

**BHARAT HEAVY ELECTRICALS LIMITED**  
**PIPING CENTRE, CHENNAI**

**NO: PC: TSP: VLH: 001 Rev 00**

**TECHNICAL SPECIFICATION FOR**  
**VARIABLE LOAD HANGER ASSEMBLY**



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## **Technical Specification for Variable load spring hanger**

### **Intent of specification**

Intent of specification is to select equivalent variable load spring hanger in place of BHEL variable spring hanger as specified in hanger selection sheet (projectwise) and supply the VLH (Variable load spring hanger) with suitable provision for connection with BHEL connecting components.

### **Scope of supply**

This specification shall apply for the design and fabrication of variable load spring hangers.

Range of variable load spring hangers for supporting piping loads from 20Kgs to 13600Kgs as per the hanger selection sheet.

Hanger selection sheets are prepared with the selection of BHEL standard range of variable load spring hangers from the **load table for variable spring hangers** which has two travel ranges (80mm & 160mm) with 13 load groups (01 to 13) as attached.

Type of supports with respect to position of installation are designated as follows.

#### **SH-Middle (Below supporting structure)**

#### **SA-Top (Above supporting structure)**

#### **SS-Bottom (Below pipe)**

Each hanger selection sheet contain all the information for selection of equivalent VLH (in place of BHEL VLH assembly) assembly by the vendor for connection with BHEL connecting components. Spring selected by the vendor shall have the stiffness (spring rate) equivalent to BHEL spring rate and it shall have the provision to connect with BHEL connecting components like tie rods, WCA etc.,

SH type springs and SA type springs shall have integral turn buckle arrangement and locking facility.

The spring cage assy shall contain the following parts as per the sketch (attached as Annexure -i) and the name plate shall contain the details as specified .

### **Technical requirement**

- 1.VLH selected shall conform to MSS-SP58,MSS-SP69,ASME B31.1
2. VLH selected shall be suitable for 4-6 deg angulation of the hanger rod.
- 3.The spring stiffness of the selected spring shall be restricted within (+/-) 5% variation to that of BHEL make spring as given in data.
- 4.The spring cage height and diameter of the selected spring shall not exceed the dimensions of the BHEL make spring.
- 5.Vendor to ensure connection of selected VLH to suit with BHEL connecting components as given in dimensional details.
- 6.Vendor to ensure that with selected spring and cold setting, required top & bottom margin (by default 5mm on top and 15% of vertical movement on bottom side) is available in cold and hot condition.
- 7.All the VLH irrespective of load group shall be preset at vendor works to the cold compression position. Wherever cold and hot values are not indicated (exact load and movement are not known) it shall be set at zero-travel.
- 8.Red and green indications shall be marked on the scale for hot and cold position.

### **Materials**

Materials with guaranteed chemical and physical properties are only to be used for the manufacture of load bearing components. The minimum characteristic values relating to these materials are those used in structural design. Non metallic materials and compound components such as washers and bearing

bushes are selected and tested to confirm their suitability for their intended application and expected operational duty.

### **Welds**

All welds are to be carried out by gas metal welding (GMAW) – in special cases with covered electrodes.

### **Springs**

The most critical components within a VLH assy. is its springs. They are directly responsible for its correct functional behavior and provide a direct supporting force to the applied load. The operational safety of the entire plant depends, in the final analysis, on their enduring functional suitability. Alongside the correct choice of materials and a technically suitable construction, the application of suitable production procedure is of vital importance.

In addition to the requirements of ASTM A-125 all alloy springs shall be shot peened and examined by magnetic particle.

DIN standards 2076, 2077, 2089 and 2096 form the basis for the helical coil spring specifications. The material used for small wire sizes (wire < 10 mm) is spring steel C to DIN 17223. For larger sizes hot-rolled rod of 50CrV4 (or equivalent) is to be used to DIN 17221.

Rolling skin is to be removed prior to hot coiling by grinding or scaling. All rods are to be tested for surface cracking.

The coiling and normalizing process shall be performed in a controlled manner by a semi-automatic process.

All springs are marked with their heat number and are subject to functional control checks. Results are recorded and added later to the series documentations of the relevant spring hangers.

## **Corrosion protection**

After rust removal by shot blasting, Variable load hangers have to be coated with zinc dust primer coat to a minimum thickness of 40 um and a finish coat of blue colour paint of minimum thickness 40 um.

Spring coils are to be cleaned and strengthened by shot blasting, followed by zinc phosphate treatment (or equivalent).

## **Painting**

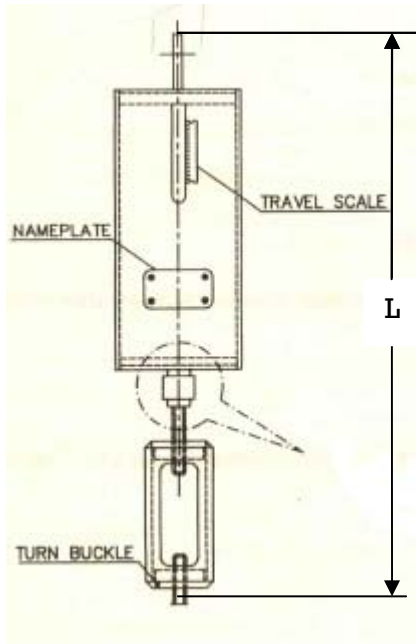
- **Surface Preparation** : Abrasive Blast Cleaning to SA - 2 1/2.
- **Primer** : Epoxy Zinc Rich Primer, (% VS = 35 min), DFT = 40 micron minimum.
- **Finish** : Aliphatic Acrylic Polyurethane, (% VS = 40 min), DFT = 30 micron minimum.

Vendor shall submit their quality plan, Manufacturing & Testing procedure for hangers including springs to BHEL for approval along with the offer.

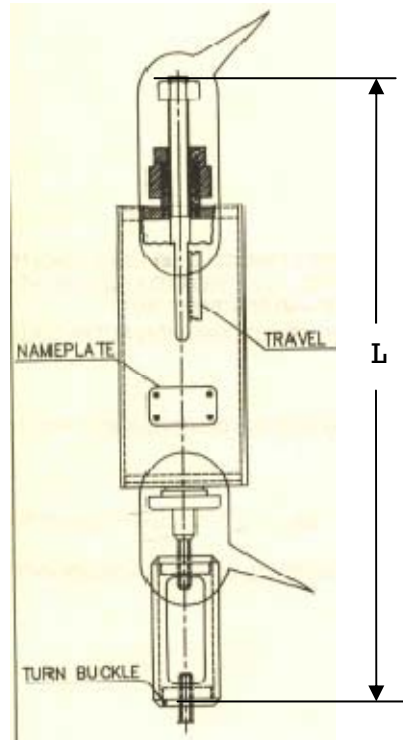
## **Annexure:**

- (i) Sketch of VLH with name plate.
- (ii) Product selection range and dimensional details of BHEL VLH.
- (iii) Sample VLH selection sheet- Data to be filled by vendor

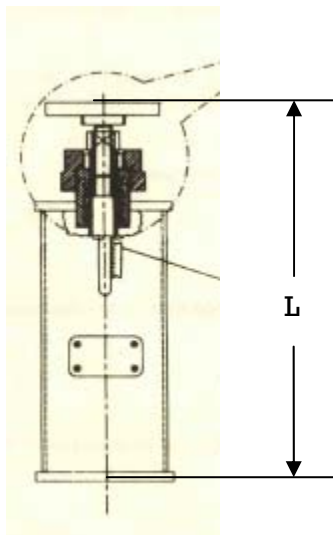
# ANNEXURE-I



SH TYPE VARIBALE SPRING HANGER



SA TYPE VARIBALE SPRING HANGER



SS TYPE VARIBALE SPRING HANGER

## NAME PLATE DETAILS

The following details are punched on the name plate of VSH:

Hangar Type	(e.g. SH-10-080)
Hangar Tag Number	(e.g. MSH-28)
Operating Load	(e.g. 2600 kg.)
Movement	(+ for upward movement; - for downward movement)