BHARAT HEAVY ELECTRICALS LIMITED

PIPING CENTRE, CHENNAI

NO: PC: TSP: CLH: 001 Rev 00

TECHNICAL SPECIFICATION FOR

CONSTANT LOAD HANGER

Prepared	Checked	Approved	Date
(M.R.Krishna)	(M.Manoharan)	(C.Karunakaran)	13-06-2013

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- **CLH SELECTION SHEET**

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TECHNICAL SPECIFICATION FOR CONSTANT LOAD HANGER

1.0 Intent of Specification

Intent of this specification is to procure constant load hanger for the specified Type, load and movement.

This specification shall apply for the selection, design, fabrication, testing and supply of constant load hangers with setting at cold load.

2.0 Scope of Supply

Scope is to select CLH for the load and movement as specified in CLH selection sheet and supply the CLH (Constant load hanger) with bottom connection thread as specified in selection sheet.

For Type-A, Scope shall include the top connecting components between CLH and structure.

For Type-B&D, necessary components for mounting the CLH above the structure shall be supplied along with CLH.

For Type-C, vendor to specify the distance between bracket.

Total travel for the selected CLH shall be either 30% more than the movement indicated or 35mm whichever is higher.

Example : Total travel (min) = Maximum of (Indicated movement+ 30% of Indicated movement or 35mm).

Each Tag no shall be set at cold position and locked.

CLH shall be supplied in fully tested/calibrated condition for the entire load and movement range.

Each CLH shall have cold and hot position marked in Green and Red.

Important note: Based on load, movement and arrangement type the total list of CLH in the specification sheets are grouped under different series.

Example: A-162,A-172,B-285 etc.,

Qty required in each series is tabulated separately as "Index to CLH selection sheet."

Since a same CLH can be used for different load-movement combination, we have grouped the same (into family) for our operational convenience, to facilitate procurement on a distributable basis. Pricing shall be given for each series (refer Index to CLH Selection Sheet) and not for individual CLH selected based on load and movement, to facilitate the same. All the CLH in each series shall be treated as same size/model for pricing purpose. The counter offering to other than L-1 vendors will be on "Family basis" rather on individual basis.

3.0 Selection of CLH

Equivalent BHEL Series and qty required for each Hanger Tag no is furnished in the selection sheet along with arrangement types required. Equivalent CLH type suiting the arrangement shall be selected.

Constant load hangers selected shall operate on any one of the following principle.

1. Bell-crank lever principle
2. Law of parallelogram of forces.

If Bell-crank type is selected, vendor to offer horizontal type arrangement as per Type-A, which is given in Annexure-2. Where specifically vertical type is called for with space restriction, vendor to comply for the same. BHEL will select the option based on space availability. Arrangement (horizontal/vertical) requirement (in an event of Bell-crank lever principle) will be frozen during order execution stage and hence the bids of bidders who do not have both versions (horizontal/vertical) would be technically rejected. This is applicable for Type-A CLH arrangements only which is given in Annexure-2.

4.0 Technical Requirement

4.1. CLH selected shall conform to MSS-SP58, MSS-SP69, and ASME B31.1

4.2. CLH selected shall be capable of +10% or -10% load adjustment of the set load.

4.3. Selected CLH shall operate irrespective of the direction of travel.

4.4. Type of CLH and connection details shall be as specified in the selection sheet.

4.5 CLH selected shall be tested for the entire load range and movement range at vendor works.

4.6. All steel construction –spring and housing –shall be compact sturdy construction.

4.7. CLH selected shall have suitable locking facility throughout the movement range.

4.8. Vendor shall submit their procedure for setting at operating load, Manufacturing & Testing procedure for CLH including springs to BHEL for approval along with the offer.

4.9 Vendor shall furnish the procedure/calculation/method for setting the CLH with required load and movement.

4.10 Facility required for movement setting and precautions to be followed shall be clearly specified.

5.0 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.

6.0 Springs

The most critical components within a CLH assembly is its springs. They are directly responsible for its correct functional behavior and provide a direct supporting force to the applied load.

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 Conform 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.

Reference Quality document QPG: CLH: 01

7.0 Corrosion Protection for Springs

This shall be as per the enclosed quality document QPG: CLH: 01

8.0 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.

Reference Quality document QPG: CLH: 01

9.0 Name Plate Details

The following details shall be inscribed/stamped on the name plate of each CLH

- Make
- Model number
- Material Code
- Design Load
- Vertical Movement
- Hanger Tag number

Further each CLH shall have cold and hot position marked in Green and Red respectively.

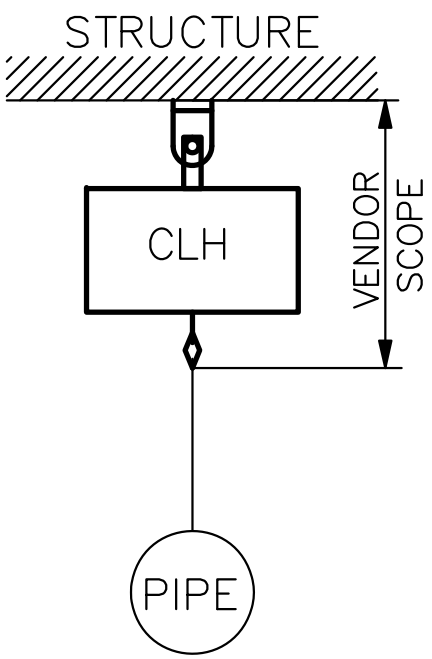
10.0 Packaging

All items shall be individually packed in a wooden box/crate with all details in scripted on the box. The same shall be suitable for sea/air worthy depending on the mode of shipment.

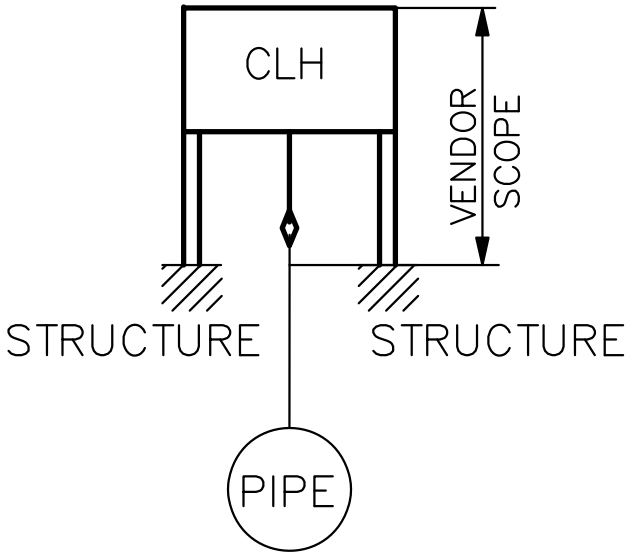
ANNEXURE–2

CLH ARRANGEMENT TYPES

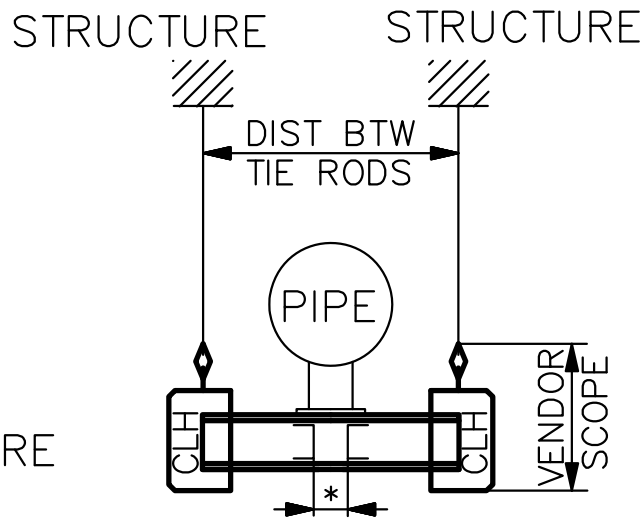
TYPE–A



TYPE–B

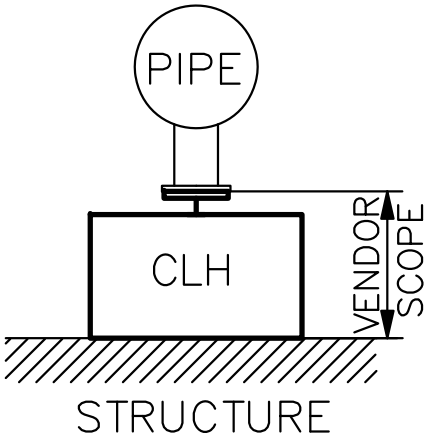


TYPE–C



* – VENDOR TO SPECIFY

TYPE–D



QUALITY REQUIREMENTS FOR PROCUREMENT OF CLH

Doc No : QPG:CLH:01
Dt : 11.06.13

Sl. No	COMPONENT / OPERATIONS	TYPE OF CHECK	RECORDS TO BE SUBMITTED	REMARKS
Raw material / Components				
1	Pipes,Tubes,Plates,Bars,Rolled sections & Spring rod	Chemical, Mechanical properties & HT condition as per specification	TC / CoC	TC : Test certificate CoC : Certificate of compliance HT : Heat Treatment
2	Springs	a) Visual & dimension b) Heat Treatment c) Mechanical test d) Magnetic particle test (MPI) e) Scragging test ** f) Cramping test ## g) Hardness test h) Load Vs Deflection i) Surface Protection $ j) Marking & Heat number	TC & Test Reports	** and ## - Refer note. $: Refer note
Inprocess				
3	Welding	Procedure & Performance Qualification details (WPS/PQR)	WPS, PQR	
4	NDE for welding	LPI/MPI	Reports	
Final				
5	Hanger assembly	Visual & dimension	TC	
6	Hangers Functional test	Travel characterstics (Minimum 5 readings per assembly)	Test Reports	
7	Painting	Surface preparation, Paint & DFT	TC	Refer note:3
8	Identification (As per Specification)	Marking, Name plate	TC	
9	Packing	Refer Note:6		
10	Documentation	Verification of Records	TC, IR & other quality documents as above	IR - Inspection Report

** :- All springs shall be scragged by compressing to solid height and releasing three times consecutively. The free length measured after scragging shall meet the free length dimension indicated in the drawing / P.O.

:- Cramp Test is to be performed on all the springs by holding spring compressed to a Minimum working length for a period of not less than 6 hours. Then all the springs shall be visually examined for any crack, damages, all springs shall be free from crack or any damages.

$:- Immediately after shot blasting the surface of the spring be thoroughly cleaned and coated with Grey shade zinc rich Epoxy primer as per IS 14589 Gr2 containing 85% min. zinc. DFT shall be 40 microns min.

NOTE :
1. Vendor shall submit their quality plan, Manufacturing & Testing procedure for hangers including springs to BHEL for approval.
2. Sources of Raw materials and any critical items like springs shall be approved by BHEL.
3. Painting for CLH :- Surface preparation : Abrasive Blast cleaning - Sa 2 1/2
   Primer : One coat of 40 microns of Epoxy Zinc rich primer to IS 14589 Gr.II,% VS = 35 min.
   Finish : One coat of 30 microns of Aliphatic Acrylic Polyurethane paint ,%VS = 40 min.
   Shade : Phirozi Blue Shade No.176 of IS 5
   Total DFT : 70 microns minimum.
4. All hangers shall be inspected at Vendor's works by BHEL / BHEL authorised inspection agency and Inspection Report shall be issued by them.
5. For Import Vendors, Inspection shall be, by Approved Inspection Agencies like Lloyds, SGS, BV and other reputed thirdparty Inspection Agencies.
6. Hangers shall be suitably packed in box / crate with polyethene lining to avoid damages during transit & storage.
7. Vendors shall comply with all the above requirements. If any deviations to the requirements shall be clearly spelt out in bid under the heading "DEVIATIONS". Any undisclosed clarifications / deviations shall not be accepted at later stage.

PREPARED BY 11/06/2013

APPROVED BY 11/6/13