

MECHANICAL EQUIPMENT

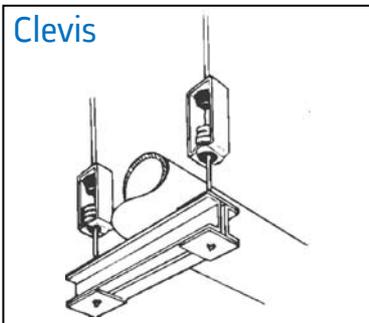
Products

Air Conditioning & HVAC

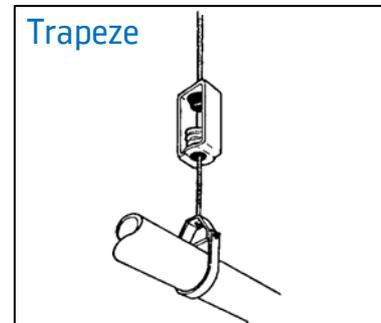
Introduction into Hangers

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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.

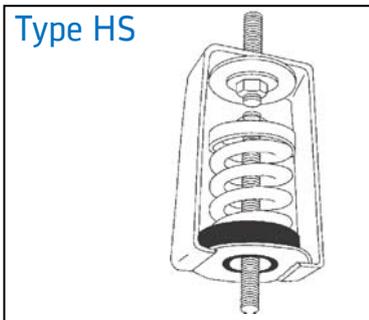
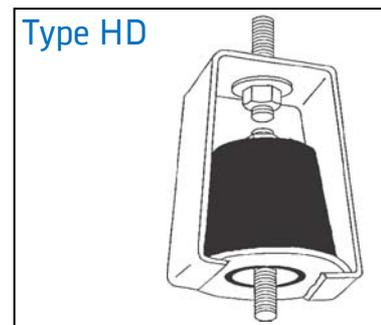


One method of hanging a pipe uses *clevis pipe clamps*. Another method is to support the piping on a *trapeze* and share the load between two hangers. This may be convenient or economical for supporting large diameter pipes or two or more parallel pipes, or equipment such as a ceiling-hung fan.



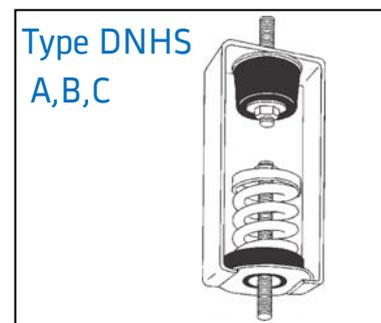
The same principles apply for hangers as for mountings. The higher the deflection of the resilient element, steel spring, rubber or both, the higher the efficiency of vibration isolation which is the same as saying the lower the transmissibility.

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.



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.

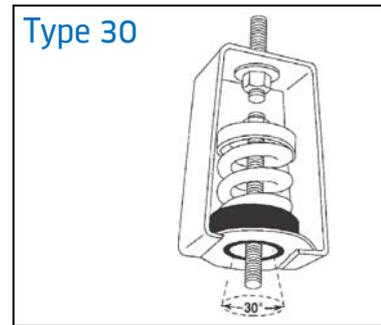
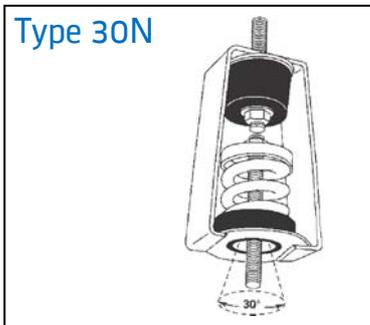
Mason Industries has always been the leading and most innovative vibration company in the United States and about 30 years ago they introduced the idea of achieving higher efficiency and improving noise isolation by putting a rubber element in series with a steel spring, and this range was designated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



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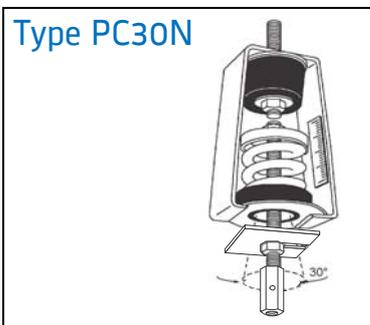
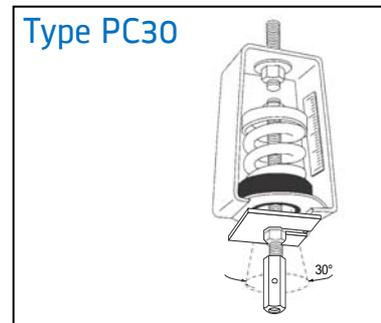
In those days, 30 years ago, it was not uncommon for hanger installations to perform below expectations, especially in plant rooms. Almost invariably the reason was that, due to poor workmanship, or something getting in the way, the hanger rods were not or could not be installed vertically. When this 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.



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 *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.

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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

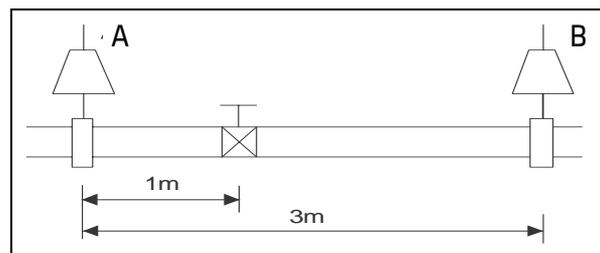
150 mm diameter piping with water and insulation weighs 51 kg per meter. If a run of this piping is supported by hangers at 3 meter spacing the load will be 153 kg per hanger. Refer to the Load Rating Tables on the following pages. Here are 3 correct selections for 153 kg.

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 x 1/3). 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.

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