NEWSLETTER

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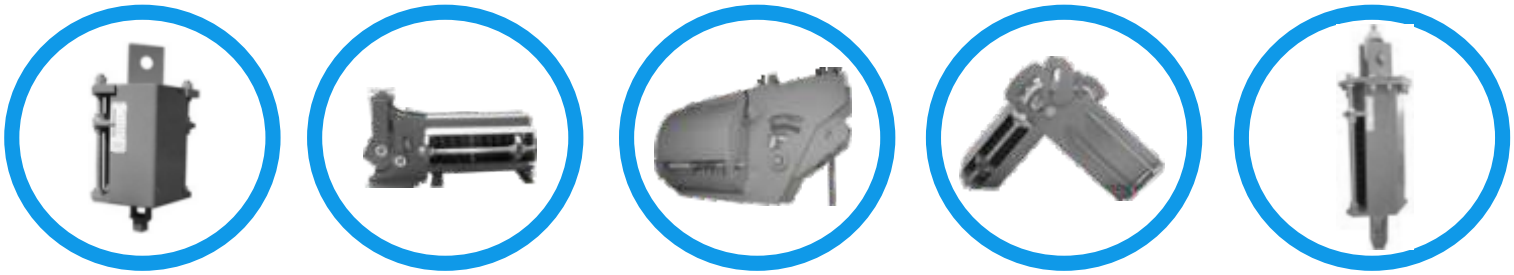

Spring Hangers – Hot Loads and Cold Loads

1) In the previous newsletter we have seen that what is “hot Load” & cold load” on a spring. This can be otherwise called hot Compression & cold compression respectively. (As load can be indicated either in Kg/KN or in mm).

2. Before we go further let us understand the character of spring, (i.e. load carrying capacity of a spring). Since we use helical coiled compression spring, we have certain terms called (a) Diameter of the coil rod, (b) number off coils, (c) helical coil diameter, (d) the material of coil, (e) spring free height and (f) compressed height etc. All these factors decide the Spring Rate (S.R) which is nothing but-“What Load (Kg or N) to be (applied / released) to compress or release the spring by 1mm.

That is S.R= Kg/mm or N/mm.

3. When a spring is not loaded at all, its height is called free height at no load (Top up condition). When a spring is loaded to its full capacity its height called as full height / fully loaded (Bottom out condition).

4. So, for a given load & S.R we can determine the compression value in Kg or in mm.

This can be easily explained by an example. Let us assume a spring of 1000/100 – Kg/mm. This means the spring can be loaded from 0 to 1000kg. (i.e.) spring gets compressed from 0 mm to 100 mm.

5. Example – 1

Spring used 1000 / 100 Kg /mm

So, SR (Spring Rate) = 10Kg/mm

Vertical movement of Pipe (△Y) -5 mm

Operating Load (Hot Load) = 500 Kg &

$$\text{Operating Load in mm} = \frac{\text{Operating Load in Kg}}{\text{SR in kg/mm}} = 500 / 10 = 50\text{mm}$$

Cold Load in Kg = Operating Load + (±Y x S.R)

= 500 + (-5 x 10)
= 500 - 50 Kg
= 450Kg

Cold Load in mm = Operating Load in mm + (±Y mm)
= 50 + (-5) mm
= 50 – 5 mm
= 45 mm

This means the support now takes 450 kg (Compressed to 45 mm) in Cold & 500Kg in operation (Hot) / (compressed to 50 mm). We can find load varies by (500-450=50kg) between Hot & Cold condition.

6. This variation in load when compared with Hot load as percentage is called

Variability Factor

$$= \frac{\text{Hot Load – Cold Load}}{\text{Hot Load}} \times 100$$

$$= \frac{500-450}{500} \times 100 = (50 / 500) \times 100 = 10\%$$

or

$$\frac{(\Delta Y \times S.R) \times 100}{\text{Hot Load}}$$

$$= (5 \times 10 \times 100)/500 = 10\%.$$

Operating Load (Hot Load) = 500 Kg &

$$\text{Operating Load in mm} = \frac{\text{Operating Load in Kg}}{\text{SR in kg/mm}} = 500 / 10 = 50\text{mm}$$

7. This variability factor is limited normally to 25% as per applicable standards. Under exceptional cases this may be restricted to single digit values (5 or 6%)

Let us continue in the next news letter. Till then bye!

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