ACTOM

MECHANICAL EQUIPMENT

Products

Air Conditioning & HVAC

Hangers

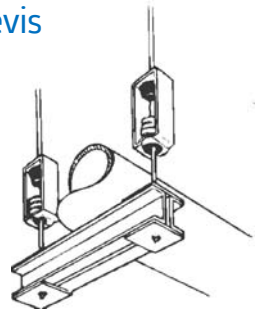
ARNOT

Vibration & Rubber
Engineering Solutions

Introduction into Hangers

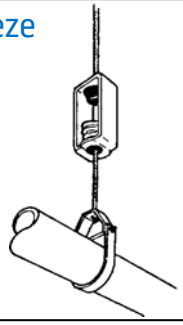
Hangers are an effective way of isolating noise and vibration in pipe work from the ceiling or structure from which the piping is suspended. They are also used to support and isolate equipment such as axial fans, air handling units, ducts and acoustic ceilings.

Clevis



One method of hanging a pipe uses *clevis pipe clamps*. Another method is to support the piping on a *trapeze* and share the load between two hangers. This may be convenient or economical for supporting large diameter pipes or two or more parallel pipes, or equipment such as a ceiling-hung fan.

Trapeze

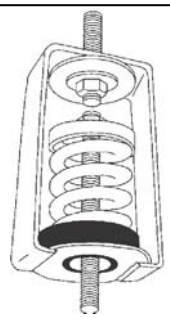


The same principles apply for hangers as for mountings. The higher the deflection of the resilient element, steel spring, rubber or both, the higher the efficiency of vibration isolation which is the same as saying the lower the transmissibility.

Type HD

Mason Type *HD Hangers* use rubber elements capable of deflections of 5 to 10mm. They can be used for supporting equipment operating at relatively high speed, not less than 1000 rpm, and for treating pipe vibration in non-critical areas. Their main function is noise isolation.

Type HS



For isolating vibration *Spring Hangers* are recommended. The original range of Mason hangers was called *Type HSA, B or C*, using the same range of 25mm deflection springs as the SLFA, B and C range of mountings. These springs are very stable and even if accidentally so overloaded as to go solid they will not be overstressed.

Type DNHS A,B,C

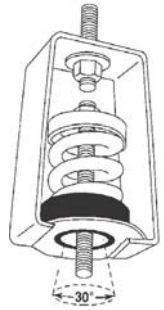
Mason Industries has always been the leading and most innovative vibration company in the United States and about 30 years ago they introduced the idea of achieving higher efficiency and improving noise isolation by putting a rubber element in series with a steel spring, and this range was designated *Type DNHSA, B or C.*

Introduction into Hangers

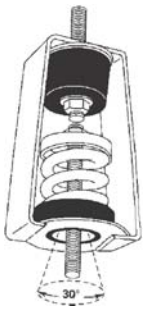
In those days, 30 years ago, it was not uncommon for hanger installations to perform below expectations, especially in plant rooms. Almost invariably the reason was that, due to poor workmanship, or something getting in the way, the hanger rods were not or could not be installed vertically. When this was the case it did not require much angularity for the lower rod to touch the bottom of the hanger cage, and this short-circuited the spring altogether. Instead of the vibration being directed into the compressed spring where its energy, or most of it, could be stored there was a direct path from the lower rod to the hanger cage.

Initially the problem was tackled by locating the spring in a rubber cup with a projecting lip so that any contact was metal to rubber instead of metal to metal. However this did not really solve the rod angularity problem - the springs could still be short-circuited even if metal to metal contact was prevented.

Type 30



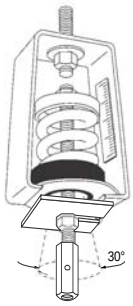
Type 30N



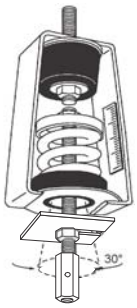
Mason solved this problem by designing a new range of low-profile springs especially for use in hangers, with the characteristic that the rod could swing through a full arc of 30° before touching the rubber lip. For this reason the new hanger range was designated *Type 30*, or with the extra rubber element on top *Type30N*, and *these are always our first recommendation if there is any possibility that the hanger rods may not hang vertically.*

The *PC Range* of hangers was a further development. In conventional hangers the springs will of course deflect as soon as they are loaded. With this flexibility it is quite difficult for the piping contractor to get the installation right, with the piping horizontal, the springs equally compressed and the pipe clamps located vertically below the hangers. In the case of hot or chilled water piping, it is difficult to know how much load has been put onto pump flanges, since the piping was empty when it was hung. It takes some skill to adjust the springs to take up the additional water load.

Type PC30



Type PC30N



Type *PC Hangers* have a simple arrangement, by means of a slotted plate and locknut, for preloading springs at 80% of their rated load. At any load below this the springs are effectively solid as the piping is installed, making accurate installation much easier. If the final weight is slightly less than the 80% pre-load it will require a little slackening of the locknut to release and remove the slotted plate and free the spring. If the final weight is slightly more than the 80% pre-load the slotted plate and spring will come free automatically. Either way the piping or equipment movement will be small as the springs take over the entire load.

We recommend the use of PC30 or PC30N hangers for the three or four hanger positions nearest to a pump or other equipment.

ARMOT

Introduction into Hangers

SPRING HANGER SELECTION

Decide on the positioning and spacing of all hangers. Then work out the load at each hanger using the weight per meter of the relevant pipe sizes (with water and insulation if applicable) from the following

Size [mm]	Approximate Weight per Meter [kg]		
	Pipe	Pipe and Water	Pipe, Water & Insulation
50	5	7	9
65	9	12	14
80	11	16	18
100	16	24	27
125	22	35	38
150	28	47	51
200	43	76	82
250	61	112	119
300	81	154	163

EXAMPLE

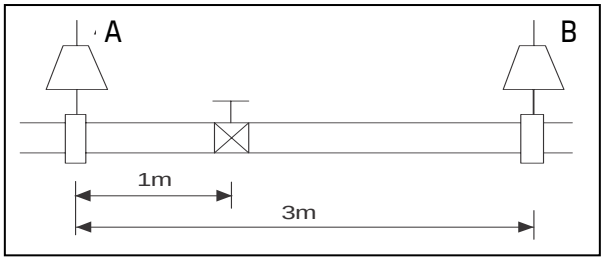
150 mm diameter piping with water and insulation weighs 51 kg per meter. If a run of this piping is supported by hangers at 3 meter spacing the load will be 153 kg per hanger.
Refer to the Load Rating Tables on the following pages. Here are 3 correct selections for 153 kg.

Hanger	Rated Capacity [kg]	Spring Rate [kg/mm]	Deflection at 153 kg Load [mm]
HSB-450	207	6.3	24
HSC-435	200	5.1	30
30-445	200	6.2	35

- Choose HSB-450 for best price, HSC-435 for best efficiency or 30-445 to ensure no short-circuiting (especially in a crowded plant room).
- For additional efficiency and noise reduction, step up to DNHSB-450, or DNHSC-435, or 30N-445.
- Consider also PC hangers close to equipment or wherever the pre-compression (solid rod) feature will facilitate installation.
- Of course allowances have to be made for flanges, bends, tees, valves, strainers, etc. Specifications differ - refer to suppliers for weights. These additional weights have to be apportioned to adjacent hangers.

EXAMPLE

If the pipe run referred to above had a valve weighing 90 kg located as shown below then the additional load on hanger A would be 60 kg (90 x 2/3) and on hanger B 30 kg (90 x1/3). Then the total load at A would be 213 kg and at B 183 kg.

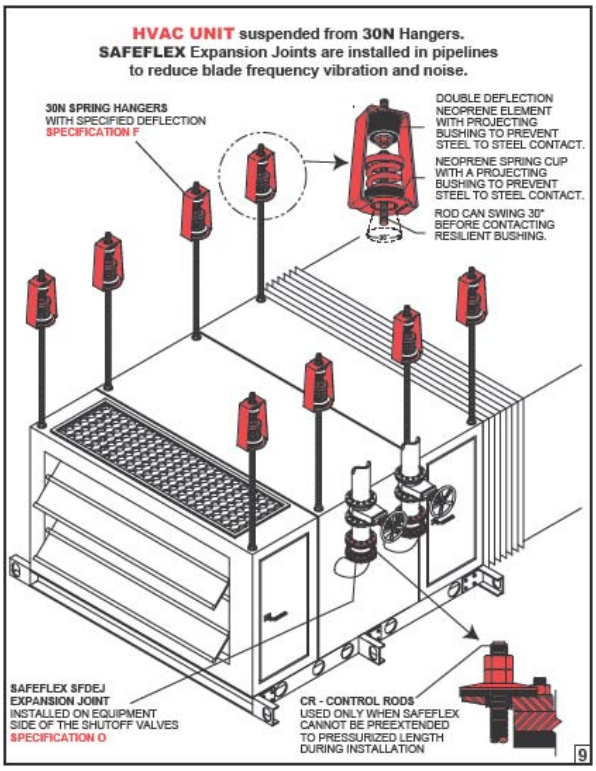


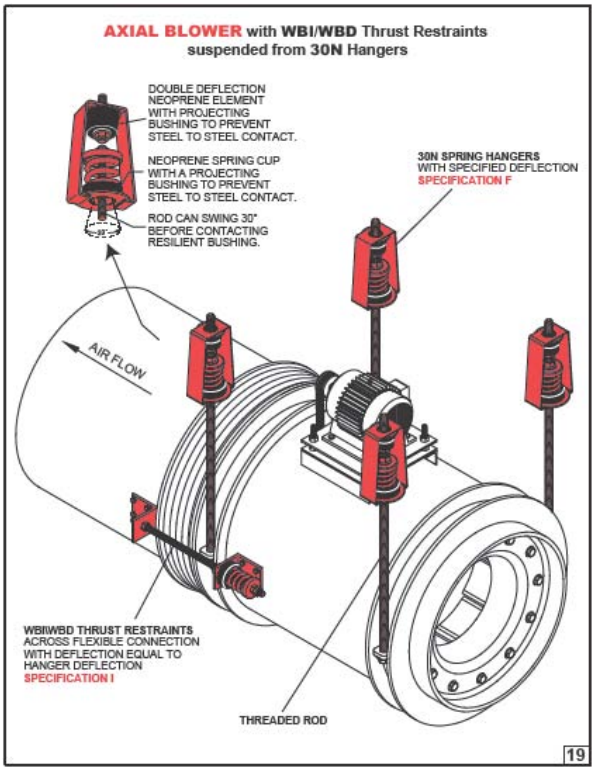
- At tee-junctions the additional weight of the tee and any adjacent equipment will need to be distributed between three hangers, according to their distances from the tee.

PC Pre-compression Option

PC hangers are supplied with a short length of threaded rod and a slotted steel plate which are used to preload the spring. By compressing the spring to 80% of its rated deflection the hanger rod is locked at or close to its working elevation while the piping is being installed and until it is ready for commissioning. The installation can proceed as if the rods were solid without the inconvenience of the pipe sagging during installation. When the pipe work is being filled with water the load on the PC plate will decrease until the nut comes free, or nearly free, and the plate can be removed.

Introduction into Hangers





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Type HS and PCHS Spring Hangers

Selection Table

Type	Size	Rated Capacity [kg]	Rated Deflection [mm]	Spring Rate [kg/mm]	Spring Color
HSA	45	20	40	0.5	Blue
	75	34	38	0.9	Orange
	125	56	33	1.7	Red
	200	90	29	3.1	Black
	310	150	25	6.1	Yellow
HSB	60	27	54	0.5	Grey
	140	64	49	1.3	Orange
	280	128	40	3.2	Green
	450	207	33	6.3	Red
	750	340	30	11.3	White
	1000	450	25	18.0	Blue
HSC	225	100	45	2.2	Orange
	435	200	39	5.1	Grey
	735	320	35	9.2	White
	1000	445	26	17.2	Black
HSC	1350	615	25	24.6	Yellow
	1675	765	25	30.6	Yellow[1]
	2100	950	25	38.0	Yellow[2]

1 with grey inner spring
2 with red inner spring

All hangers can be tagged for identification, if specified

LR = Allowance for length of lower rod above base of hanger – our supply only with PCHS

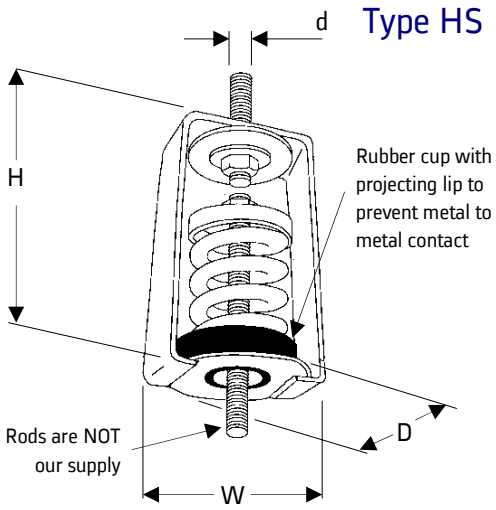
d = Rod diameter. First size shown is standard. Sizes in brackets are optional. Standard size will be supplied unless optional is specified.

RE = Rod extension – base of hanger to centre off rod coupling – our supply

CL = Length of rod coupling – our supply. HSD or PCHSD (2 springs) and HSE or PCHSE (4 springs) can be supplied for capacities up to 3800 kg. Dimensions are not published because they can be changed to meet the customer's particular requirements.

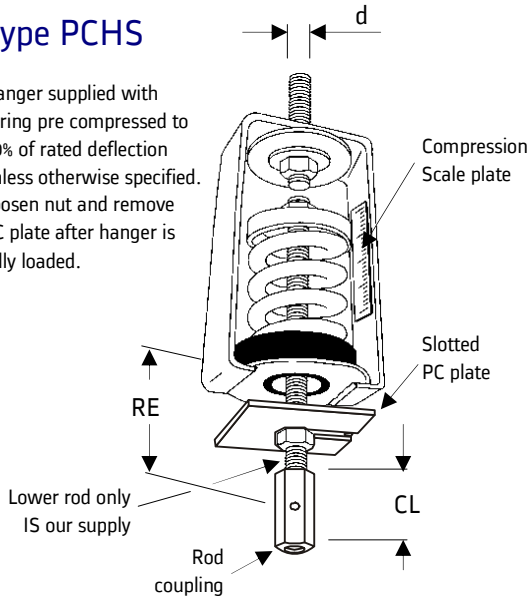
Pre compression equipment comprises of slotted PC plate, threaded rod, top nut and lock nut, bottom nut, rod coupling and scale plate

Type HS



Type PCHS

Hanger supplied with spring pre compressed to 80% of rated deflection unless otherwise specified. Loosen nut and remove PC plate after hanger is fully loaded.



Dimensions in mm

Type	Size	H	W	D	LR	d	PCHS only	
							RE	CL
HSA	45 – 310	130	83	50	100	M10	105	45
HSB	60 – 450	180	120	50	135	M12 (M16)	110	45 (50)
HSB	750 – 1000	180	120	50	135	M16 (M12)	110	50 (45)
HSC	225 435	190	135	65	135	M12 (M16)	110	45 (50)
HSC	735 – 1000	190	135	65	135	M16 (M12)	110	50 (45)
HSC	1350	190	135	65	140	M20	120	50
HSC	1675 - 2100	190	135	65	145	M20	120	50

Type DNHS and PCDNHS Spring Hangers

Selection Table

Type	Size	Rated Capacity [kg]	Rated Deflection [mm]	Spring Rate [kg/mm]	Spring Color	Average Rubber Deflection [mm]
DNHSA	45	20	40	0.5	Blue	4
	75	34	38	0.9	Orange	4
	125	56	33	1.7	Red	4
	200	90	29	3.1	Black	4
	310	152	25	6.1	Yellow	4
DNHSB	140	64	49	1.3	Orange	4.5
	280	128	40	3.2	Green	4.5
	450	207	33	6.3	Red	4.5
DNHSB	750	340	30	11.3	White	5
	1000	450	25	18.0	Blue	5
DNHSC	225	100	45	2.2	Blue	5.5
	435	200	39	5.1	Grey	5.5
	735	320	35	9.2	White	5.5
	1000	445	26	17.2	Black	5.5
DNHSC	1350	615	25	24.6	Yellow	6.5
	1675	765	25	30.6	Yellow[1]	6.5
	2100	950	25	38.0	Yellow[2]	6.5

1 with grey inner spring
2 with red inner spring

All hangers can be tagged for identification, if specified

LR = Allowance for length of lower rod above base of hanger – our supply only with PCDNHS

UR = Allowance for length of upper rod below top of hanger – not our supply

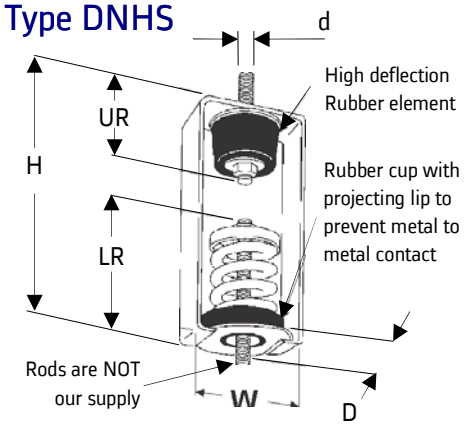
d = Rod diameter. First size shown is standard. Sizes in brackets are optional. Standard size will be supplied unless optional is specified.

RE = Rod extension – base of hanger to centre of rod coupling – our supply

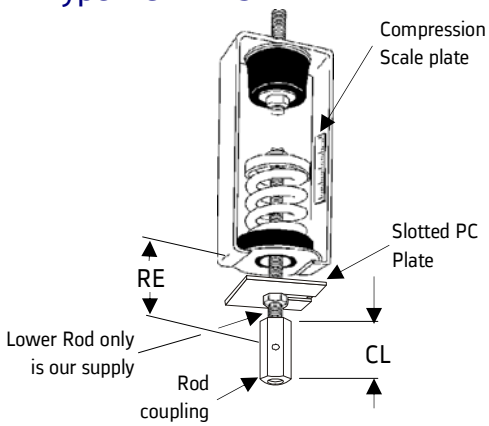
CL = Length of rod coupling – our supply.

DNHSD or PCDNHSD (2 springs) can be supplied for capacities up to 1900 kg. Dimensions are not published because they can be changed to meet the customer's particular requirements.

Type DNHS



Type PCDNHS



Hanger supplied with spring pre-compressed to 80% of rated deflection, unless otherwise specified. Loosen nut and remove PC plate after hanger is fully loaded.

Prefix PC is used when pre-compression option is required.
Pre compression equipment comprises of slotted PC plate, threaded rod, top nut and lock nut, bottom nut, rod coupling and scale plate

Dimensions in mm

Type	Size	H	W	D	LR	UR	d	PCHS only	
								RE	CL
DNHSA		170	83	50	100	55	M10	105	45
DNHSB	140 - 450	225	120	65	135	80	M12 (M16)	110	45 (50)
DNHSB	750 - 1000	225	120	65	135	80	M16 (M12)	110	50 (45)
DNHSC	225 - 435	275	135	65	140	80	M12 (M16)	110	45 (50)
DNHSC	735 - 1000	275	135	65	140	80	M16 (M12)	110	50 (45)
DNHSC	1350	275	135	65	150	90	M20	120	50
DNHSC	1675 - 2100	275	135	65	150	90	M20	120	50

Type 30 and PC30 Spring Hangers

Selection Table

Type	Size	Rated Capacity [kg]	Rated Deflection [mm]	Spring Rate [kg/mm]	Spring Color
30	12	5	25	0.2	Red
	25	11	25	0.44	Orange
	41	18.5	29	0.64	Red
	56	25	26	0.95	Black
	95	48	25	1.9	Green
	138	64	33	1.95	White
	278	125	27	4.6	Grey
	336	148	25	5.9	Red
	445	200	32	6.2	Brown
	800	350	27	13.0	Orange
	1500	665	34	19.6	Red
	2060	936	28	34.0	Black

All hangers can be tagged for identification, if specified

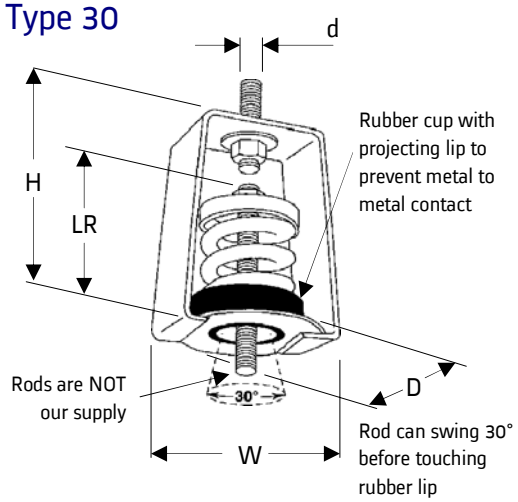
LR = Allowance for length of lower rod above base of hanger – our supply only with PC30

d = Rod diameter (M16 is standard for 30 and PC30 – 445 to 800. M12 can be supplied if specified)

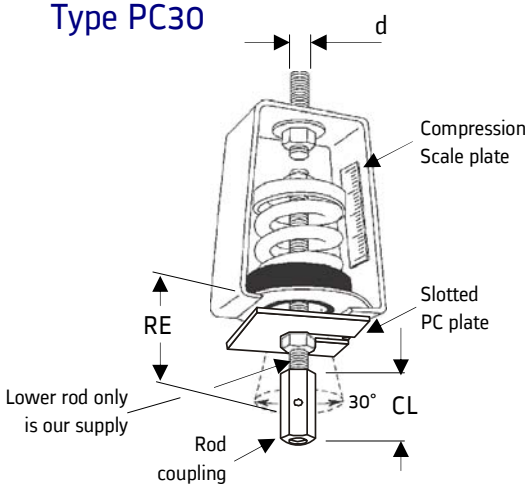
RE = Rod extension – base of hanger to centre off rod coupling – our supply

CL = Length of rod coupling – our supply.

Type 30



Type PC30



Prefix PC is used when pre-compression option is required.
Pre compression equipment comprises of slotted PC plate, threaded rod, top nut and lock nut, bottom nut, rod coupling and scale plate

Hanger supplied with spring pre-compressed to 80% of rated deflection, unless otherwise specified. Loosen nut and remove PC plate after hanger is fully loaded.

Dimensions in mm

Type	Size	H	W	D	LR	d	PC30 only	
							RE	CL
30	12 - 25	100	85	50	75	M10	110	45
	41 - 95	100	85	50	80	M10	105	45
	138 - 336	178	120	50	105	M12	130	45
	445 - 800	190	134	65	125	M16 (M12)	120	50 (45)
	1500 - 2060	230	165	65	170	M20	120	50

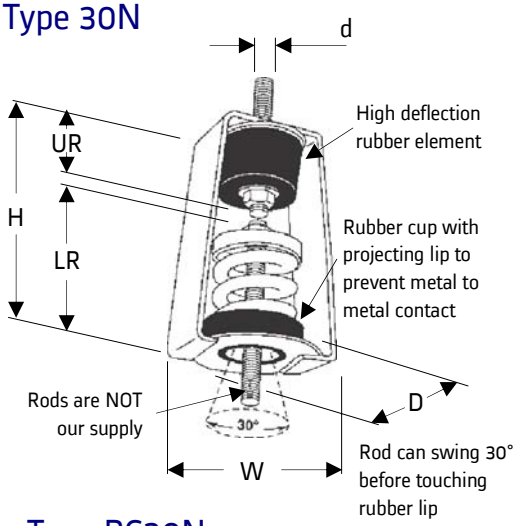
Type 30N and PC30N Spring Hangers

Selection Table

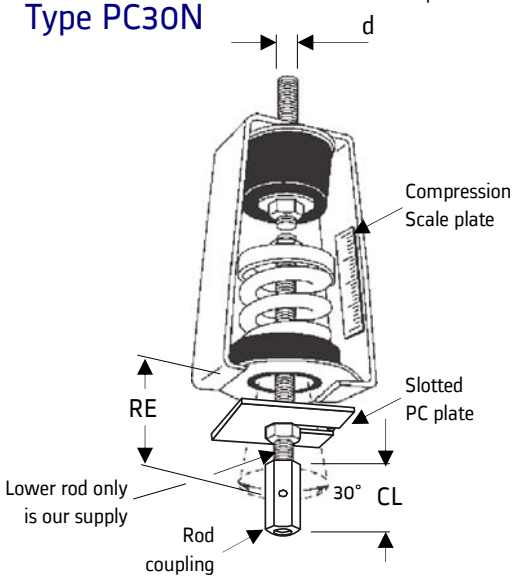
Type	Size	Rated Capacity [kg]	Rated Deflection [mm]	Spring Rate [kg/mm]	Spring Color	Average Rubber Defecltion [mm]
30N	12	5	25	0.2	Red	2
	25	11	25	0.44	Orange	2
	41	18.5	29	0.64	Red	4
	56	25	26	0.95	Black	4
	95	48	25	1.9	Green	4
	138	64	33	1.95	White	5
	278	125	27	4.6	Grey	5
	336	148	25	5.9	Red	5
	445	200	32	6.2	Brown	5
	800	350	27	13.0	Orange	5
	1500	665	34	19.6	Red	7
	2060	936	28	34.0	Black	7

All hangers can be tagged for identification, if specified

Type 30N



Type PC30N



LR = Allowance for length of lower rod above base of hanger – our supply only with PC30N

UR = Allowance for length of upper rod below top of hanger – rod not our supply

d = Rod diameter (M16 is standard for 30N and PC30N – 445 to 800. M12 can be supplied if specified)

RE = Rod extension – base of hanger to centre off rod coupling – our supply

CL = Length of rod coupling – our supply.

Prefix PC is used when pre-compression option is required.
Pre compression equipment comprises of slotted PC plate, threaded rod, top nut and lock nut, bottom nut, rod coupling and scale plate

Hanger supplied with spring pre-compressed to 80% of rated deflection, unless otherwise specified. Loosen nut and remove PC plate after hanger is fully loaded.

Dimensions in mm

Type	Size	H	W	D	LR	d	PC30N only	
							RE	CL
30N	12 - 25	145	85	50	75	M10	110	45
	41 - 95	145	85	50	80	M10	105	45
	138 - 336	170	120	50	105	M12	130	45
	445 - 800	273	135	65	125	M16 (M12)	120	50 (45)
	1500 - 2060	300	175	65	170	M20	120	50

ARNOT

Type IM Spring Hangers

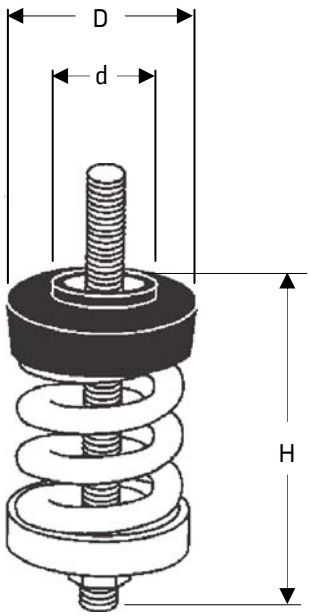
Selection Table

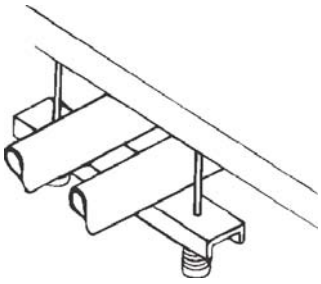
Type	Size	Rated Capacity [kg]	Rated Deflection [mm]	Spring Rate [kg/mm]	Spring Color
IMA	12	5	25	0.2	Red
	25	11	25	0.44	Orange
IMA	45	20	40	0.5	Blue
	75	34	38	0.9	Ornage
	125	56	33	1.7	Red
	200	90	29	3.1	Black
	310	152	25	6.1	Yellow
IMB	60	27	54	0.5	Grey
	140	64	49	1.3	Orange
	280	128	40	3.2	Green
	450	207	33	6.3	Red
	750	340	30	11.3	White
	1000	450	25	18.0	Blue
IMC	110	50	52	0.95	Orange
	225	100	45	2.2	Blue
	435	200	39	5.1	Grey
	735	320	35	9.2	White
	1000	445	26	17.2	Black
	1350	615	25	24.6	Yellow
	1675	765	25	30.6	Yellow[1]
	2100	950	25	38.0	Yellow[2]

1 with grey inner spring
2 with red inner spring

All hangers can be tagged for identification, if specified

Type IM





Pipe Trapeze using IM

Steelwork must be drilled to fit projecting lip
(diameter 'd') to ensure no metal to metal contact

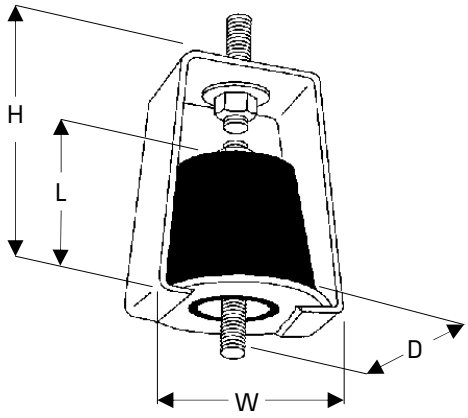
Dimensions in mm

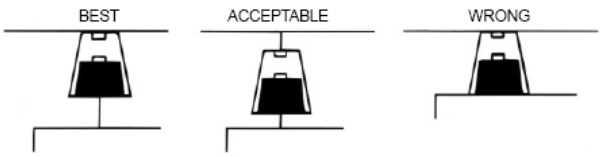
Type	Size	H	D	d	MRD Max Rod Dia
IMA	12 & 25	64	62	33	10
IMA	41 – 310	90	62	33	10
IMB	60 - 1000	117	80	48	14
IMC	110 - 2100	132	92	60	20

Type HD Rubber Hangers

Selection Table

Type	Size	Load Range [kg]	Deflection [mm]
HDA	Green Red	20 – 35 35 – 70	6
HDB	Red Yellow	90 – 180 140 – 270	8
HDC	White Yellow	200 – 375 350 – 700	10
HDD	Yellow	600 -1150	10





Install hangers with a gap on the underside. This allows the isolators to operate efficiently. The gaps also compensate for minor misalignment. Direct contact of the unit and hanger box "short circuits" the isolation.

Dimensions

Type & Size	H [mm]	W [mm]	D [mm]	L [mm]	Max Rod Dia
HDA	72	56	50	55	M10
HDB	115	108	50	75	M12
HDC	115	108	50	75	M12
HDD	159	121	65	90	M20

ACTOM

ACTOM Mechanical Equipment

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