21/4	23/4	10.0 ⁺	5.8
RW30N-	B-336	336 152	1.35 34	336 4.47	9	Silver	60	73	102	171	121	95	16	57	70	10.0 ⁺	4.8
	B-410	410 186	1.42 36	385 5.17		Black										10.0 ⁺	4.0
	B-540	540 245	1.35 34	540 7.21		Yellow										10.0 ⁺	3.0
	C-630	630 286	1.53 39	558 7.33		Gray										10.0 ⁺	3.2
RW30N-	C-800	800 363	1.40 36	800 10.1	0.40	Orange	27/8	35/8	43/4	9	51/4	5	3/4	21/2	3	10.0 ⁺	2.5
	C-1010	1010 458	1.50 38	920 12.1	10	Green	73	92	121	229	133	127	19	64	76	10.0 ⁺	2.0
	C-1265	1265 574	1.40 36	1265 15.9		Red										10.0 ⁺	1.6
	D-1575	1575 714	1.63 41	1280 17.4	0.40	Pink	33/4	47/8	43/4	121/2	53/4	7	7/8	21/2	41/4	10.0 ⁺	6.0
	D-2150	2150 975	1.43 36	2095 27.1	10	Purple	95	124	121	318	146	178	22	64	108	9.0	4.4
	F-2760	2760 1252	1.40 36	2760 34.8	0.40	Silver	41/2	51/8	6	141/2	61/4	7	7/8	21/2	5	5.0	4.3

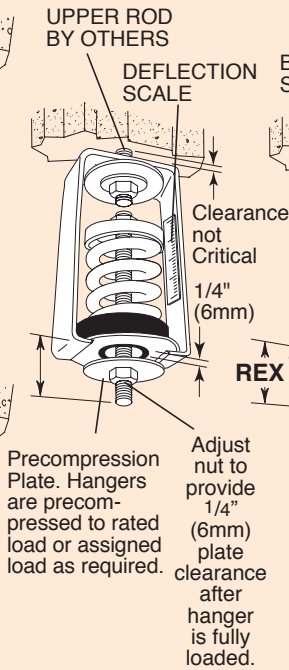
All springs have additional travel to solid equal to 50% of Rated Deflection. Hanger elements have straight line deflection curves. [†]includes double deflection LDS element. ^{††}applies to spring only. ⁺10.0 indicates a rating of 10 G's or greater

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

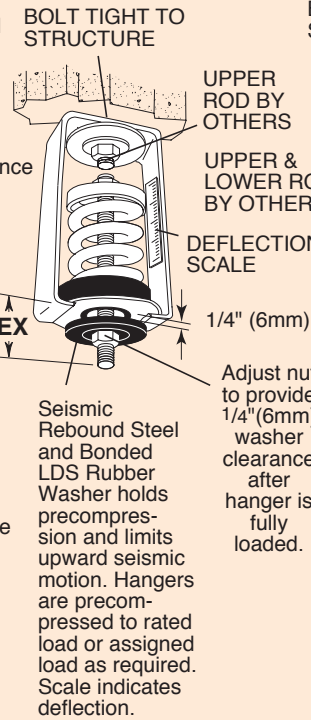
HS FOR ROD ATTACHMENT



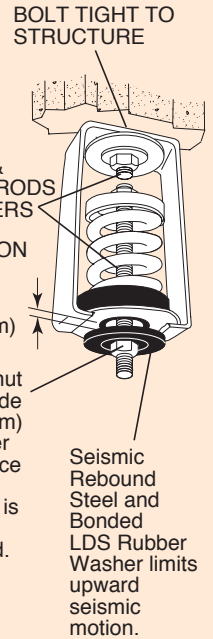
PCHS TYPE HS PRECOMPRESSED



PCHSS TYPE HS PRECOMPRESSED & SEISMIC RESTRAINT



RWHS TYPE HS SEISMIC RESTRAINT



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

Type	Size	Rated Capacity (lbs)(kg)	Rated Defl. [†] (in)(mm)	Spring Constant (lbs/in)(kg/mm)	Spring Color/Stripe	Spring Only Spring Free OD Height	D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Vertical 'G' Ratings Tension Compression	
1" 25mm	X-12	12 5	1.25 32	10 0.18	Orange	11/2 21/2 38 64	21/2 64	41/4 108	27/8 73	31/2 89	3/8 10	13/4 44	10.0*	10.0*
	X-23	23 10	1.30 33	18 0.30	Brown								10.0*	10.0*
	X-33	33 15	1.10 28	30 0.54	Copper								10.0*	10.0*
	X-54	54 24	1.20 30	45 0.80	White								10.0*	10.0*
	X-76	76 34	1.02 25	73 1.36	Black								10.0*	10.0*
	X-113	113 51	1.00 25	113 2.04	Brass								10.0*	7.6
	X-130	130 59	1.00 25	130 2.36	Purple								10.0*	6.6
	X-175	175 79	1.00 25	175 3.16	Silver								10.0*	4.9
	X-210	210 95	1.00 25	210 3.80	Blue								9.0	4.1
Defl.	A-12	12 5	1.00 25	12 0.20	Copper	13/4 17/8 44 48	23/4 70	53/4 146	31/4 83	31/2 89	5/8 16	21/4 57	10.0*	10.0*
	A-18	18 8	1.00 25	18 0.32	Gray								10.0*	10.0*
	A-25	25 11	1.00 25	25 0.44	Orange								10.0*	10.0*
HS-	A-41	41 19	1.18 30	35 0.63	Pink	13/4 21/4 44 57	23/4 70	53/4 146	31/4 83	4 102	5/8 16	21/4 57	10.0*	10.0*
	A-56	56 25	1.14 30	49 0.83	Black								10.0*	10.0*
	A-73	73 33	1.06 27	69 1.22	Tan								10.0*	10.0*
	A-95	95 43	1.01 26	94 1.65	Green								10.0*	10.0*
PCHS-	A-45	45 20	1.60 41	28 0.49	Blue	13/4 3 44 76	23/4 70	53/4 146	31/4 83	4 102	5/8 16	21/2 64	10.0*	10.0*
	A-75	75 34	1.50 38	50 0.89	Orange								10.0*	10.0*
	A-125	125 57	1.33 34	94 1.68	Brown								10.0*	10.0*
	A-200	200 91	1.15 29	174 3.14	Black								10.0*	10.0*
PCHSS-	A-310	310 141	1.00 25	310 5.64	Yellow	13/4 33/8 44 86	23/4 70	53/4 146	31/4 83	4 102	5/8 16	21/2 64	10.0*	7.1
	A-400	400 181	1.00 25	400 7.24	Green								10.0*	5.5
RWHS-	A-510	510 231	1.00 25	510 9.24	Red	13/4 31/8 44 79	23/4 70	53/4 146	31/4 83	4 102	5/8 16	21/2 64	10.0*	4.3
	A-625	625 283	1.00 25	625 11.3	White	13/4 33/8 44 86	23/4 70	53/4 146	31/4 83	4 102	5/8 16	21/2 64	9.0	3.5
RWHS-	B-65	65 29	2.10 53	31 0.55	Brown	23/8 4 60 102	4 102	71/4 184	43/4 121	41/4 108	3/4 19	21/4 57	10.0*	10.0*
	B-85	85 39	2.10 53	40 0.74	White*								10.0*	10.0*
	B-115	115 52	2.00 51	57 1.02	Silver								10.0*	10.0*
	B-150	150 68	2.00 51	75 1.33	Orange								10.0*	10.0*
	B-280	280 127	1.60 41	174 3.10	Green								10.0*	5.4
	B-450	450 204	1.31 33	344 6.18	Red								10.0*	3.3
	B-750	750 340	1.12 28	670 12.1	White								10.0*	2.0
B-1000	1000 454	1.00 25	1000 18.2	Blue	23/8 4 60 102	4 102	71/4 184	43/4 121	41/4 108	3/4 14	21/4 57	10.0*	1.5	

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

*10.0 indicates a rating of 10 G's or greater

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

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

Type	Size	Rated Capacity		Rated Defl. [†]		Spring Constant		Spring Color	Spring Only		D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Vertical 'G' Ratings	
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)		Free OD	Height							Tension	Compression
1" 25mm Defl.	1-1000	1000	454	1.00	25	1000	18.2	Black									10.0*	3.2
	1-1350	1350	612	1.00	25	1350	24.5	Yellow									8.7	2.4
	1-1750	1750	794	1.00	25	1750	31.8	Black*									6.7	1.8
	1-2100	2100	953	1.00	25	2100	38.1	Yellow**	27/8	41/8	4	83/4	51/4	5	7/8	21/4	5.6	1.5
	1-2385	2385	1082	1.00	25	2385	43.3	Yellow**	73	105	102	222	133	127	22	57	5.0	1.4
HS-	1-2650	2650	1202	1.00	25	2650	48.1	Red*									4.4	1.2
	1-2935	2935	1331	1.00	25	2935	53.2	Red**									4.0	1.1
	2-2700	2700	1225	1.00	25	2700	49.0	Yellow	27/8	41/8	9	10	51/4	7	1	41/4	10.0*	3.0
PCHS-	2-3500	3500	1588	1.00	25	3500	63.5	Black*	73	105	229	254	133	178	25	108	10.0*	2.3
	2-4200	4200	1905	1.00	25	4200	76.2	Yellow*									9.8	1.9
PCHSS-	4-5400	5400	2449	1.00	25	5400	98.0	Yellow	27/8	41/8	7	13	87/8	7	11/4	41/2	10.0*	3.5
	4-7000	7000	3175	1.00	25	7000	127.0	Black*	73	105	178	330	225	178	32	114	8.4	2.7
	4-8400	8400	3810	1.00	25	8400	152.4	Yellow*									7.0	2.2
RWHS-	4-9540	9540	4327	1.00	25	9540	173.1	Yellow**	27/8	41/8	7	13	87/8	7	11/4	41/2	6.2	2.0
	4-10600	10600	4808	1.00	25	10600	192.3	Red*	73	105	178	330	225	178	32	114	5.5	1.8
	4-11740	11740	5325	1.00	25	11740	213.0	Red**									5.0	1.6

[†]All springs have additional travel to solid equal to 50% of the rated deflection.
*with Red inner spring **with Green inner spring

*10.0 indicates a rating of 10 G's or greater

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

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

Type	Size	Rated Capacity		Rated Defl. [†]		Spring Constant		Spring Color/Stripe	Spring Only		D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Vertical 'G' Ratings	
		(lbs)	(kg)	(in)	(mm)	(lbs/in)	(kg/mm)		Free OD	Height							Tension	Compression
2" 51mm Defl.	B-20	20	9	2.40	61	8	0.15	Tan									10.0*	10.0*
	B-26	26	12	2.18	55	12	0.22	White/Bl									10.0*	10.0*
	B-35	35	16	2.20	56	16	0.29	Purple									10.0*	10.0*
	B-50	50	23	2.20	56	24	0.41	White/Rd	23/8	4	4	71/4	43/4	51/8	3/4	21/4	10.0*	10.0*
	B-65	65	29	2.10	53	31	0.55	Brown	60	102	102	184	121	130	19	57	10.0*	10.0*
	B-85	85	39	2.10	53	40	0.74	White/Blk									10.0*	10.0*
	B-115	115	52	2.00	51	57	1.02	Silver									10.0*	10.0*
HS-	B-150	150	68	2.00	51	75	1.33	Orange									10.0*	10.0*
	B2-210	210	95	2.12	54	99	1.76	Silver	23/8	41/2	4	71/4	43/4	51/8	3/4	21/4	10.0*	7.1
	B2-290	290	132	2.00	51	144	2.59	Blue	60	114	102	184	121	130	19	57	10.0*	5.2
	B2-450 [‡]	450	204	2.00	51	224	4.00	Tan									10.0*	3.3
	B2-680 [‡]	680	308	2.00	51	340	6.04	Gray									10.0*	2.2
PCHS-	C2-125	125	57	2.50	64	50	0.89	Purple									10.0*	10.0*
	C2-170	170	77	2.40	61	70	1.26	Brown									10.0*	10.0*
	C2-210	210	95	2.30	58	90	1.64	Red									10.0*	10.0*
	C2-260	260	118	2.20	56	120	2.11	White									10.0*	10.0*
	C2-330	330	150	2.00	51	165	2.94	Black	27/8	5	4	83/4	51/4	51/4	7/8	21/4	10.0*	9.6
	C2-460	460	209	2.00	51	230	4.10	Blue	73	127	102	222	133	133	22	57	10.0*	6.9
	C2-610	610	277	2.00	51	305	5.43	Green									10.0*	5.2
	C2-880 [‡]	880	399	2.00	51	440	7.82	Gray									10.0*	3.6
PCHSS-	C2-1210 [‡]	1210	549	2.00	51	605	10.8	Silver									9.7	2.6
	C2-1540 [‡]	1540	699	2.00	51	770	13.7	Gray*									7.7	2.1
RWHS-	C2-1870 [‡]	1870	848	2.00	51	935	16.6	Silver*									6.3	1.7
	2-C2-2420 [‡]	2420	1098	2.00	51	605	21.5	Silver	27/8	5	9	10	51/4	6	1	41/4	10.0*	4.6
	2-C2-3080 [‡]	3080	1397	2.00	51	770	27.4	Gray*	73	127	229	254	133	152	25	108	10.0*	3.6
	2-C2-3740 [‡]	3740	1696	2.00	51	935	33.3	Silver*									10.0*	3.0
	4-C2-3520 [‡]	3520	1597	2.00	51	440	31.3	Gray	27/8	5	7	13	87/8	8	11/4	41/2	10.0*	5.3
RWHS-	4-C2-4840 [‡]	4840	2195	2.00	51	605	43.0	Silver	73	127	178	330	225	203	32	114	10.0*	3.9
	4-C2-6160 [‡]	6160	2794	2.00	51	770	54.8	Gray*									9.5	3.1
	4-C2-7480 [‡]	7480	3393	2.00	51	935	66.5	Silver*									7.8	2.5

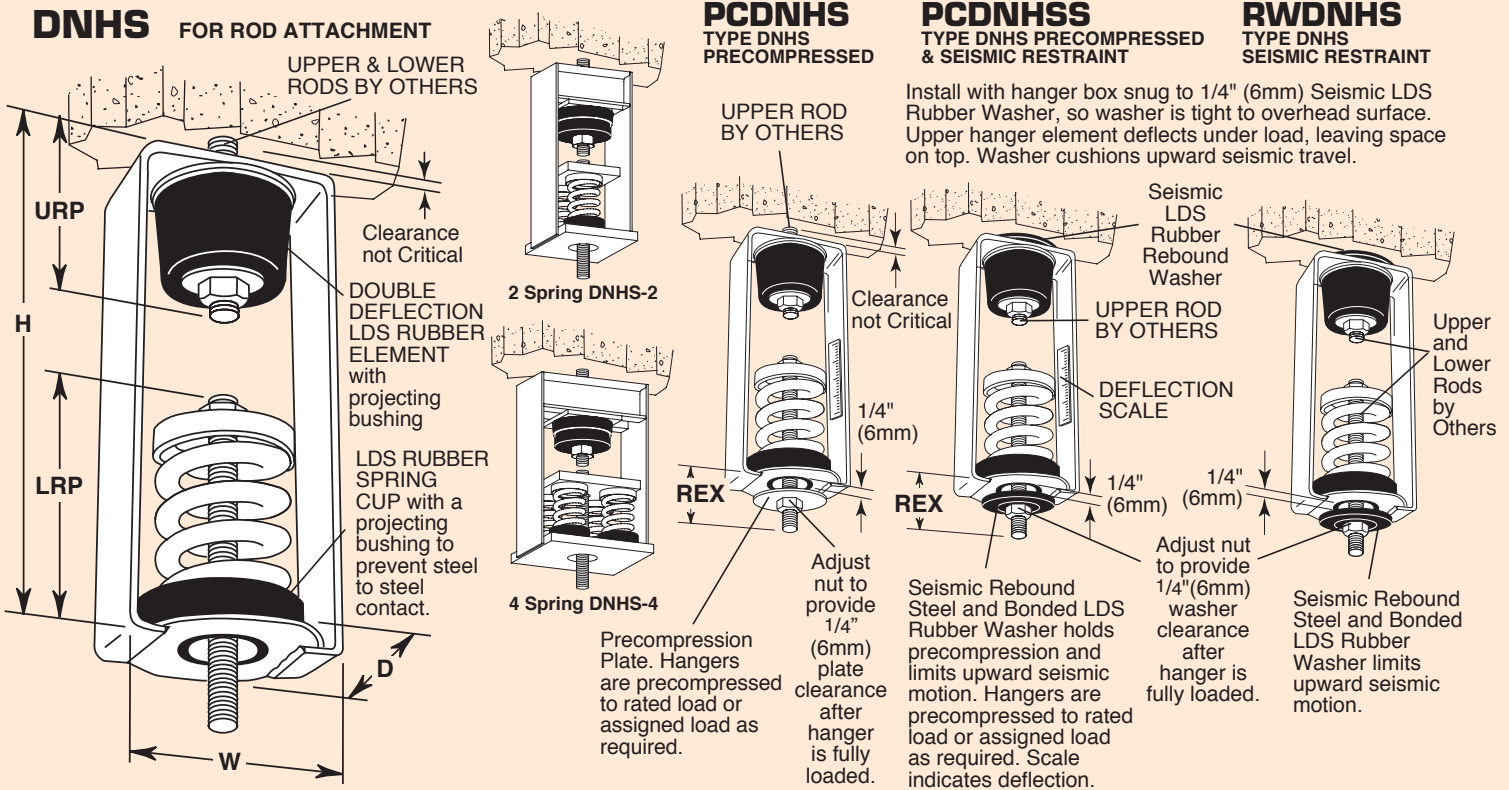
[†]All springs without "[‡]" have additional travel to solid equal to 50% of the rated deflection.
*with Red inner spring

*10.0 indicates a rating of 10 G's or greater

[‡]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 LDS HANGERS



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

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. [†] (in) (mm)	Spring Constant ^{††} (lbs/in)(kg/mm)	Average Defl. LDS Rubber	Spring Color/Stripe	Spring Only		LRP— Lower Rod Penetration MRD— Max. Rod Diameter				REX— Rod Extension URP— Upper Rod Penetration			Vertical G Ratings Com-Tension	
							Free OD	Height	D	H	W	LRP	MRD	REX	URP	pression	
1" 25mm Defl.	X-12	12 5	1.45 37	10 0.18		Orange										10.0 ⁺	10.0 ⁺
	X-23	23 10	1.50 38	18 0.26		Brown										10.0 ⁺	10.0 ⁺
	X-33	33 15	1.30 33	30 0.45		Copper										10.0 ⁺	10.0 ⁺
	X-54	54 24	1.40 36	45 0.67		White										10.0 ⁺	10.0 ⁺
	X-76	76 34	1.22 31	73 1.10	0.20	Black	11/2 21/2	21/2 51/2	27/8 31/4	3/8 13/4	13/4 13/4					10.0 ⁺	10.0 ⁺
	X-113	113 51	1.20 30	113 1.70	5	Brass	25 64	64 140	73 83	10 44	44					10.0 ⁺	6.7
	X-130	130 59	1.20 30	130 1.97		Purple										10.0 ⁺	5.8
	X-175	175 79	1.20 30	175 2.63		Silver										10.0 ⁺	4.3
X-210	210 95	1.20 30	210 3.17		Blue										10.0 ⁺	3.6	
DNHS-	A-12	12 5	1.35 34	12 0.15	0.35	Copper	13/4 17/8	23/4 63/4	31/4 31/2	5/8 21/4	21/4 21/4					10.0 ⁺	10.0 ⁺
	A-18	18 8	1.35 34	18 0.24	9	Gray	44 48	70 171	83 89	16 57	57					10.0 ⁺	10.0 ⁺
	A-25	25 11	1.35 34	25 0.32		Orange										10.0 ⁺	10.0 ⁺
	A-41	41 19	1.53 39	35 0.49		Pink										10.0 ⁺	10.0 ⁺
PCDNHS-	A-56	56 25	1.49 38	49 0.66	0.35	Black	13/4 21/4	23/4 63/4	31/4 4	5/8 21/4	21/4 21/4					10.0 ⁺	10.0 ⁺
	A-73	73 33	1.41 36	69 0.92	9	Tan	44 57	70 171	83 102	16 57	57					10.0 ⁺	10.0 ⁺
	A-95	95 43	1.36 35	94 1.23		Green										10.0 ⁺	10.0 ⁺
	A-45	45 20	1.95 50	28 0.40		Blue										10.0 ⁺	10.0 ⁺
PCDNHS-	A-75	75 34	1.85 47	50 0.72		Orange										10.0 ⁺	10.0 ⁺
	A-125	125 57	1.68 43	94 1.33	0.35	Brown	13/4 3	23/4 63/4	31/4 4	5/8 21/2	21/4 21/4					10.0 ⁺	10.0 ⁺
	A-200	200 91	1.50 38	174 2.39	9	Black	44 76	70 171	83 102	16 64	64 57					10.0 ⁺	8.8
	A-310	310 141	1.35 34	310 4.15		Yellow										10.0 ⁺	5.6
A-400	400 181	1.35 34	400 5.32		Green										10.0 ⁺	4.4	
PCDNHS-	A-510	510 231	1.35 34	510 6.79	0.35	Red	13/4 31/8	23/4 63/4	31/4 4	5/8 21/2	21/4 21/4					10.0 ⁺	3.4
	A-625	625 283	1.35 34	625 8.32	0.35	White	44 79	70 171	83 102	16 64	64 57					10.0 ⁺	2.8
RWDNHS-	B-65	65 29	2.45 62	31 0.47		Brown/Blk										10.0 ⁺	10.0 ⁺
	B-85	85 39	2.45 62	40 0.63		White/Blk										10.0 ⁺	10.0 ⁺
	B-115	115 52	2.35 60	57 0.87		Silver										10.0 ⁺	10.0 ⁺
	B-150	150 68	2.35 60	75 1.13	0.35	Orange	23/8 4	4 9	43/4 41/4	3/4 21/4	3 3					10.0 ⁺	10.0 ⁺
	B-280	280 127	1.95 50	174 2.54	9	Green	60 102	102 229	121 108	19 57	76					10.0 ⁺	8.2
	B-450	450 204	1.66 42	344 4.86		Red										10.0 ⁺	5.1
B-750	750 340	1.47 37	670 9.19		White										10.0 ⁺	3.1	
B-1000	1000 454	1.35 34	1000 13.4	0.35	Blue	23/8 4	4 9	43/4 41/4	3/4 21/4	3 3					10.0 ⁺	2.3	

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

[†]includes double deflection LDS element. ^{††}applies to spring only. *10.0 indicates a rating of 10 G's or greater

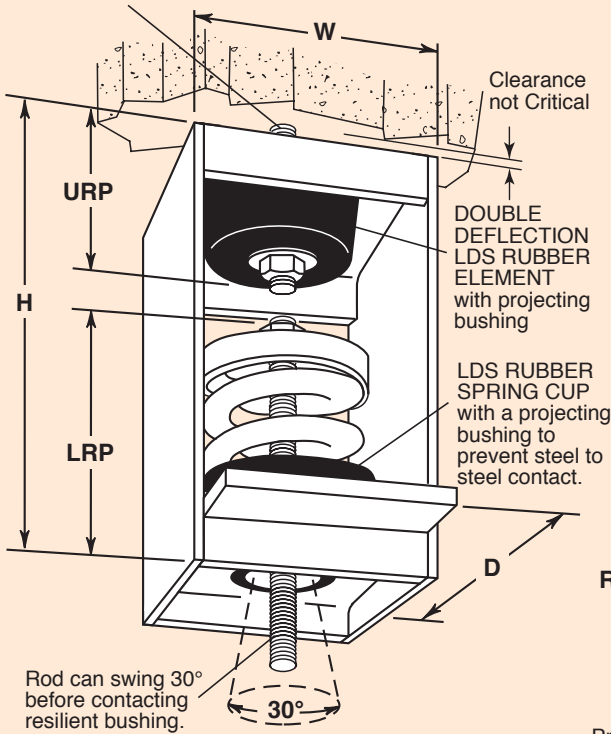
2" (51mm), 3" (76mm), 4" (102mm) & 5" (127mm) DEFLECTION 30° SWING - 100 SERIES SPRING and DOUBLE DEFLECTION LDS HANGERS

30N-100 FOR ROD ATTACHMENT

PC30N-100
TYPE 30N-100
PRECOMPRESSED

PC30NS-100
TYPE 30N-100
PRECOMPRESSED &
SEISMIC RESTRAINT

RW30N-100
TYPE 30N-100
SEISMIC RESTRAINT

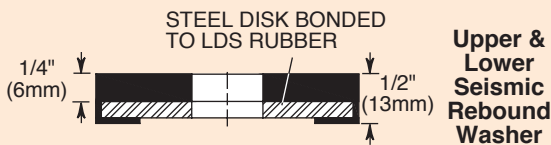
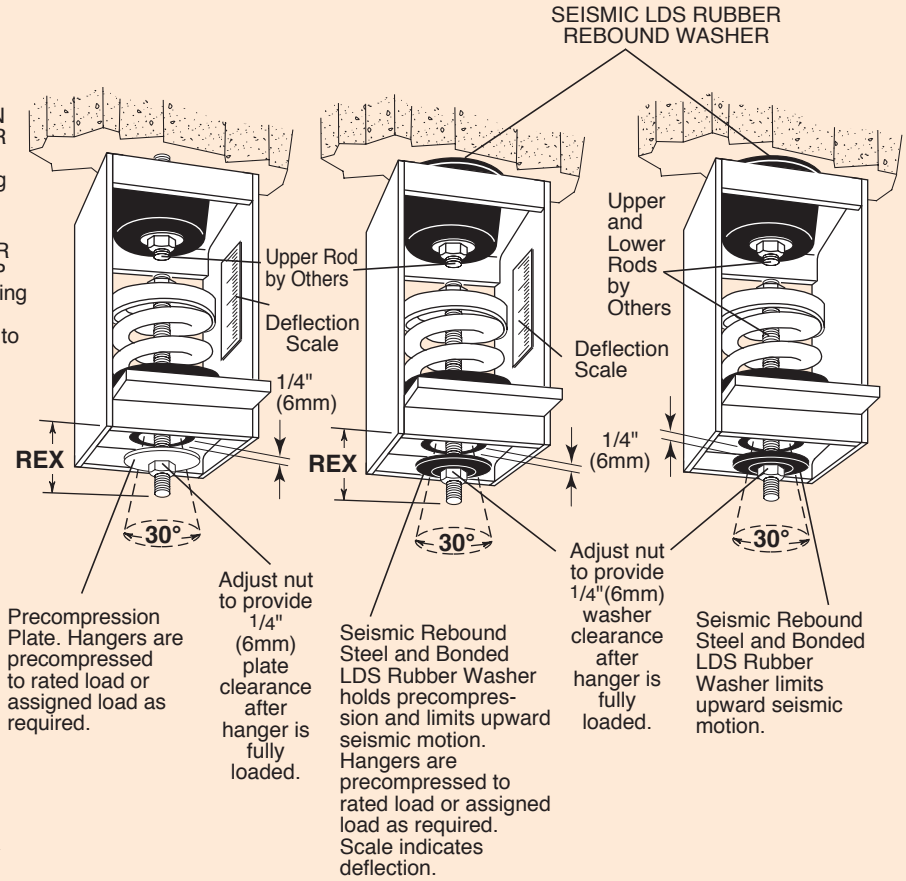


Rod can swing 30° before contacting resilient bushing.

NOTE –

Illustration shows typical construction. Components vary depending on capacity. SRD is the Smallest (Minimum) Rod Diameter which will maintain spring stability.

Install with hanger box snug to 1/4" (6mm) Seismic LDS Rubber Washer, so washer is tight to overhead surface. Upper hanger element deflects under load, leaving space on top. Washer cushions upward seismic travel.



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

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. [†] (in) (mm)	Spring Constant ^{††} (lbs/in) (kg/mm)	Average Defl. LDS Rubber	Spring Color/Stripe	Spring Only		LRP- Lower Rod Penetration MRD- Max. Rod Diameter SRD- Min. Rod Diameter						Vertical G Ratings								
							OD	Free Height	D	H	W	LRP	MRD	SRD	REX	URP	Tension	Compression					
2" Defl.	101	125	57	2.90	74	50	0.77	Purple	33/4	95	53/4	146						10.0*	10.0*				
	102	200	91	2.90	74	80	1.23	Brown	33/4	95	53/4	146						10.0*	10.0*				
	103	310	141	2.90	74	125	1.91	Pink	33/4	95	53/4	146						10.0*	10.0*				
	104	500	227	2.90	74	200	3.07	0.40	Green	33/4	95	53/4	146	5	131/2	6	71/2	7/8	5/8	41/2	31/4	10.0*	10.0*
	105	740	336	2.80	71	310	4.73	10	Red	33/4	95	53/4	146	127	343	152	191	22	16	114	83	10.0*	7.2
	106	1050	476	2.50	64	500	7.44		White	33/4	95	57/8	149										8.0
30N-	107	1400	635	2.40	61	700	10.4	Blue	33/4	95	57/8	149										6.0	3.8
PC30N-	108	1660	753	2.45	62	810	12.2	0.40	Silver	41/2	114	63/4	171	6	153/8	71/4	11	7/8	5/8	5	31/4	6.8	5.3
	109	2250	1021	2.40	61	1125	16.7	10	Orange	41/2	114	71/2	191	152	391	184	279	22	16	127	83	5.0	3.9
PC30NS-	110	3000	1361	2.40	61	1500	22.3	0.40	Gray	5	127	71/2	191	6	16	71/4	111/2	7/8	3/4	5	31/4	4.0	2.9
	111	4000	1814	2.40	61	2000	29.7	10	Tan	5	127	71/2	191	152	406	184	292	22	19	127	83	3.0	2.2
RW30N-	112	5300	2404	2.40	61	2665	39.4	0.40	Black	51/2	140	81/2	216	7	17	91/4	121/4	11/8	7/8	51/2	31/4	2.7	2.4
	113	7100	3221	2.40	61	3550	52.8	10	Yellow	6	152	83/4	222	178	432	235	311	29	22	140	83	2.0	1.8
	114	9300	4218	2.40	61	4650	69.2	0.40	Blue/Or	63/4	171	10	254	8	22	10	151/2	11/8	1	51/2	61/2	4.1	1.3
	115	12600	5715	2.40	61	6300	93.7	10	Blue/Rd	63/4	171	10	254	203	559	254	394	29	25	140	165	3.0	0.95

All springs have additional travel to solid equal to 50% of Rated Deflection. LDS elements have straight line deflection curves. [†]includes double deflection LDS element. ^{††}applies to spring only. *10.0 indicates a rating of 10 G's or greater.

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

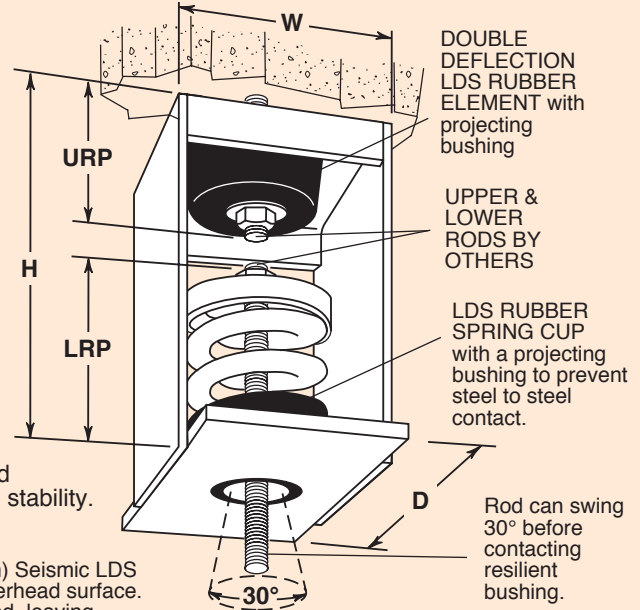
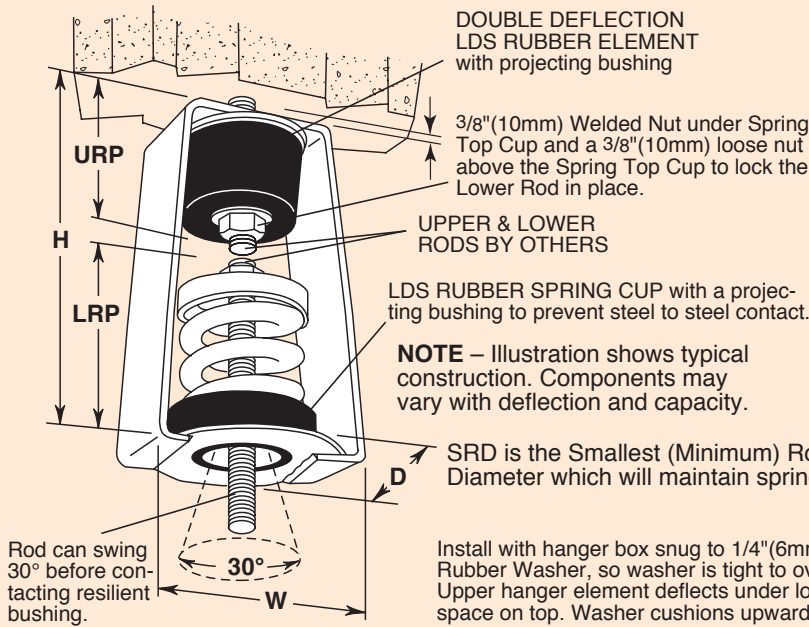
Type	Size	Rated Capacity		Rated Defl. [†] (in)(mm)	Spring Average		Spring Color/ Stripe	Spring Only		LRP- Lower Rod Penetration MRD- Max. Rod Diameter SRD- Min. Rod Diameter				REX- Rod Extension URP- Upper Rod Extension				Vertical G Ratings						
		(lbs)	(kg)		(lbs/in)	(kg/mm)		Defl LDS	Spring OD	Free Height	D	H	W	LRP	MRD	SRD	REX	URP	Tension	Compression				
See 3" 76mm Low Capacity Hangers Page 12																								
3" 76mm Defl.	126	195	88	3.65	93	60	0.95	0.40	Purple	33/4	95	63/8	162	5	131/2	6	8	7/8	5/8	41/2	31/4	10.0*	10.0*	
	127	280	127	3.65	93	85	1.37	10	Brown	33/4	95	61/2	165	127	343	152	203	22	16	114	83	10.0*	10.0*	
	128	390	177	3.65	93	120	1.90		Orange	4	102	61/2	165									10.0*	10.0*	
	30N-	129	520	236	3.65	93	160	2.54		Green	4	102	7	178	127	343	152	216	22	16	114	83	10.0*	10.0*
		130	710	322	3.65	93	220	3.46		Red	41/2	114	71/4	184	6	153/8	71/4	101/4	7/8	5/8	41/2	31/4	10.0*	10.0*
		131	940	426	3.65	93	290	4.58	0.40	White	41/2	114	71/2	191	6	153/8	71/4	11	7/8	5/8	41/2	31/4	10.0*	9.3
	PC30N-	132	1280	581	3.65	93	395	6.25		Blue	5	127	77/8	200	6	153/8	71/4	111/4	7/8	5/8	41/2	31/4	8.0	6.8
		133	1770	803	3.65	93	545	8.63	0.40	Black	51/2	140	91/4	235	71/2	171/2	81/4	121/4	7/8	3/4	41/2	31/4	5.6	5.6
		134	2490	1129	3.65	93	765	12.1	10	Yellow	51/2	140	91/4	235	191	445	210	311	22	19	114	83	4.0	4.0
	PC30NS-	135	3300	1497	3.65	93	1000	16.1		Gray	6	152	91/2	241									3.0	3.0
		136	4500	2041	3.65	93	1370	22.0	0.40	Blue/ Brown	63/4	171	93/4	235	8	20	9	14	7/8	7/8	5	31/2	7.0	2.1
	RW30N-	137	6200	2818	3.65	93	1900	30.2	0.40	Blue/Or	73/4	197	107/8	276	9	24	11	16	11/8	1	51/2	61/2	2.7	1.5
138		8300	3765	3.65	93	2560	40.5	10	Blue/Rd	73/4	197	11	279	229	610	279	406	29	25	140	165	2.0	1.1	
139		11400	5171	3.65	93	3500	55.6	0.40	Blue/Wt	73/4	197	121/4	311	9	251/2	11	171/2	11/8	1	51/2	61/2	3.0	0.65	
See 4" 102mm Low Capacity Hangers Page 12																								
4" 102mm Defl.	150	240	109	4.78	121	55	0.16		Purple	5	127	83/8	213									10.0*	10.0*	
	151	330	150	4.78	121	75	1.24	0.40	Brown	5	127	81/2	213	6	153/8	71/4	11	7/8	5/8	5	31/4	10.0*	10.0*	
	152	420	191	4.78	121	95	1.58	10	Orange	5	127	83/8	213	152	391	184	279	22	16	127	83	10.0*	10.0*	
	153	530	240	4.78	121	120	1.98		Green	5	127	83/8	213									10.0*	10.0*	
	30N-	154	680	308	4.78	121	155	2.55		Red	6	152	87/8	225									10.0*	10.0*
		155	880	399	4.78	121	200	3.30	0.40	White	6	152	91/8	232	71/2	171/2	81/4	131/4	7/8	5/8	5	31/4	10.0*	10.0*
		156	1120	508	4.78	121	255	4.20	10	Blue	6	152	97/8	251	181	445	210	337	22	16	127	83	8.9	8.9
		157	1420	644	4.78	121	325	5.32		Black	6	152	10	254									7.0	7.0
	PC30N-	158	1840	835	4.78	121	420	5.32	0.40	Yellow	63/4	171	103/8	264	8	20	9	141/4	7/8	5/8	5	31/4	10.0*	5.2
		159	2370	1075	4.78	121	540	6.90	10	Gray	63/4	171	111/8	283	203	508	229	362	22	16	127	83	10.0*	4.0
	PC30NS-	160	3000	1361	4.78	121	695	11.3	0.40	Blue/Br	73/4	197	107/8	276	9	24	11	17	11/8	3/4	51/2	61/2	6.5	3.0
		161	3900	1769	4.78	121	895	14.6	10	Blue/Rd	73/4	197	113/8	289	9	24	11	17	11/8	3/4	61/2	61/2	5.0	2.3
RW30N-	162	5100	2313	4.78	121	1155	19.5	0.40	Blue/Or	83/4	222	111/2	292	91/2	261/2	121/4	19	11/8	1	61/2	61/2	6.6	1.3	
	163	6500	2948	4.78	121	1485	24.4	10	Blue/Wh	83/4	222	131/4	337	241	673	311	483	29	25	165	165	5.2	1.1	
	164	8400	3810	4.78	121	1910	31.5		Blue/Sil	83/4	222	133/8	340									4.0	0.81	
5" 127mm Defl.	174	270	122	5.71	145	50	0.84		Purple	6	152	97/8	251									10.0*	10.0*	
	175	320	145	5.71	145	60	1.00	0.40	Brown	6	152	101/16	256	7	16	91/4	121/2	3/4	5/8	5	31/4	10.0*	10.0*	
	176	370	168	5.71	145	70	1.16	10	Orange	6	152	10	254	178	406	235	318	19	16	127	83	10.0*	9.4	
	177	460	209	5.78	147	85	1.42		Green	6	152	101/2	267									10.0*	7.6	
	178	560	254	5.78	147	105	1.73		Red	6	152	103/4	273									10.0*	6.2	
	30N-	179	670	304	5.78	147	125	2.07		White	63/4	171	111/16	281									10.0*	10.0*
		180	830	376	5.78	147	155	2.56	0.40	Blue	63/4	171	113/8	289	8	19	10	15	3/4	5/8	51/2	31/2	10.0*	10.0*
		181	1000	454	5.78	147	185	3.09	10	Black	63/4	171	111/8	283	203	483	254	381	19	16	140	89	10.0*	9.1
		182	1240	562	5.77	147	230	3.82		Yellow	63/4	171	113/8	289									10.0*	7.3
	PC30N-	183	1500	680	5.77	147	280	4.63		Gray	73/4	197	127/16	316									10.0*	6.0
		184	1830	830	5.77	147	340	5.65	0.40	Pink	73/4	197	117/8	302	9	21	111/4	17	7/8	3/4	6	31/2	10.0*	4.9
		185	2230	1012	5.77	147	415	6.88	10	Silver	73/4	197	12	305	229	533	286	432	22	19	152	89	10.0*	4.0
186		2710	1229	5.77	147	505	8.36		Tan	73/4	197	123/4	324									9.0	3.3	
PC30NS-	187	3300	1497	5.77	147	615	10.2	0.40	Blue/Or	83/4	222	123/4	324	91/2	261/2	121/4	19	7/8	7/8	6	61/2	10.0*	2.1	
	188	4100	1860	5.77	147	755	12.7	10	Blue/Rd	83/4	222	133/8	340	241	673	311	483	22	22	152	165	9.6	1.7	
RW30N-	189	4900	2223	5.77	147	915	15.1		Blue/Wt	91/16	230	137/16	341									8.0	1.4	
	190	6000	2722	5.77	147	1120	18.5	0.40	Blue/Yel	91/2	241	145/8	371	10	28	121/4	21	11/8	1	61/2	61/2	7.3	1.1	
	191	7300	3311	5.77	147	1365	22.5	10	Blue/Sil	91/2	241	153/16	386	254	711	311	533	29	25	165	165	6.0	0.85	
RW30N-	192	9000	4082	5.77	147	1670	27.8	0.40	Blue/Gy	101/4	260	155/8	397	101/2	30	131/4	23	11/8	1	61/2	61/2	3.7	0.6	
	193	11000	4990	5.77	147	2040	34.0	10	Blue/Tn	101/4	260	16	406	267	762	337	584	29	25	165	165	3.0	0.5	

All springs have additional travel to solid equal to 50% of Rated Deflection. LDS elements have straight line deflection curves.
[†]includes double deflection LDS element. ^{††}applies to spring only. *10.0 indicates a rating of 10 G's or greater.

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

30N-1000 3" FOR ROD ATTACHMENT

30N-1000 4" FOR ROD ATTACHMENT



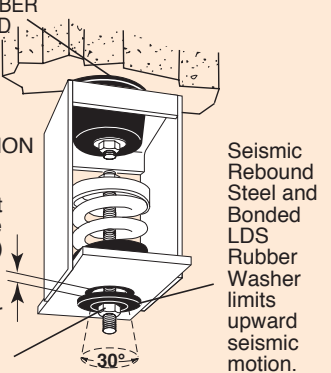
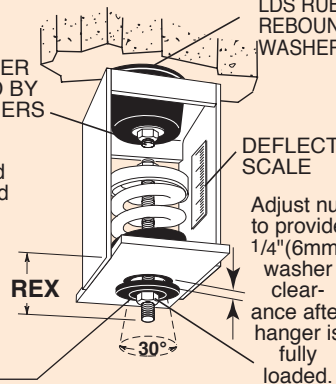
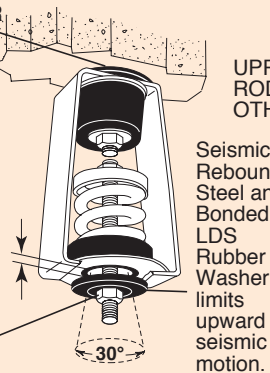
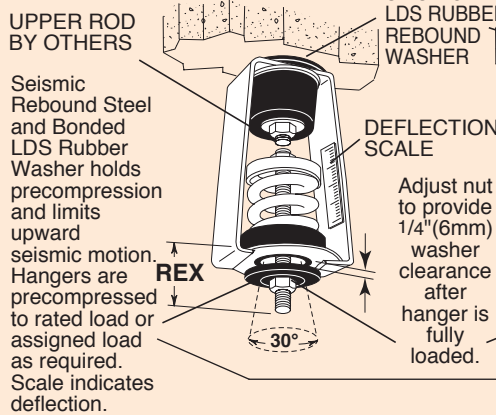
Install with hanger box snug to 1/4" (6mm) Seismic LDS Rubber Washer, so washer is tight to overhead surface. Upper hanger element deflects under load, leaving space on top. Washer cushions upward seismic travel.

PC30NS-1000 3" TYPE 30N-1000 PRECOMPRESSED

RW30N-1000 3" TYPE 30N-1000 SEISMIC RESTRAINT

PC30NS-1000 4" TYPE 30N-1000 PRECOMPRESSED

RW30N-1000 4" TYPE 30N-1000 SEISMIC RESTRAINT



For washer details see page 5

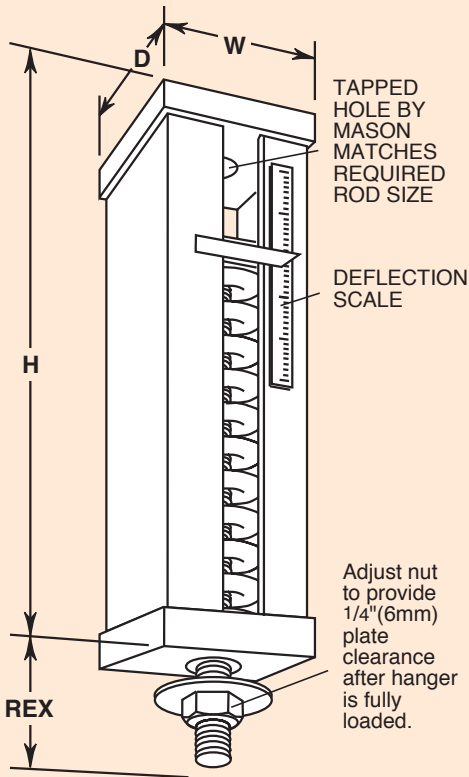
Ratings & Dimensions for 3" (76mm) & 4" (102mm) Deflection Spring and Double Deflection LDS Hangers (in mm)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl. [†] (in) (mm)	Spring Constant ^{††} (lbs/in) (kg/mm)	Spring Color/Stripe	Spring Only		D	H	W	LRP	MRD	SRD	REX	URP	Vertical G Ratings		
						OD	Free Height									Tension	Compression	
3" 76mm Defl.	1082	15 7		5 0.09	Silver/Red	5	127									10.0*	10.0*	
	1083	24 11		8 0.14	Silver/Blue	5 1/8	130									10.0*	10.0*	
	1084	33 15		11 0.20	Silver/Green	5 1/8	130									10.0*	10.0*	
	1085	48 22		16 0.29	Black	5 1/8	130									10.0*	10.0*	
	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	10.0*	10.0*
PC30N-	1087	75 34	86	25 0.45	Blue	73	51/4	133	120	254	133	178	10	10	70	51	10.0*	10.0*
	1088	111 50		37 0.66	Green		51/4	133									10.0*	10.0*
PC30NS-	1089	150 68		50 0.90	Purple		51/2	140									10.0*	10.0*
	1090	195 89		65 1.17	Tan		57/8	149									10.0*	9.0
RW30N-	1091	270 123		90 1.62	Yellow		6	152									10.0*	6.5
4" 102mm Defl.	1006	50 23		11 0.19	Black/Brown		71/4	184									10.0*	10.0*
	1007	65 29		15 0.24	Black/Orange		73/8	187									10.0*	10.0*
	1008	80 36		18 0.30	Black/Green		71/2	191									10.0*	10.0*
	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	10.0*	10.0*
	1010	130 59	114	30 0.49	Black/White	114	73/4	197	152	356	184	254	19	16	127	83	10.0*	10.0*
PC30NS-	1011	160 73		37 0.60	Black/Yellow		8	203									10.0*	10.0*
	1012	190 86		46 0.71	Black/Silver		8 1/4	210									10.0*	10.0*

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

[†]includes double deflection LDS element. ^{††}applies to spring only. *10.0 indicates a rating of 10 G's or greater.

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	D	H	W	Rod Extension 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	4 1/2 114	5 1/2 140	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	4 1/2 114	5 1/2 140	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

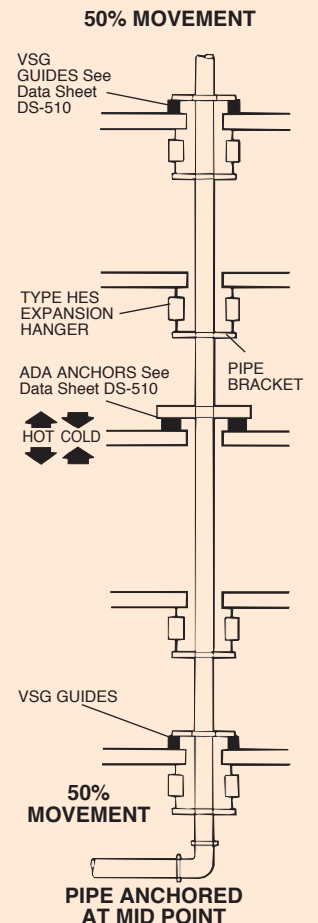
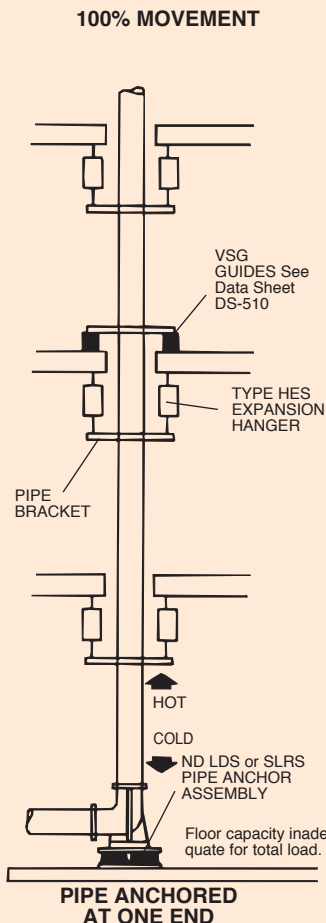
HES Hangers are installed at riser suspension points to control load shifts as the riser expands or contracts. If a 120 foot(37m) steel riser goes through a temperature increase of 150°F(66°C), the piping will expand 1.4"(36mm). If the piping had an anchor point in the basement, the piping bracket at 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.

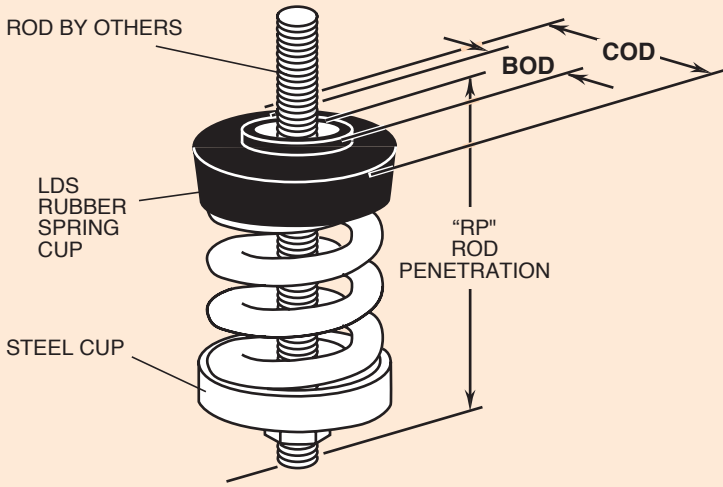
EXAMPLE-

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 foot(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 over travel 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).

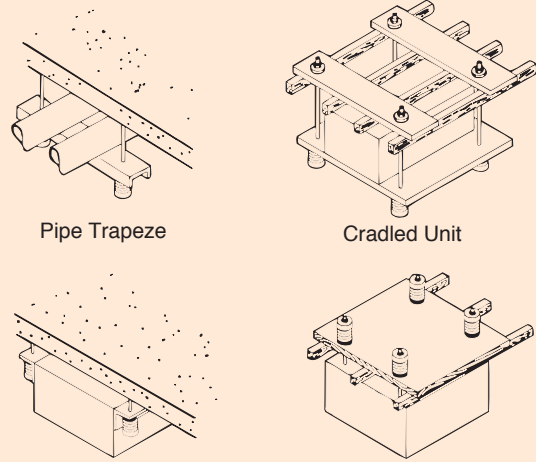


Piping installed at ambient temperature, expansion movement is directed away from the anchor at higher steam or water temperatures and toward the anchor when chilled water is circulated.

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 (lbs) (kg)	Rated Def. (in) (mm)	Spring Constant (lbs/in) (kg/mm)	Spring Color	Spring Only		Bushing Outside Dia. BOD	Cup Outside Dia. COD	Max. Rod Dia. MRD	Rod Penetration RP
						OD	Free Height				
1" 25mm Defl. IM-	X-12	12 5	1.25 32	10 0.18	Orange	1 1/2 38	2 1/2 64	1 1/8 29	2 51	3/8 10	2 3/4 69
	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						
	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	1 3/4 44	1 7/8 48	1 1/4 32	2 1/2 64	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	1 3/4 44	3 76	1 1/4 32	2 1/2 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	1 3/4 44	3 1/8 79	1 1/4 32	2 1/2 64	1/2 13	3 1/2 89
	A-625	625 283	1.00 25	625 11.3	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 12.1	White							
B-1000	1000 454	1.00 25	1000 18.2	Blue							
B-1250	1250 567	1.00 25	1250 22.7	Gray							
B-1650	1650 748	1.00 25	1650 29.9	Black							
C-1000	1000 454	1.00 25	1000 18.2	Black	2 7/8 73						
C-1350	1350 612	1.00 25	1350 24.5	Yellow							
C-1750	1750 794	1.00 25	1750 31.8	Black*							
C-2100	2100 953	1.00 25	2100 38.1	Yellow*							
C-2385	2385 1082	1.00 25	2385 43.3	Yellow**							
C-2650	2650 1202	1.00 25	2650 48.1	Red*							
C-2935	2935 1331	1.00 25	2935 53.2	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 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				
2" Defl.	B-20	20	9	2.40	61	8	0.15	Tan	23/8	4	17/8	31/8	3/4	47/8
	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						
B-115	115	52	2.00	51	57	1.02	Silver	60	102	48	79	19	124	
B-150	150	68	2.00	51	75	1.33	Orange	23/8	41/2	17/8	31/8	3/4	53/8	
B2-210	210	95	2.12	54	99	1.76	Silver							
B2-290	290	132	2.00	51	144	2.59	Blue							
B2-450 [†]	450	204	2.00	51	224	4.00	Tan							
B2-680 [†]	680	308	2.00	51	340	6.04	Gray	60	114	48	79	19	137	
IM-	C2-125	125	57	2.50	64	50	0.89	Purple	27/8	5	23/8	35/8	3/4	57/8
	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						
	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	7.83	Gray						
	C2-1210 [†]	1210	549	2.00	51	605	10.8	Silver						
	C2-1540 [†]	1540	699	2.00	51	770	13.7	Gray*						
	C2-1870 [†]	1870	848	2.00	51	935	16.6	Silver*						

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

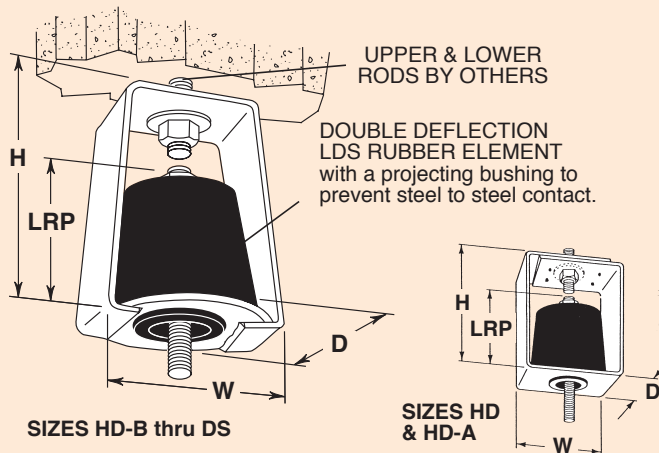
Size	Derated Capacity (lbs)	Derated Defl. (in)
B2-450	4101.83	
B2-680	5651.66	
C2-880	8001.82	
C2-1210	10101.67	
C2-1540	12851.67	
C2-1870	15601.67	

Size	Derated Capacity (kg)	Derated 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

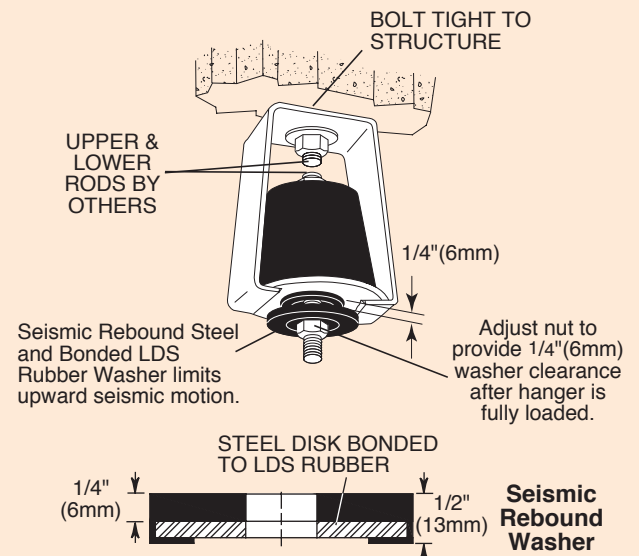
All springs without "†" have additional travel to solid equal to 50% of Rated Deflection. *with Red inner spring

DOUBLE DEFLECTION LDS HANGERS

HD FOR ROD ATTACHMENT



RWHD TYPE HD SEISMIC RESTRAINT



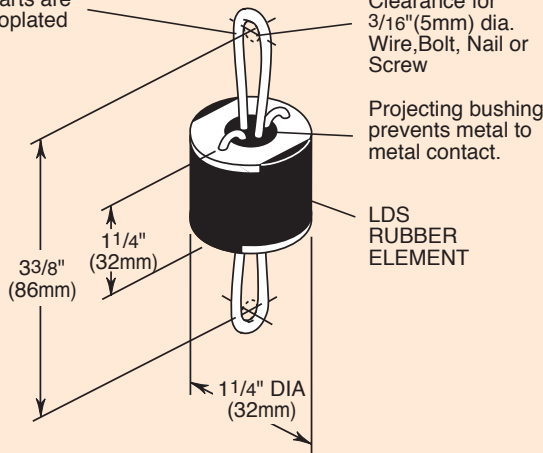
Ratings & Dimensions for LDS Hangers (inches mm)

Type	Size (Color Mark)	Duro-meter	Rated Capacity Range		Max Rated Defl [†]	D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Vertical G Ratings							
			(lbs)	(mm)	(in)	(mm)					Tension	Compression						
HD-	Green	40	Up to 35	Up to 16	0.20	5	13/4	44	21/4	57	17/8	48	11/4	32	3/8	10	10.0 ⁺	10.0 ⁺
	White	60	35-75	16-34	0.20	5											10.0 ⁺	6.3
	A-Black	30	Up to 45	Up to 20	0.35	9											10.0 ⁺	10.0 ⁺
RWHD-	A-Green	40	30-75	14-34	0.35	9	2	51	23/4	70	21/4	57	21/4	57	1/2	13	10.0 ⁺	8.5
	A-Red	50	60-125	27-57	0.35	9											10.0 ⁺	5.1
	B-Red	50	Up to 235	Up to 107	0.40	10											10.0 ⁺	10.0 ⁺
	B-White	60	180-380	82-172	0.40	10											10.0 ⁺	6.7
	B-Yellow	70	320-650	145-295	0.40	10											10.0 ⁺	3.9
	BS-Blue	70	500-1000	227-454	0.40	10											10.0 ⁺	2.3
CS-Blue	70	1000-2100	454-953	0.40	10											9.0	1.2	
DS-Blue	70	2100-4200	953-1905	0.40	10											5.0	1.0	

[†]includes double deflection LDS element. Hanger elements have straight line deflection curves. *10.0 indicates a rating of 10 G's or greater.

WHR 0.2" (5mm) DEFLECTION LDS CEILING HANGERS for Wire or Horizontal Attachment

All Metal Parts are Zinc Electroplated



Clearance for 3/16" (5mm) dia. Wire, Bolt, Nail or Screw

Projecting bushing prevents metal to metal contact.

LDS RUBBER ELEMENT

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

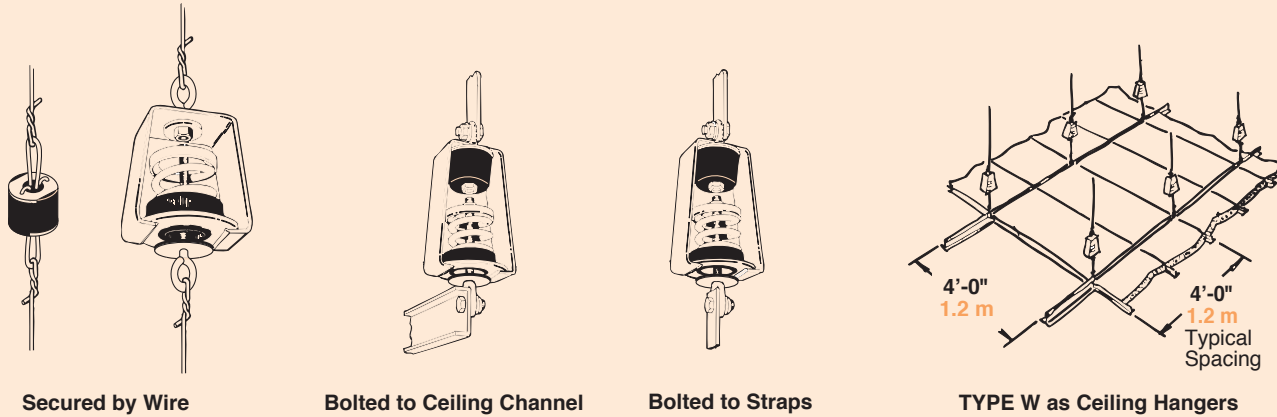
Ratings for LDS Ceiling Hangers

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.

For a complete presentation of Mason Ceiling Hangers, please refer to Bulletin CH-620 in the Architectural section.

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	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.

All hangers can be manufactured in stainless steel or hot dipped galvanized at additional cost.



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