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350 Rabro Drive
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631/348-0282
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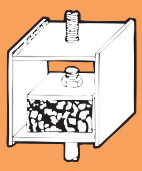
2101 W. Crescent Ave., Suite D
Anaheim, CA 92801
714/535-2727
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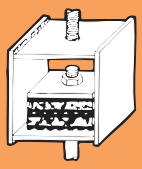
SPRING, RUBBER and COMBINATION HANGERS

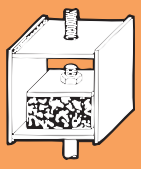
HANGERS

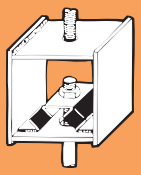
H-610-9 BULLETIN

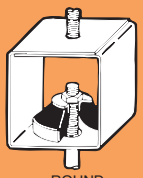
All rubber parts are LDS (Low Dynamic Stiffness) Rubber. For information on LDS Rubber, see Bulletin ACS-102, page 6.

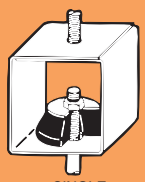

BLOCK OF CORK

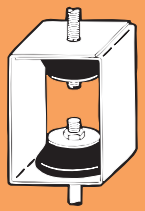

LAYERS OF RUBBER PADS

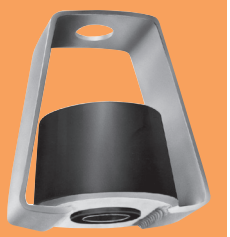

BLOCK OF FELT


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.

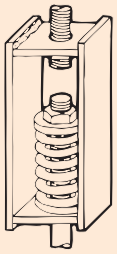
Both the round rubber-in-shear and the round compression hangers were also merchandised with a single deflection element in the top and bottom of the box to provide twice the deflection and lower the frequency. Our company went on to develop a larger taller double deflection element capable of providing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

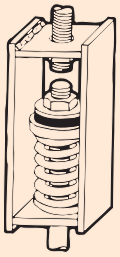
HD Hangers are double deflection units with average static deflections of 0.4"(10mm). They are molded in LDS because of its excellent aging characteristics. If you wish to isolate primary vibration, they should only be considered for smaller equipment running above 800 RPM in non-critical areas. The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


TYPE 30 SPRING HANGER

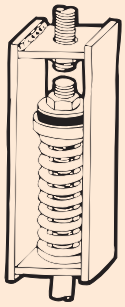

TYPE 30N COMBINATION SPRING and DOUBLE DEFLECTION LDS HANGER



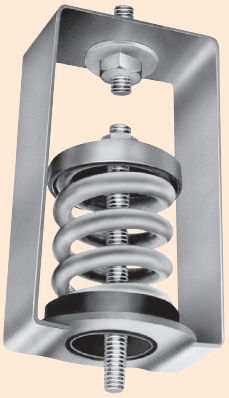
Early Spring Hanger with Stiff Unstable Spring



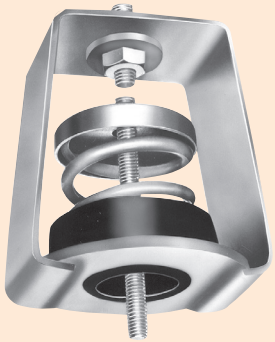
Introduction Of Rubber Washer



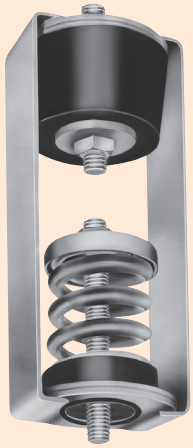
Rubber Washer plus Higher Deflection Unstable Spring



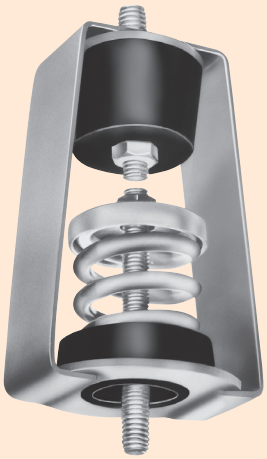
HS Hanger



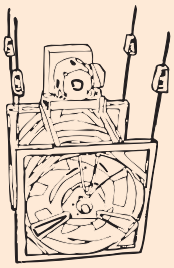
Series 30 Hanger

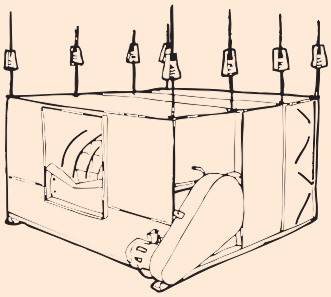


DNHS Hanger



Series 30N Hanger





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 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 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.

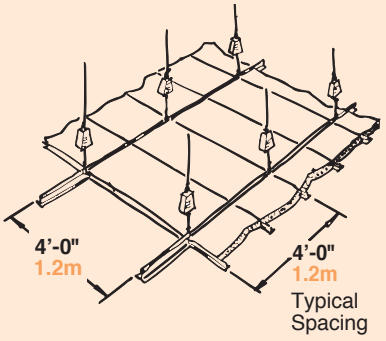
With the exception of a few very low capacity hangers and welded high-capacity and multiple-spring designs all of our hanger boxes are made by bending steel flats into an inverted U shape with return bends on the bottom, and arc welding them to thick American Standard or special steel washers. We believe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

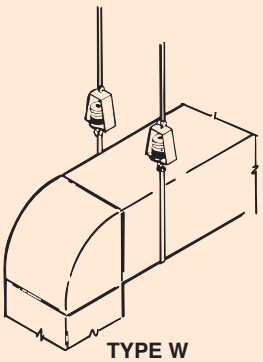
On the bottom of this page, we illustrate “W” hangers originally designed for suspending ceilings by means of wire. Many ceilings are supported by bolted arrangements, but we have continued with the “W” designation. For information on these hangers, please refer to Bulletin CH-620 in our Architectural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



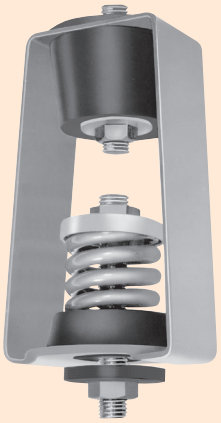
TYPE W as Ceiling Hangers



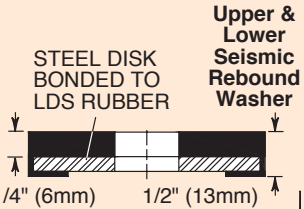
TYPE W
As Duct Hangers

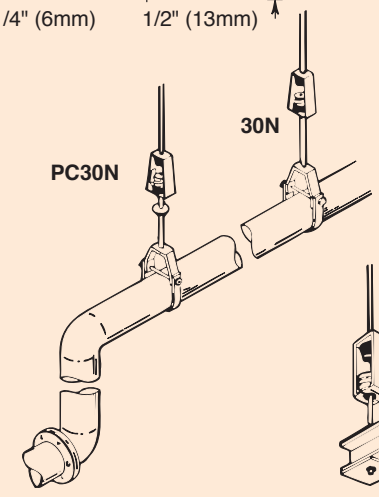


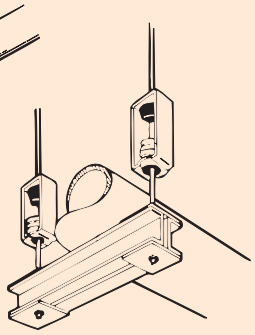
PC30S Hanger



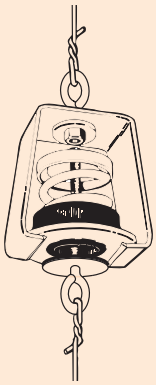
RW30N Hanger



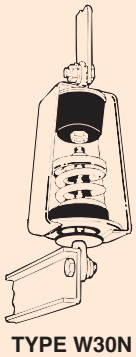




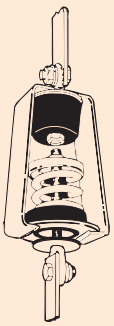
Trapeze Hung Pipe



TYPE W30
Secured by Wire



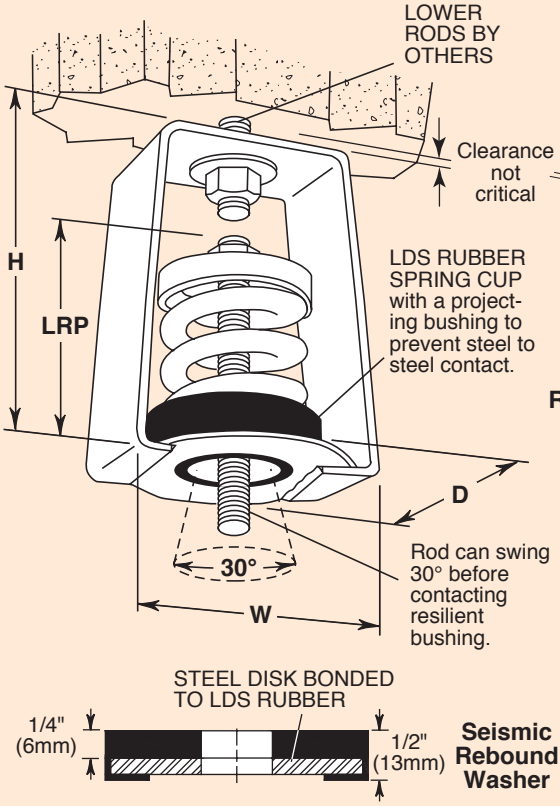
TYPE W30N
Bolted to
Ceiling Channel



TYPE W30N
Bolted to Straps

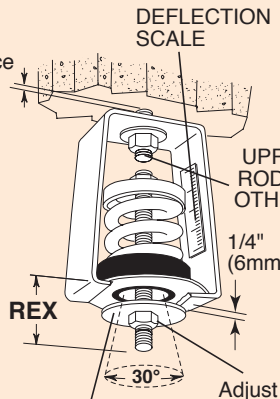
1" (25mm) DEFLECTION 30° SWING – X, A, B, C, D & F SPRING HANGERS

30 FOR ROD ATTACHMENT



Seismic Rebound Washer

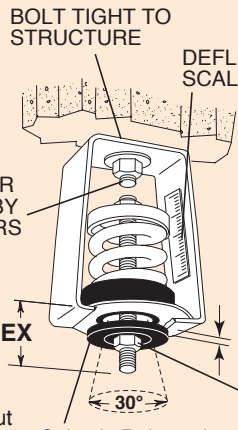
PC30
TYPE 30 PRECOMPRESSED



Precompression Plate. Hangers are precompressed to rated load or assigned load as required.

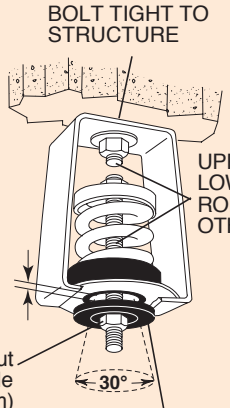
Adjust nut to provide 1/4" (6mm) plate clearance after hanger is fully loaded.

PC30S
TYPE 30 PRECOMPRESSED & SEISMIC RESTRAINT



Seismic Rebound Steel and Bonded LDS Rubber Washer holds precompression and limits upward seismic motion. Hangers are precompressed to rated load or assigned load as required. Scale indicates deflection.

RW30
TYPE 30 SEISMIC RESTRAINT



Adjust nut to provide 1/4"(6mm) washer clearance after hanger is fully loaded.

Seismic Rebound Steel and Bonded LDS Rubber Washer limits upward seismic motion.

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

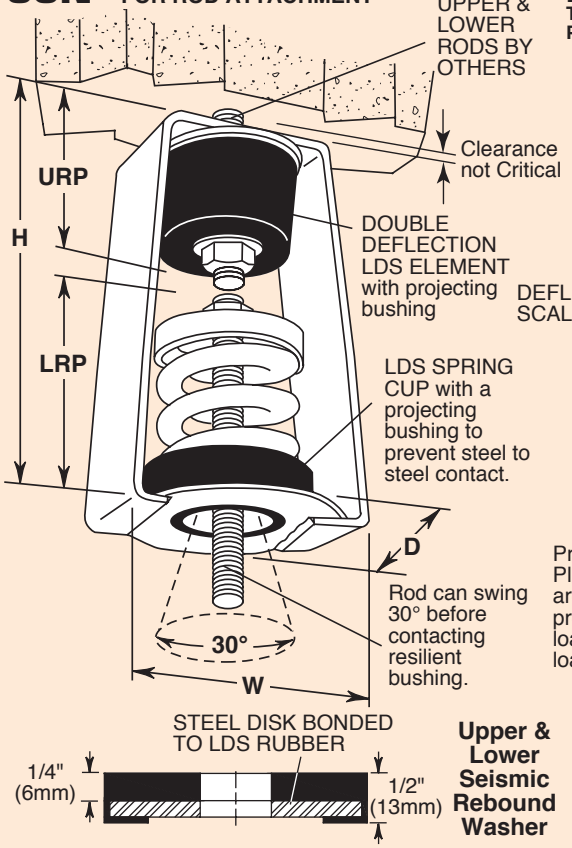
Type	Size	Rated Capacity (lbs) (kg)	Rated Defl.† (in) (mm)	Spring Constant (lbs/in) (kg/mm)	Spring Color	Spring Only OD	Spring Only Free Height	D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Vertical 'G' Ratings Tension	Vertical 'G' Ratings Compression
30-	X-12	12 5	1.25 32	10 0.18	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	1 1/2	2 1/2	2 1/2	4 1/4	2 7/8	3 1/2	3/8	1 3/4	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	1 3/4	1 7/8	2 3/4	5 3/4	3 1/4	3 1/2	5/8	2 1/4	10.0+	10.0+
	A-18	18 8	1.00 25	18 0.32	Gray	44	48	70	146	83	89	16	57	10.0+	10.0+
	A-25	25 11	1.00 25	25 0.44	Orange									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	1 3/4	2 1/4	2 3/4	5 3/4	3 1/4	4	5/8	2 1/4	10.0+	10.0+
	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+
PC30S-	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	2 3/8	2 7/8	4	7 1/4	4 3/4	4 1/4	5/8	2 1/4	10.0+	5.2
	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
RW30-	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	2 7/8	3 5/8	4	8 3/4	5 1/4	5	3/4	2 1/4	7.9	4.0
	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	3 3/4	4 7/8	4 3/4	12 1/2	5 3/4	7	7/8	2 1/2	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	4 1/2 114	5 1/8 130	6 152	12 305	6 1/4 159	7 178	7/8 22	2 1/2 64	5.0	4.3

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

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

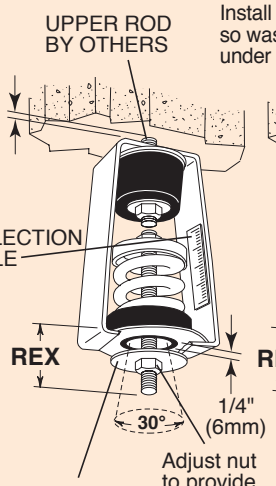
1"(25mm) DEFLECTION 30° SWING – X, A, B, C, D & F SPRING and DOUBLE DEFLECTION LDS HANGERS

30N FOR ROD ATTACHMENT



Upper & Lower Seismic Rebound Washer

PC30N
TYPE 30N PRECOMPRESSED

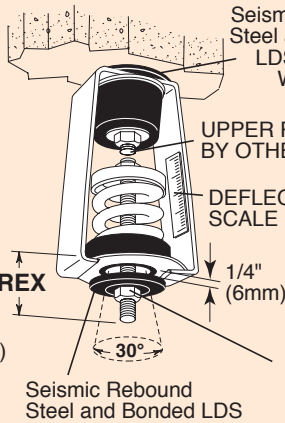


Precompression Plate. Hangers are precompressed to rated load or assigned load as required.

Adjust nut to provide 1/4" (6mm) plate clearance after hanger is fully loaded.

PC30NS
TYPE 30N PRECOMPRESSED & SEISMIC RESTRAINT

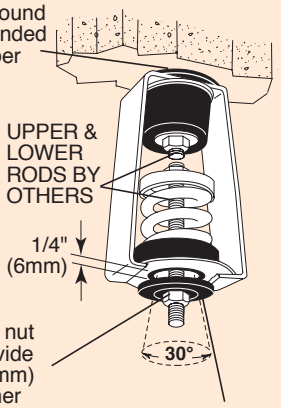
Install with hanger box snug to 1/4" (6mm) Seismic LDS Rubber Washer, so washer is tight to overhead surface. Upper hanger element deflects under load, leaving space on top. Washer cushions upward seismic travel.



Seismic Rebound Steel and Bonded LDS Rubber Washer holds precompression and limits upward seismic motion. Hangers are precompressed to rated load or assigned load as required. Scale indicates deflection.

Adjust nut to provide 1/4"(6mm) washer clearance after hanger is fully loaded.

RW30N
TYPE 30N SEISMIC RESTRAINT



Seismic Rebound Steel and Bonded LDS Rubber Washer limits upward seismic motion.

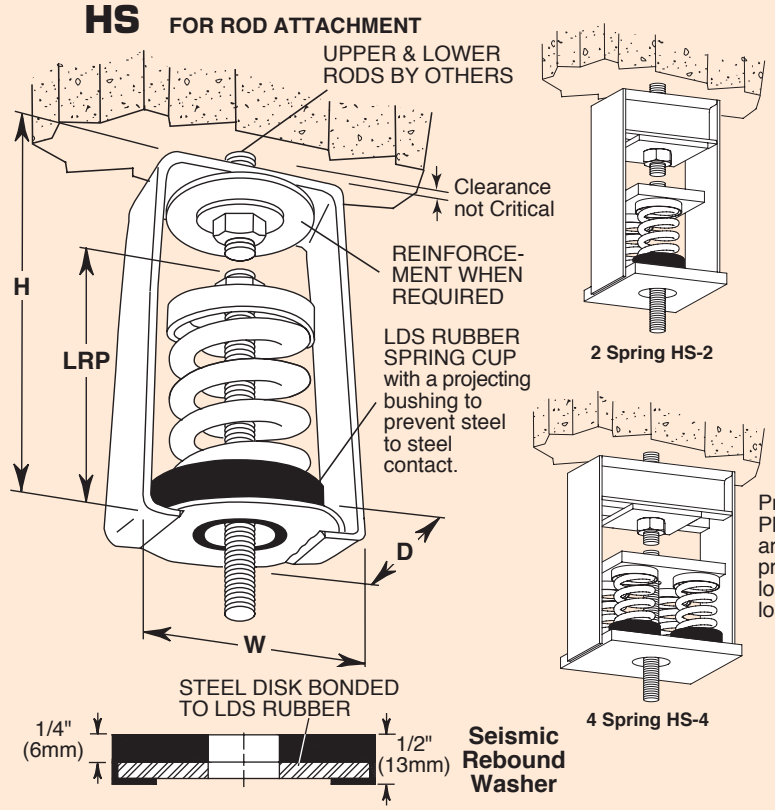
Ratings & Dimensions for 1"(25mm) Deflection Spring and Double Deflection LDS Hangers (inches mm)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl.† (in) (mm)	Spring Constant†† (lbs/in) (kg/mm)	Average Defl. LDS Rubber	Spring Color	Spring Only OD	Spring Only Free Height	LRP– Lower Rod Penetration MRD– Max. Rod Diameter D	H	W	LRP	REX– Rod Extension URP– Upper Rod Penetration MRD	REX	URP	Vertical G Ratings Tension	Vertical G Ratings 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	1 1/2	2 1/2	2 1/2	5 1/2	2 7/8	3 1/4	3/8	2 1/4	1 3/4	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	0.35	Copper	1 3/4	1 7/8	2 3/4	6 3/4	3 1/4	3 1/4	5/8	2 1/4	2 1/4	10.0+	10.0+
	A-18	18 8	1.35 34	18 0.24		Gray										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	1 3/4	2 1/4	2 3/4	6 3/4	3 1/4	3 5/8	5/8	2 1/4	2 1/4	10.0+	10.0+
	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+
PC30NS-	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	2 3/8	2 7/8	4	6 3/4	4 3/4	3 3/4	5/8	2 1/4	2 3/4	10.0+	5.8
	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
RW30N-	C-630	630 286	1.53 39	558 7.33		Gray										10.0+	3.2
	C-800	800 363	1.40 36	800 10.1	0.40	Orange	2 7/8	3 5/8	4 3/4	9	5 1/4	5	3/4	2 1/2	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	3 3/4	4 7/8	4 3/4	12 1/2	5 3/4	7	7/8	2 1/2	4 1/4	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 10	Silver	4 1/2 114	5 1/8 130	6 152	14 1/2 368	6 1/4 159	7 178	7/8 22	2 1/2 64	5 127	5.0	4.3

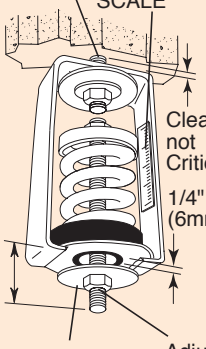
All springs have additional travel to solid equal to 50% of Rated Deflection. Hanger elements have straight line deflection curves. †includes double deflection LDS element. ††applies to spring only. +10.0 indicates a rating of 10 G's or greater

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

HS FOR ROD ATTACHMENT



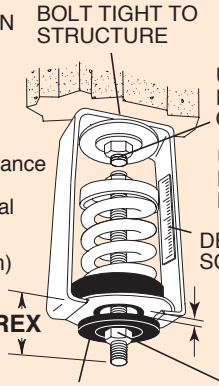
PCHS
TYPE HS PRECOMPRESSED



Precompression Plate. Hangers are precom-pressed to rated load or assigned load as required.

Adjust nut to provide 1/4" (6mm) plate clearance after hanger is fully loaded.

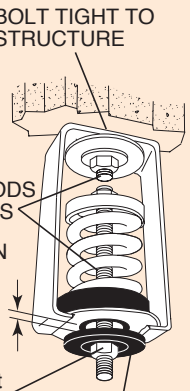
PCHSS
TYPE HS PRECOMPRESSED & SEISMIC RESTRAINT



Seismic Rebound Steel and Bonded LDS Rubber Washer holds precompres-sion and limits upward seismic motion. Hangers are precom-pressed to rated load or assigned load as required. Scale indicates deflection.

Adjust nut to provide 1/4"(6mm) washer clearance after hanger is fully loaded.

RWHS
TYPE HS SEISMIC RESTRAINT



Seismic Rebound Steel and Bonded LDS Rubber Washer limits upward seismic motion.

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 OD	Spring Only Free Height	D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Exten-sion REX	Vertical 'G' Ratings Com-Tension	Vertical 'G' Ratings Com-pression
	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	1 1/2	2 1/2	2 1/2	4 1/4	2 7/8	3 1/2	3/8	1 3/4	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
1"	X-175	175 79	1.00 25	175 3.16	Silver									10.0+	4.9
25mm	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	1 3/4	1 7/8	2 3/4	5 3/4	3 1/4	3 1/2	5/8	2 1/4	10.0+	10.0+
	A-18	18 8	1.00 25	18 0.32	Gray	44	48	70	146	83	89	16	57	10.0+	10.0+
	A-25	25 11	1.00 25	25 0.44	Orange									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	1 3/4	2 1/4	2 3/4	5 3/4	3 1/4	4	5/8	2 1/4	10.0+	10.0+
	A-73	73 33	1.06 27	69 1.22	Tan	44	57	70	146	83	102	16	57	10.0+	10.0+
HS-	A-95	95 43	1.01 26	94 1.65	Green									10.0+	10.0+
	A-45	45 20	1.60 41	28 0.49	Blue									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	1 3/4	3	2 3/4	5 3/4	3 1/4	4	5/8	2 1/2	10.0+	10.0+
	A-200	200 91	1.15 29	174 3.14	Black	44	76	70	146	83	102	16	64	10.0+	10.0+
PCHS-	A-310	310 141	1.00 25	310 5.64	Yellow									10.0+	7.1
	A-400	400 181	1.00 25	400 7.24	Green									10.0+	5.5
	A-510	510 231	1.00 25	510 9.24	Red	1 3/4	3 1/8	2 3/4	5 3/4	3 1/4	4	5/8	2 1/2	10.0+	4.3
						44	79	70	146	83	102	16	64		
	A-625	625 283	1.00 25	625 11.3	White	1 3/4	3 3/8	2 3/4	5 3/4	3 1/4	4	5/8	2 1/2	9.0	3.5
PCHSS-						44	86	70	146	83	102	16	64		
	B-65	65 29	2.10 53	31 0.55	Brown									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+
RWHS-	B-150	150 68	2.00 51	75 1.33	Orange	2 3/8	4	4	7 1/4	4 3/4	4 1/4	3/4	2 1/4	10.0+	10.0+
	B-280	280 127	1.60 41	174 3.10	Green	60	102	102	184	121	108	19	57	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	2 3/8	4	4	7 1/4	4 3/4	4 1/4	3/4	2 1/4	10.0+	1.5
						60	102	102	184	121	108	14	57		

†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 (lbs) (kg)	Rated Defl.† (in)(mm)	Spring Constant (lbs/in)(kg/mm)	Spring Color	Spring Only OD	Spring Only Free Height	D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Vertical 'G' Ratings Tension	Vertical 'G' Ratings Compression
	1-1000	1000 454	1.00 25	1000 18.2	Black									10.0+	3.2
1"	1-1350	1350 612	1.00 25	1350 24.5	Yellow									8.7	2.4
25mm	1-1750	1750 794	1.00 25	1750 31.8	Black*									6.7	1.8
Defl.	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
	1-2650	2650 1202	1.00 25	2650 48.1	Red*									4.4	1.2
HS-	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									10.0+	3.0
PCHS-	2-3500	3500 1588	1.00 25	3500 63.5	Black*	27/8	41/8	9	10	51/4	7	1	41/4	10.0+	2.3
	2-4200	4200 1905	1.00 25	4200 76.2	Yellow*	73	105	229	254	133	178	25	108	9.8	1.9
	4-5400	5400 2449	1.00 25	5400 98.0	Yellow									10.0+	3.5
PCHSS-	4-7000	7000 3175	1.00 25	7000 127.0	Black*	27/8	41/8	7	13	87/8	7	11/4	41/2	8.4	2.7
	4-8400	8400 3810	1.00 25	8400 152.4	Yellow*	73	105	178	330	225	178	32	114	7.0	2.2
	4-9540	9540 4327	1.00 25	9540 173.1	Yellow**									6.2	2.0
RWHS-	4-10600	10600 4808	1.00 25	10600 192.3	Red*	27/8	41/8	7	13	87/8	7	11/4	41/2	5.5	1.8
	4-11740	11740 5325	1.00 25	11740 213.0	Red**	73	105	178	330	225	178	32	114	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 (lbs) (kg)	Rated Defl.† (in)(mm)	Spring Constant (lbs/in)(kg/mm)	Spring Color/ Stripe	Spring Only OD	Spring Only Free Height	D	H	W	Lower Rod Penetration LRP	Max. Rod Dia. MRD	Rod Extension REX	Vertical 'G' Ratings Tension	Vertical 'G' Ratings Compression
	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+
2"	B-65	65 29	2.10 53	31 0.55	Brown	60	102	102	184	121	130	19	57	10.0+	10.0+
51mm	B-85	85 39	2.10 53	40 0.74	White/Blk									10.0+	10.0+
Defl.	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+
	B2-210	210 95	2.12 54	99 1.76	Silver									10.0+	7.1
	B2-290	290 132	2.00 51	144 2.59	Blue	23/8	41/2	4	71/4	43/4	51/8	3/4	21/4	10.0+	5.2
	B2-450‡	450 204	2.00 51	224 4.00	Tan	60	114	102	184	121	130	19	57	10.0+	3.3
HS-	B2-680‡	680 308	2.00 51	340 6.04	Gray									10.0+	2.2
	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+
PCHS-	C2-330	330 150	2.00 51	165 2.94	Black									10.0+	9.6
	C2-460	460 209	2.00 51	230 4.10	Blue	27/8	5	4	83/4	51/4	51/4	7/8	21/4	10.0+	6.9
	C2-610	610 277	2.00 51	305 5.43	Green	73	127	102	222	133	133	22	57	10.0+	5.2
	C2-880‡	880 399	2.00 51	440 7.82	Gray									10.0+	3.6
	C2-1210‡	1210 549	2.00 51	605 10.8	Silver									9.7	2.6
PCHSS-	C2-1540‡	1540 699	2.00 51	770 13.7	Gray*									7.7	2.1
	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									10.0+	4.6
	2-C2-3080‡	3080 1397	2.00 51	770 27.4	Gray*	27/8	5	9	10	51/4	6	1	41/4	10.0+	3.6
	2-C2-3740‡	3740 1696	2.00 51	935 33.3	Silver*	73	127	229	254	133	152	25	108	10.0+	3.0
	4-C2-3520‡	3520 1597	2.00 51	440 31.3	Gray									10.0+	5.3
RWHS-	4-C2-4840‡	4840 2195	2.00 51	605 43.0	Silver	27/8	5	7	13	87/8	8	11/4	41/2	10.0+	3.9
	4-C2-6160‡	6160 2794	2.00 51	770 54.8	Gray*	73	127	178	330	225	203	32	114	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

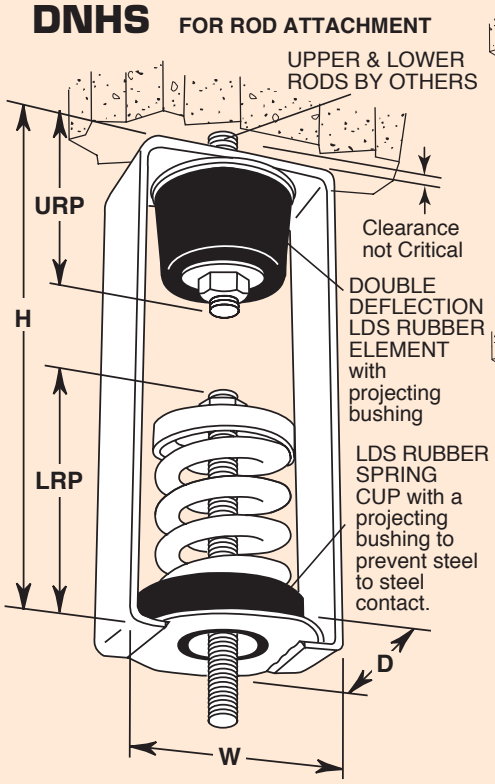
+10.0 indicates a rating of 10 G's or greater

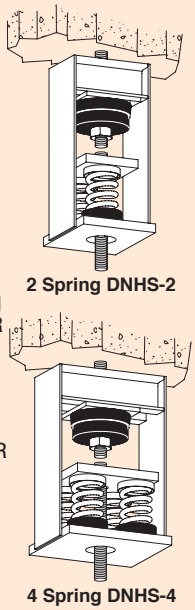
‡Published ratings allow minimum 25% additional travel to solid. For a full 50% specified minimum use the following ratings:

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

DNHS FOR ROD ATTACHMENT



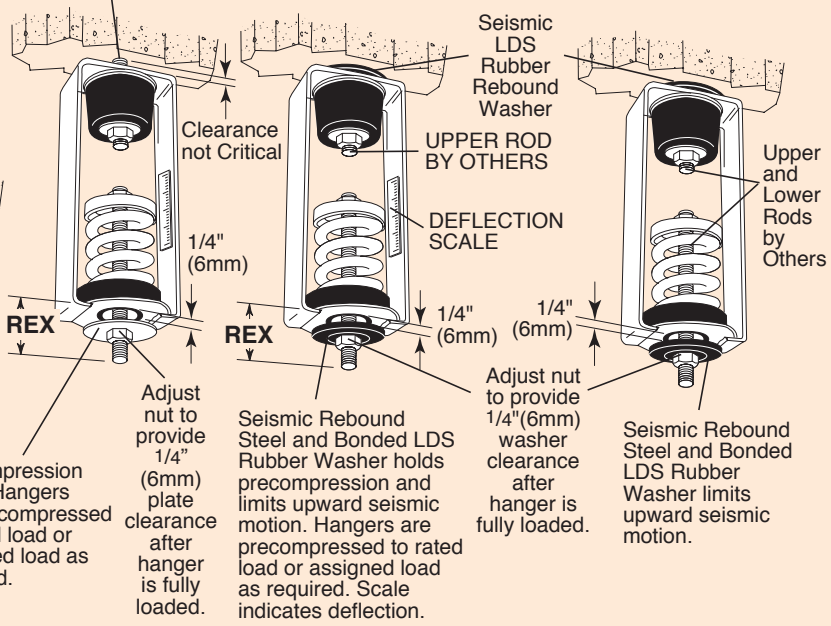


PCDNHS
TYPE DNHS PRECOMPRESSED

PCDNHSS
TYPE DNHS PRECOMPRESSED & SEISMIC RESTRAINT

RWDNHS
TYPE DNHS SEISMIC RESTRAINT

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 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 OD	Spring Only Free Height	LRP– Lower Rod Penetration MRD– Max. Rod Diameter D	H	W	LRP	REX– Rod Extension URP– Upper Rod Penetration MRD	REX	URP	Vertical G Ratings Tension	Vertical G Ratings Compression
	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	10.0+	10.0+
1"	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
25mm	X-130	130 59	1.20 30	130 1.97		Purple										10.0+	5.8
Defl.	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
	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	10.0+	10.0+
	A-18	18 8	1.35 34	18 0.24		Gray										10.0+	10.0+
	A-25	25 11	1.35 34	25 0.32	9	Orange	44	48	70	171	83	89	16	57	57	10.0+	10.0+
	A-41	41 19	1.53 39	35 0.49		Pink										10.0+	10.0+
DNHS-	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	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	10.0+	10.0+
	A-200	200 91	1.50 38	174 2.39	9	Black	44	76	70	171	83	102	16	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
PCDNHSS-	A-510	510 231	1.35 34	510 6.79	0.35 9	Red	13/4 44	31/8 79	23/4 70	63/4 171	31/4 83	4 102	5/8 16	21/2 64	21/4 57	10.0+	3.4
	A-625	625 283	1.35 34	625 8.32	0.35 9	White	13/4 44	33/8 86	23/4 70	63/4 171	31/4 83	4 102	5/8 16	21/2 64	21/4 57	10.0+	2.8
	B-65	65 29	2.45 62	31 0.47		Brown/Blk										10.0+	10.0+
RWDNHS-	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	0.35	Silver	23/8	4	4	9	43/4	41/4	3/4	21/4	3	10.0+	10.0+
	B-150	150 68	2.35 60	75 1.13	9	Orange	60	102	102	229	121	108	19	57	76	10.0+	10.0+
	B-280	280 127	1.95 50	174 2.54		Green										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 9	Blue	23/8 60	4 102	4 102	9 229	43/4 121	41/4 108	3/4 19	21/4 57	3 76	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

1"(25mm) DEFLECTION C & MULTIPLE C 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 OD	Free Height	LRP– Lower Rod Penetration MRD– Max. Rod Diameter D	H	W	LRP	REX– Rod Extension URP– Upper Rod Extension MRD	REX	URP	Vertical G Ratings Tension	Compression
	1-1000	1000	454	1.40	36	1000	12.6		Black										10.0+	7.3
	1-1350	1350	612	1.40	36	1350	17.0		Yellow										10.0+	5.4
1"	1-1750	1750	794	1.40	36	1750	22.1		Black*										10.0+	4.2
25mm	1-2100	2100	953	1.40	36	2100	26.5	0.40	Yellow*	27/8	41/8	4	11	51/4	5	7/8	21/4	31/4	8.4	3.5
Defl.	1-2385	2385	1082	1.40	36	2385	30.1	10	Yellow**	73	105	102	279	133	127	22	57	83	7.4	3.1
	1-2650	2650	1202	1.40	36	2650	33.3		Red*										6.6	2.8
DNHS-	1-2935	2935	1331	1.40	36	2935	37.0		Red**										6.0	2.5
	2-2700	2700	1225	1.40	36	2700	34.0		Yellow										10.0+	4.5
PCDNHS-	2-3500	3500	1588	1.40	36	3500	44.1	0.40	Black*	27/8	41/8	9	12	51/4	7	1	41/4	33/4	10.0+	3.5
	2-4200	4200	1905	1.40	36	4200	52.9	10	Yellow*	73	105	229	305	133	178	25	108	95	10.0+	2.9
	4-5400	5400	2449	1.40	36	5400	68.0		Yellow										10.0+	5.0
PCDNHSS-	4-7000	7000	3175	1.40	36	7000	88.2	0.40	Black*	27/8	41/8	7	15	87/8	7	11/4	41/2	6	8.4	3.9
	4-8400	8400	3810	1.40	36	8400	105.8	10	Yellow*	73	105	178	381	225	178	32	114	152	7.0	3.2
	4-9540	9540	4327	1.40	36	9540	120.2		Yellow**										6.2	2.8
RWDNHS-	4-10600	10600	4808	1.40	36	10600	133.6	0.40	Red*	27/8	41/8	7	15	87/8	7	11/4	41/2	6	5.5	2.6
	4-11740	11740	5325	1.40	36	11740	147.9	10	Red**	73	105	178	381	225	178	32	114	152	5.0	2.3

All springs have additional travel to solid equal to 50% of Rated Deflection. LDS elements have straight line deflection curves.
*with Red inner spring **with Green inner spring †includes double deflection LDS element. ††applies to spring only.
+10.0 indicates a rating of 10 G's or greater

2"(51mm) DEFLECTION B, B2, C2 & MULTIPLE C2 SPRING and DOUBLE DEFLECTION LDS HANGERS

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 OD	Free Height	LRP– Lower Rod Penetration MRD– Max. Rod Diameter D	H	W	LRP	REX– Rod Extension URP– Upper Rod Extension MRD	REX	URP	Vertical G Ratings Tension	Compression
	B-20	20	9	2.75	70	8	0.13		Tan										10.0+	10.0+
	B-26	26	12	2.53	64	12	0.19		White/Bl										10.0+	10.0+
	B-35	35	16	2.55	65	16	0.25		Purple										10.0+	10.0+
	B-50	50	23	2.55	62	24	0.35	0.35	White/Rd	23/8	4	4	9	43/4	51/8	3/4	21/4	3	10.0+	10.0+
2"	B-65	65	29	2.45	62	31	0.47	9	Brown	60	102	102	229	121	130	19	57	76	10.0+	10.0+
51mm	B-85	85	39	2.45	62	40	0.63		White/Blk										10.0+	10.0+
Defl.	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		Orange										10.0+	10.0+
	B2-210	210	95	2.47	63	99	1.51		Silver										10.0+	10.0+
	B2-290	290	132	2.35	60	144	2.20	0.35	Blue	23/8	41/2	4	9	43/4	51/8	3/4	21/4	3	10.0+	8.0
	B2-450‡	450	204	2.35	60	224	3.40	9	Tan	60	114	102	229	121	130	19	57	76	10.0+	5.1
DNHS-	B2-680‡	680	308	2.35	60	340	5.13		Gray										10.0+	3.4
	C2-125	125	57	2.90	74	50	0.77		Purple										10.0+	10.0+
	C2-170	170	77	2.80	71	70	1.08		Brown										10.0+	10.0+
	C2-210	210	95	2.70	69	90	1.38		Red										10.0+	10.0+
	C2-260	260	118	2.60	66	120	1.79		White										10.0+	10.0+
PCDNHS-	C2-330	330	150	2.40	61	165	2.46		Black										10.0+	10.0+
	C2-460	460	209	2.40	61	230	3.43	0.40	Blue	27/8	5	4	11	51/4	51/4	7/8	21/4	31/4	10.0+	10.0+
	C2-610	610	277	2.40	61	305	4.54	10	Green	73	127	102	279	133	133	22	57	83	10.0+	10.0+
	C2-880‡	880	399	2.40	61	440	6.54		Gray										10.0+	8.3
	C2-1210‡	1210	349	2.40	61	605	5.72		Silver										10.0+	6.0
PCDNHSS-	C2-1540‡	1540	699	2.40	61	770	11.5		Gray*										10.0+	4.7
	C2-1870‡	1870	848	2.40	61	935	13.9		Silver*										9.4	3.9
	2-C2-2420‡	2420	1098	2.40	61	605	18.0		Silver										10.0+	5.1
	2-C2-3080‡	3080	1397	2.40	61	770	22.9	0.40	Gray*	27/8	5	9	12	51/4	6	1	41/4	33/4	10.0+	4.0
RWDNHS-	2-C2-3740‡	3740	1696	2.40	61	935	27.8	10	Silver*	73	127	229	305	133	154	25	108	95	10.0+	3.3
	4-C2-3520‡	3520	1597	2.40	61	440	26.2		Gray										10.0+	7.7
	4-C2-4840‡	4840	2195	2.40	61	605	36.0	0.40	Silver	27/8	5	7	15	87/8	8	11/4	41/2	6	10.0+	5.6
	4-C2-6160‡	6160	2794	2.40	61	770	45.8	10	Gray*	73	127	178	381	225	203	32	114	152	9.5	4.4
	4-C2-7480‡	7480	3393	2.40	61	935	55.6		Silver*										7.8	3.6

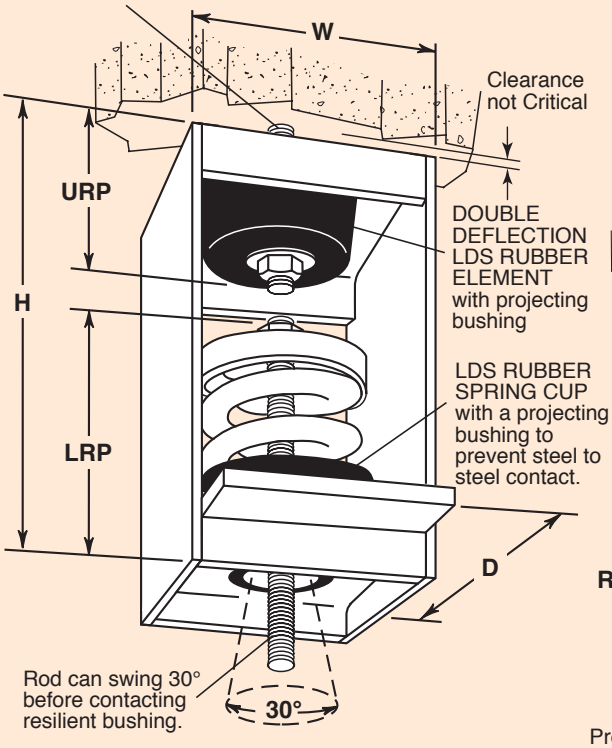
All springs without "‡" have additional travel to solid equal to 50% of Rated Deflection. LDS elements have straight line deflection curves.
*with Red inner spring +10.0 indicates a rating of 10 G's or greater

†includes double deflection LDS 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)	(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										

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

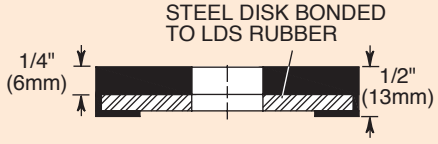
30N-100 FOR ROD ATTACHMENT



NOTE –

Illustration shows typical construction. Components vary depending on capacity.

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



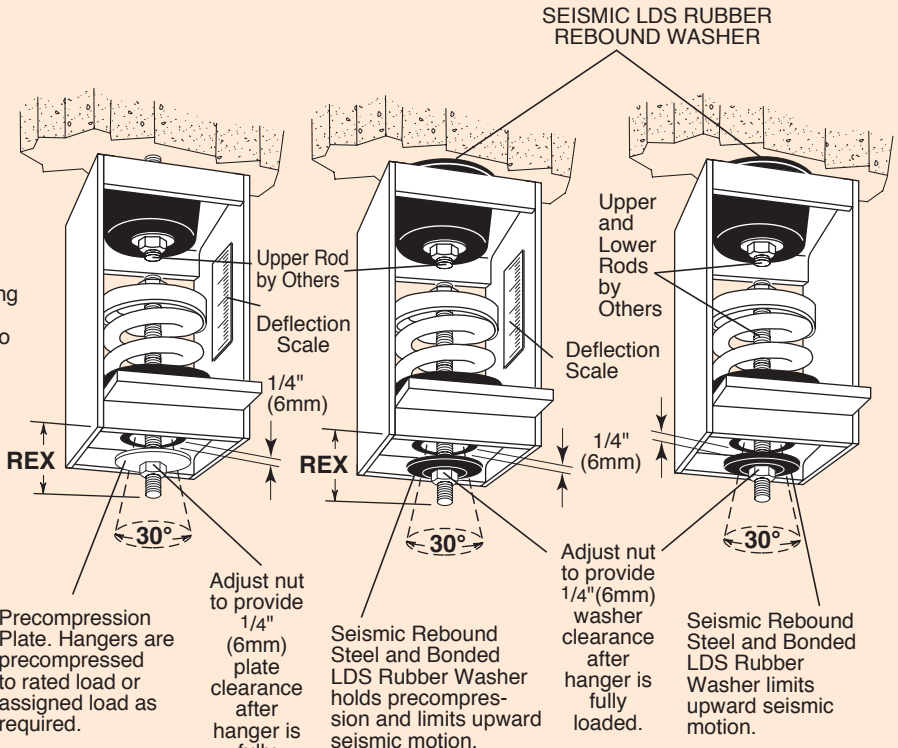
Upper & Lower Seismic Rebound Washer

PC30N-100
TYPE 30N-100 PRECOMPRESSED

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

RW30N-100
TYPE 30N-100 SEISMIC RESTRAINT

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 OD	Spring Only Free Height	LRP– Lower Rod Penetration MRD– Max. Rod Diameter SRD– Min. Rod Diameter REX– Rod Extension URP– Upper Rod Extension D	H	W	LRP	MRD	SRD	REX	URP	Vertical G Ratings Tension	Vertical G Ratings Compression
	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+
2"	103	310 141	2.90 74	125 1.91		Pink	33/4 95	53/4 146									10.0+	10.0+
51mm	104	500 227	2.90 74	200 3.07	0.40	Green	33/4 95	53/4 146	5 127	131/2 343	6 152	71/2 191	7/8 22	5/8 16	41/2 114	31/4 83	10.0+	10.0+
Defl.	105	740 336	2.80 71	310 4.73	10	Red	33/4 95	53/4 146									10.0+	7.2
	106	1050 476	2.50 64	500 7.44		White	33/4 95	57/8 149									8.0	5.1
30N-	107	1400 635	2.40 61	700 10.4		Blue	33/4 95	57/8 149									6.0	3.8
	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
PC30N-	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
	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
PC30NS-	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
	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
RW30N-	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.

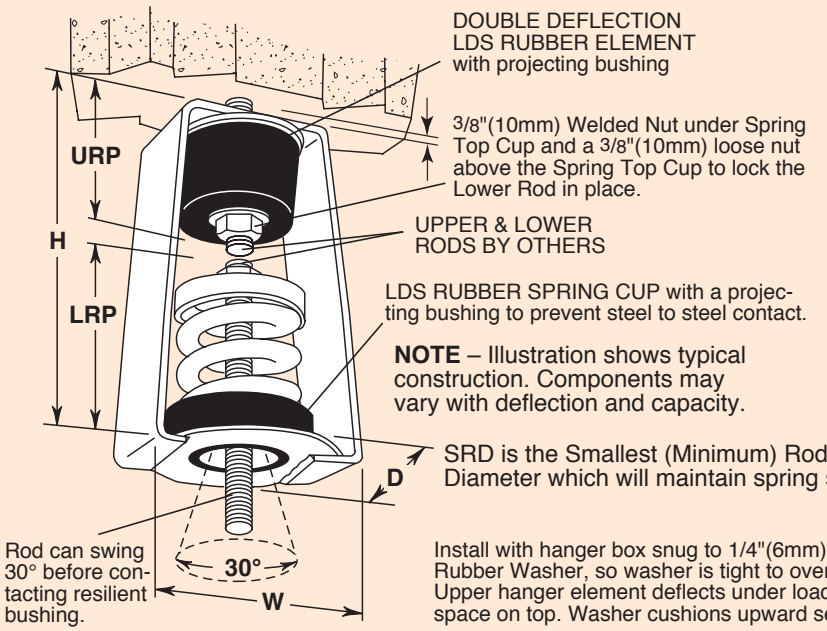
Ratings & Dimensions for 3"(76mm), 4"(102mm) & 5"(127mm) Deflection Spring and Double Deflection LDS Hangers (inches mm)

Type	Size	Rated Capacity (lbs) (kg)	Rated Defl.† (in)(mm)	Spring Constant†† (lbs/in) (kg/mm)	Average Defl LDS Rubber	Spring Color/ Stripe	Spring Only OD	Spring Only Free Height	LRP– Lower Rod Penetration MRD– Max. Rod Diameter SRD– Min. Rod Diameter D	H	W	LRP	REX– Rod Extension URP– Upper Rod Extension MRD	SRD	REX	URP	Vertical G Ratings Tension	Com-pression
	See 3" 76mm Low Capacity Hangers Page 12																	
3" 76mm Defl. 30N- PC30N- PC30NS- RW30N-	126	195 88	3.65 93	60 0.95	0.40 10	Purple	33/4 95	63/8 162	5 127	131/2 343	6 152	8 203	7/8 22	5/8 16	41/2 114	31/4 83	10.0+	10.0+
	127	280 127	3.65 93	85 1.37		Brown	33/4 95	61/2 165									10.0+	10.0+
	128	390 177	3.65 93	120 1.90		Orange	4 102	61/2 165									10.0+	10.0+
	129	520 236	3.65 93	160 2.54		Green	4 102	7 178	5 127	131/2 343	6 152	81/2 216	7/8 22	5/8 16	41/2 114	31/4 83	10.0+	10.0+
	130	710 322	3.65 93	220 3.46		Red	41/2 114	71/4 184	6 152	153/8 391	71/4 184	101/4 260	7/8 22	5/8 16	41/2 114	31/4 83	10.0+	10.0+
	131	940 426	3.65 93	290 4.58	0.40 10	White	41/2 114	71/2 191	6 152	153/8 391	71/4 184	11 279	7/8 22	5/8 16	41/2 114	31/4 83	10.0+	9.3
	132	1280 581	3.65 93	395 6.25		Blue	5 127	77/8 200	6 152	153/8 391	71/4 184	111/4 286	7/8 22	5/8 16	41/2 114	31/4 83	8.0	6.8
	133	1770 803	3.65 93	545 8.63	0.40 10	Black	51/2 140	91/4 235	71/2 191	171/2 445	81/4 210	121/4 311	7/8 22	3/4 19	41/2 114	31/4 83	5.6	5.6
	134	2490 1129	3.65 93	765 12.1		Yellow	51/2 140	91/4 235									4.0	4.0
	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 10	Blue/ Brown	63/4 171	93/4 235	8 203	20 508	9 229	14 356	7/8 22	7/8 22	5 127	31/2 89	7.0	2.1
	137	6200 2818	3.65 93	1900 30.2	0.40 10	Blue/Or	73/4 197	107/8 276	9 229	24 610	11 279	16 406	11/8 29	1 25	51/2 140	61/2 165	2.7	1.5
	138	8300 3765	3.65 93	2560 40.5		Blue/Rd	73/4 197	11 279									2.0	1.1
	139	11400 5171	3.65 93	3500 55.6	0.40 10	Blue/Wt	73/4 197	121/4 311	9 229	251/2 648	11 279	171/2 445	11/8 29	1 25	51/2 140	61/2 165	3.0	0.65
	See 4" 102mm Low Capacity Hangers Page 12																	
4" 102mm Defl. 30N- PC30N- PC30NS- RW30N-	150	240 109	4.78 121	55 0.16	0.40 10	Purple	5 127	83/8 213	6 152	153/8 391	71/4 184	11 279	7/8 22	5/8 16	5 127	31/4 83	10.0+	10.0+
	151	330 150	4.78 121	75 1.24		Brown	5 127	81/2 213									10.0+	10.0+
	152	420 191	4.78 121	95 1.58		Orange	5 127	83/8 213									10.0+	10.0+
	153	530 240	4.78 121	120 1.98		Green	5 127	83/8 213									10.0+	10.0+
	154	680 308	4.78 121	155 2.55	0.40 10	Red	6 152	87/8 225	71/2 181	171/2 445	81/4 210	131/4 337	7/8 22	5/8 16	5 127	31/4 83	10.0+	10.0+
	155	880 399	4.78 121	200 3.30		White	6 152	91/8 232									10.0+	10.0+
	156	1120 508	4.78 121	255 4.20		Blue	6 152	97/8 251									8.9	8.9
	157	1420 644	4.78 121	325 5.32		Black	6 152	10 254									7.0	7.0
	158	1840 835	4.78 121	420 5.32	0.40 10	Yellow	63/4 171	103/8 264	8 203	20 508	9 229	141/4 362	7/8 22	5/8 16	5 127	31/4 83	10.0+	5.2
	159	2370 1075	4.78 121	540 6.90		Gray	63/4 171	111/8 283									10.0+	4.0
	160	3000 1361	4.78 121	695 11.3	0.40 10	Blue/Br	73/4 197	107/8 276	9 229	24 610	11 279	17 432	11/8 29	3/4 19	51/2 140	61/2 165	6.5	3.0
	161	3900 1769	4.78 121	895 14.6		Blue/Rd	73/4 197	113/8 289	9 229	24 610	11 279	17 432	11/8 29	3/4 19	61/2 165	61/2 165	5.0	2.3
	162	5100 2313	4.78 121	1155 19.5	0.40 10	Blue/Or	83/4 222	111/2 292	91/2 241	261/2 673	121/4 311	19 483	11/8 29	1 25	61/2 165	61/2 165	6.6	1.3
	163	6500 2948	4.78 121	1485 24.4		Blue/Wh	83/4 222	131/4 337									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
	165	10800 4899	4.78 121	2455 40.5	0.40 10	Blue/Gy	93/8 238	141/8 359	10 254	28 711	121/4 311	21 533	11/8 29	1 25	61/2 165	61/2 165	4.0	0.6
5" 127mm Defl. 30N- PC30N- PC30NS- RW30N-	174	270 122	5.71 145	50 0.84	0.40 10	Purple	6 152	97/8 251	7 178	16 406	91/4 235	121/2 318	3/4 19	5/8 16	5 127	31/4 83	10.0+	10.0+
	175	320 145	5.71 145	60 1.00		Brown	6 152	101/16 256									10.0+	10.0+
	176	370 168	5.71 145	70 1.16		Orange	6 152	10 254									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
	179	670 304	5.78 147	125 2.07	0.40 10	White	63/4 171	111/16 281	8 203	19 483	10 254	15 381	3/4 19	5/8 16	51/2 140	31/2 89	10.0+	10.0+
	180	830 376	5.78 147	155 2.56		Blue	63/4 171	113/8 289									10.0+	10.0+
	181	1000 454	5.78 147	185 3.09		Black	63/4 171	111/8 283									10.0+	9.1
	182	1240 562	5.77 147	230 3.82		Yellow	63/4 171	113/8 289									10.0+	7.3
	183	1500 680	5.77 147	280 4.63	0.40 10	Gray	73/4 197	127/16 316	9 229	21 533	111/4 286	17 432	7/8 22	3/4 19	6 152	31/2 89	10.0+	6.0
	184	1830 830	5.77 147	340 5.65		Pink	73/4 197	117/8 302									10.0+	4.9
	185	2230 1012	5.77 147	415 6.88		Silver	73/4 197	12 305									10.0+	4.0
	186	2710 1229	5.77 147	505 8.36		Tan	73/4 197	123/4 324									9.0	3.3
	187	3300 1497	5.77 147	615 10.2	0.40 10	Blue/Or	83/4 222	123/4 324	91/2 241	261/2 673	121/4 311	19 483	7/8 22	7/8 22	6 152	61/2 165	10.0+	2.1
	188	4100 1860	5.77 147	755 12.7		Blue/Rd	83/4 222	133/8 340									9.6	1.7
	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 10	Blue/Yel	91/2 241	145/8 371	10 254	28 711	121/4 311	21 533	11/8 29	1 25	61/2 165	61/2 165	7.3	1.1
	191	7300 3311	5.77 147	1365 22.5		Blue/Sil	91/2 241	153/16 386									6.0	0.85
	192	9000 4082	5.77 147	1670 27.8	0.40 10	Blue/Gy	101/4 260	155/8 397	101/2 267	30 762	131/4 337	23 584	11/8 29	1 25	61/2 165	61/2 165	3.7	0.6
	193	11000 4990	5.77 147	2040 34.0		Blue/Tn	101/4 260	16 406									3.0	0.5

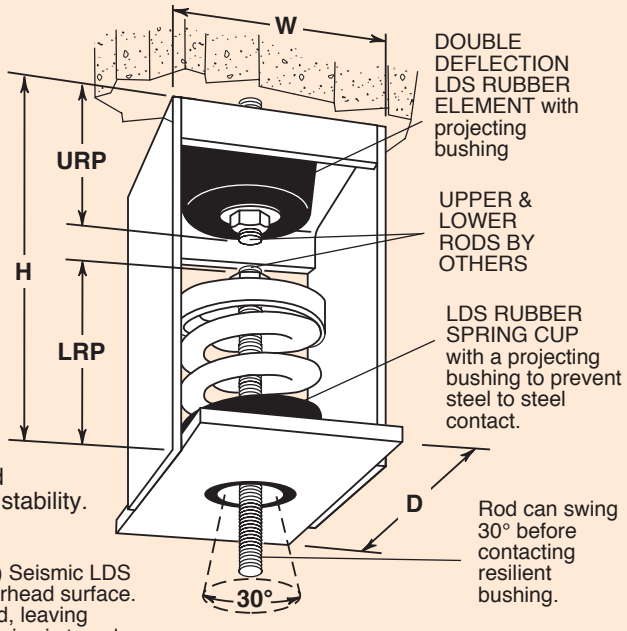
All springs have additional travel to solid equal to 50% of Rated Deflection. LDS elements have straight line deflection curves.
†includes double deflection LDS element. ††applies to spring only. +10.0 indicates a rating of 10 G's or greater.

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

30N-1000 3" FOR ROD ATTACHMENT

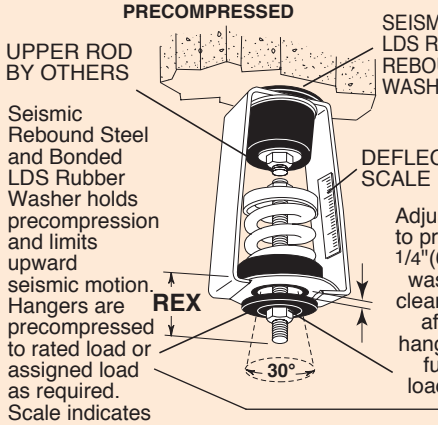


30N-1000 4" FOR ROD ATTACHMENT

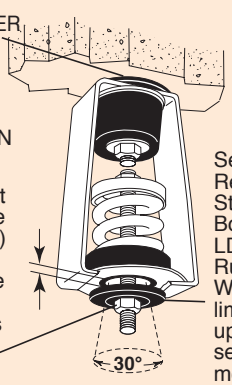


Install with hanger box snug to 1/4"(6mm) Seismic LDS Rubber Washer, so washer is tight to overhead surface. Upper hanger element deflects under load, leaving space on top. Washer cushions upward seismic travel.

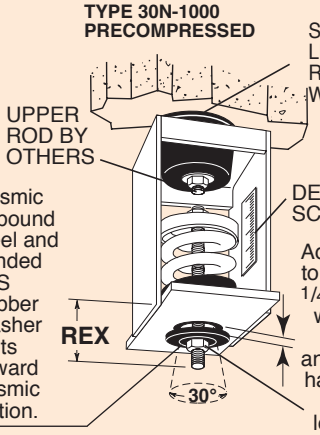
PC30NS-1000 3" TYPE 30N-1000 PRECOMPRESSED



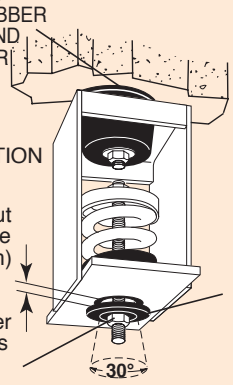
RW30N-1000 3" TYPE 30N-1000 SEISMIC RESTRAINT



PC30NS-1000 4" TYPE 30N-1000 PRECOMPRESSED



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



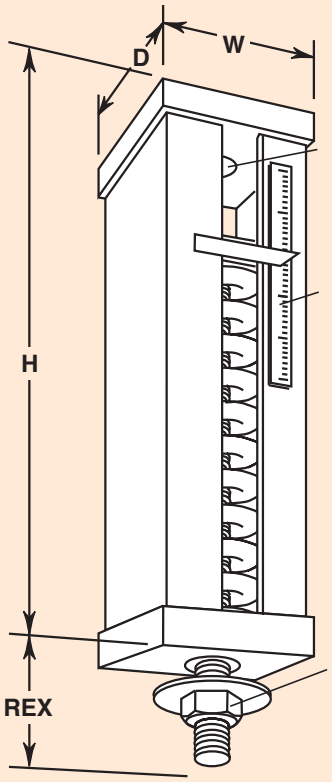
For washer details see page 5

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 OD	Spring Only Free Height	D	H	W	LRP	MRD	SRD	REX	URP	Vertical G Ratings Tension	Vertical G Ratings Compression
3"	1082	15 7		5 0.09	Silver/Red		5 127									10.0+	10.0+
76mm	1083	24 11		8 0.14	Silver/Blue		5 1/8 130									10.0+	10.0+
Defl.	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+
30N-	1086	60 27	3.40	20 0.35	Grey	2 7/8	5 1/4 133	4 3/4	10	5 1/4	7	3/8	3/8	2 3/4	2	10.0+	10.0+
	1087	75 34	86	25 0.45	Blue	73	5 1/4 133	120	254	133	178	10	10	70	51	10.0+	10.0+
PC30N-	1088	111 50		37 0.66	Green		5 1/4 133									10.0+	10.0+
PC30NS-	1089	150 68		50 0.90	Purple		5 1/2 140									10.0+	10.0+
	1090	195 89		65 1.17	Tan		5 7/8 149									10.0+	9.0
RW30N-	1091	270 123		90 1.62	Yellow		6 152									10.0+	6.5
4"	1006	50 23		11 0.19	Black/Brown		7 1/4 184									10.0+	10.0+
102mm	1007	65 29		15 0.24	Black/Orange		7 3/8 187									10.0+	10.0+
Defl.	1008	80 36	4.78	18 0.30	Black/Green	4 1/2	7 1/2 191	6	14	7 1/4	10	3/4	5/8	5	3 1/4	10.0+	10.0+
	1009	100 45	114	23 0.37	Black/Red	114	7 5/8 194	152	356	184	254	19	16	127	83	10.0+	10.0+
30N-	1010	130 59		30 0.49	Black/White		7 3/4 197									10.0+	10.0+
PC30NS-	1011	160 73		37 0.60	Black/Yellow		8 203									10.0+	10.0+
RW30N-	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					
	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	3 1/2	15 3/4	4	6	5/8
	A-310	310 141	4.00 102	78 1.38	Yellow	89	400	102	152	16
	A-400	400 181	4.00 102	100 1.77	Green					
	A-510	510 231	4.00 102	128 2.26	Red					
	A-625	625 283	4.00 102	156 2.77	White					
	B-750	750 340	4.50 114	167 2.98	White	4	20 1/2	4 1/2	5 1/2	3/4
	B-1000	1000 454	4.00 102	250 4.45	Blue	102	521	114	140	19
	C-1350	1350 612	4.00 102	338 6.00	Yellow					
	C-1750	1750 794	4.00 102	438 7.78	Black					
	C-2100	2100 953	4.00 102	525 9.34	Yellow*	4	20 1/2	4 1/2	5 1/2	3/4
	C-2385	2385 1082	4.00 102	596 10.61	Yellow**	102	521	114	140	19
	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.

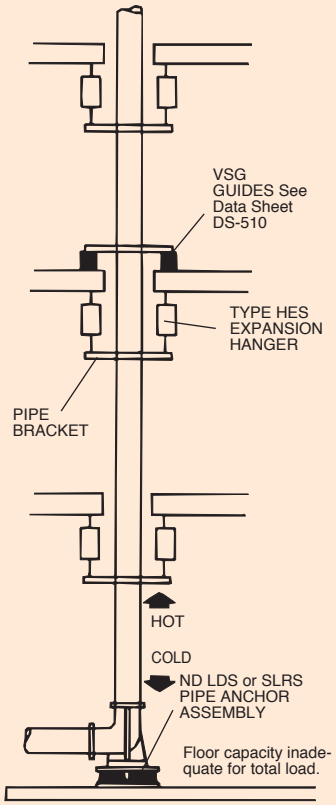
Special larger deflection hangers would be even more effective. In handling this type of problem, it is preferable to anchor the riser at the center of the run. If this had been done in the piping problem described above, each end would have expanded outward only 0.7"(18mm) instead of the 1.4"(36mm).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

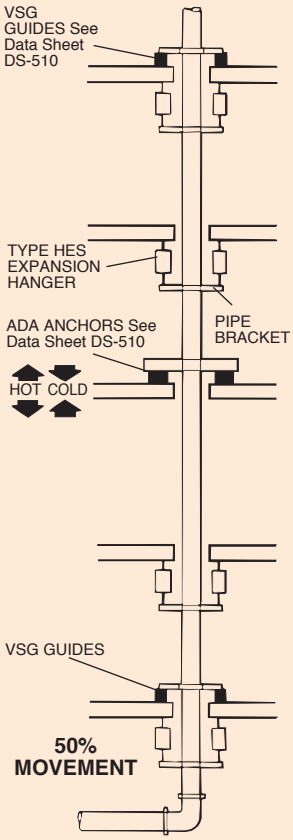
6"(152mm) Schedule 40 piping weighing 36 pound per foot(4.94kg/m) with water. The run of 120 feet(37m) would weight a total of 4320 pounds (1960 kgs). If the piping is anchored at the center we might select support points at the lower end, the 30 foot(9m) and 90 foot(27m) marks and at the top. Therefore, 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).

100% MOVEMENT



PIPE ANCHORED AT ONE END

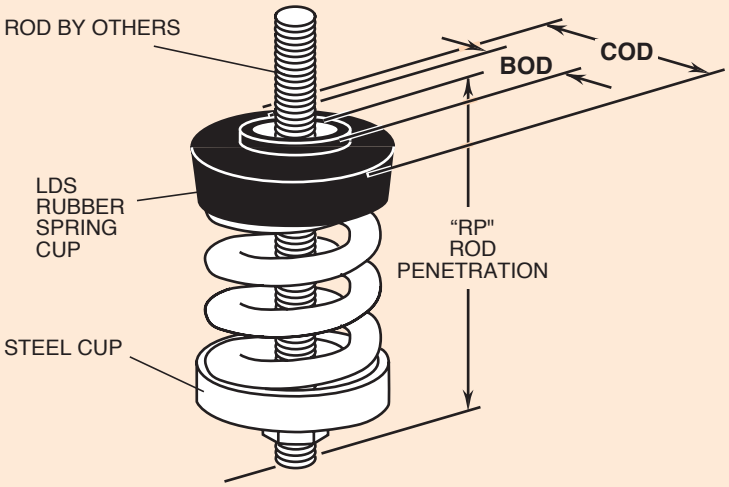
50% MOVEMENT



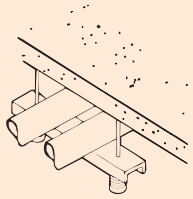
PIPE ANCHORED AT MID POINT

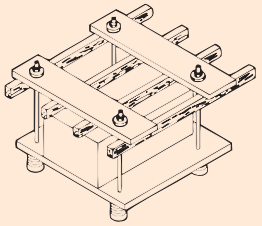
Piping installed at ambient temperature, expansion movement is directed away from the anchor at higher steam or water temperatures and toward the anchor when chilled water is circulated.

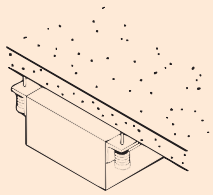
IM 1"(25mm) DEFLECTION SIMPLE SPRING HANGERS

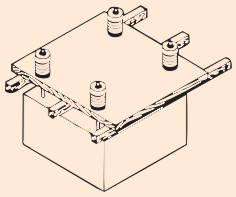


TYPICAL IM EQUIPMENT INSTALLATION AND PIPE HANGER ARRANGEMENTS


Pipe Trapeze


Cradled Unit


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 Defl. (in) (mm)	Spring Constant (lbs/in) (kg/mm)	Spring Color	Spring Only OD	Spring Only Free Height	Bushing Outside Dia. BOD	Cup Outside Dia. COD	Max. Rod Dia MRD	Rod Penetration RP
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	1 3/4 44	3 3/8 86	1 1/4 32	2 1/2 64	1/2 13	3 3/4 95
	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	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 24.5	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