



उत्पाद मानक (हीप : हरिद्वार)

ST 38007

PRODUCT STANDARD (HEEP: HARIDWAR)

पृष्ठ 12 का 1

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GAS HEATING DEVICE

1. Description:

"Gas Heating Device" is used during heat-tightening of High Pressure & Intermediate Pressure Turbine joint plane bolts / studs to a predetermined joint pressure. The gas heating device consists of heating tube with clamping device and mixing head with supply pipes. It is used with inflammable gas-oxygen mixture (e.g. acetylene-oxygen) and compressed air. The heating tube is inserted into the bolt bore where it is kept centered by the clamping device. In mixing head, the gas-oxygen flame is surrounded by compressed air. This hot gas mixture flows through the heating tube, is reversed by bottom of the blind hole in the bolt and flows back up between outside of heating tube and the sides of bore in the bolt to emerge at the end of the bolt. (Refer Figure-1)

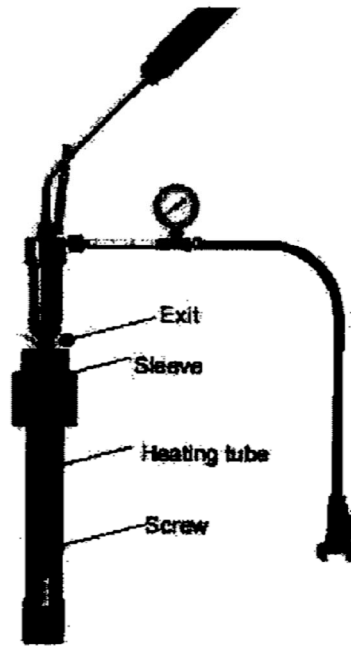


Figure-1

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इस दस्तावेज में दी गई सूचना भारत भारती प्रोपर्टी लिमिटेड की सम्पत्ति है इसका प्रयोग एवं प्रकाशन अन्य से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

दिनांक एवं हस्ताक्षर
SIGN & DATE
04/07/19

सामग्री सूची संख्या
INVENTORY NO.
P-5275

MEMBER-PSC	NEELU GARG	निर्माणकर्ता WORKED BY	ANOOP KUMAR	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
QAX	R.P. Singh	जांचकर्ता CHECKED BY	DINESH L. GOND	19.06.2019
TSX	Sandeep Gupta	समीक्षाकर्ता REVIEWED BY	ALOK KR. SINGH	19.06.2019
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	D. K. RAY
SUPERSEDES			स्वीकृति APPROVED : AGM (STE) S. R. PRASAD	Gr. NO. ST : 8.20
REV.NO.	03	निर्माण PREPARED BY :	जारी ISSUED BY :	दिनांक DATE :
DI	19-06-2019	STE-TE	TSX	09-02-1981
CHANGE ADVICE NO.	STE-19-13			



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PRODUCT STANDARD (HEEP: HARIDWAR)

In order to determine the expansion after pre-stressing, a measurement should be carried out before heating (actual measured length). The heating device is assembled according to the following instruction, depending on the use. When inserting the rigid tube, make sure that a gap of approx. 50-60 mm remains free to the bottom of the bore (Refer Figure-2). If the heating tube is too long, it must be shortened so that the gap is not less than 50 mm. If the bore is deeper than the length of tube at hand, the tube must be lengthened by welding on extensions. The weld bulge must be adapted to tube outside diameter.

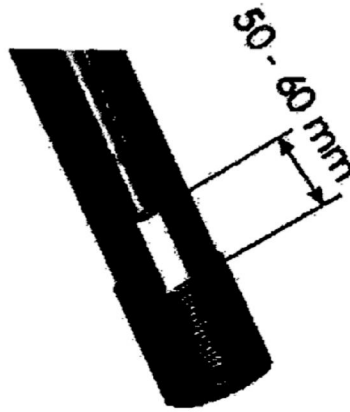


Figure-2

This heating causes elongation of the stud & then the cap nut of corresponding stud is screwed down by a specified amount in hot condition to provide a calculated joint pressure in cold condition.

2. Scope of Work:

- Scope includes designing, manufacturing and supply of gas heating device.
- All associated compressed air piping including a fine regulating valve, pressure gauge & pipe fittings.
- A measuring device for measuring the extension of stud / bolt due to heating.
- Scope of supply shall be as per Type-3 which shall include all the parts specified in Type-2 & Type-1 along with items specified in Type-3 as shown in this Figure 6.

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इस प्रलेख में दी गई सूचना भारत भारी परामर्श की संपत्ति है। इसका प्रयोग एवं प्रकाशन अन्य से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न सके।

उत्पाद मानक (हीप : हरिद्वार)
SIGN & DATE
04/07/19

आवृत्ति सूची संख्या
INVENTORY NO.
P-5275

REV. NO. 03

निर्माणकर्ता
WORKED BYANOOP
KUMAR

19-06-2019

जांचकर्ता
CHECKED BYDINESH L.
GOND

19-06-2019



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e) For more details regarding scope of supply, this standard shall be read along with BHEL drawing no. 1-12015-56600. All item specified in drawing no. 1-12015-56600 shall be considered as scope of supply. For item no. given in Figure 4, 5 & 6 of this standard refer BHEL drawing no. 1-12015-56600.

f) This heating device is a portable unit. Heating should be possible in any of the stud in assembled condition. Hence item should be supplied in carry case / box.

The arrangement shown in drawing (Refer Figure-4, 5 & 6) is for reference purpose. The sole responsibility of mechanical design rests with supplier.

3. Functional Requirement and design information:

- A minimum clear height of 600 mm above the cap nut is available for inserting and removal of the heating device.
- Separate heating arrangement / component is required for each hole size of heating hole in the stud i.e. 20, 25, 32 and 35.
- Design should ensure that vent holes for release of hot gases in outer tube remain open to atmosphere in all operating condition.

4. Functional information:

A typical outline sketch, refer Figure. No.4, 5 & 6 shows general arrangement of gas heating device and Figure No.7 – measuring device for reference purpose.

- Heating source is oxy-acetylene gas.
- Oxy-acetylene torch is ignited outside and then it is inserted in the hole meant for it in the inlet chamber.
- A compressed air piping of suitable size is fixed to inlet chamber. Compressed air inscribes the Oxy-acetylene flame at the exit from inlet chamber and led to a mixing chamber.
- From mixing chamber hot gas mixture is led to heating tube through a bend.

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इस दस्तावेज़ में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की
सम्पत्ति है इसका प्रयोग एवं अपर्याप्त रूप से निरीक्षण के बिना या
जो कि कंपनी के हित में हानिकारक हो या किया जाए।

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WORKED BY

04/07/19

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- e) Heating tube is held co-axially in the stud hole. End of heating-tube kept at a reasonable distance from end of hole in the stud.
- f) After imparting the heat to the stud, this gas-mixture Traverse back through annulus passage between outer tube & heating tube & released to atmosphere through vent holes in the outer tube.
- g) A fine regulating valve on compressed air pipe line is provided to regulate the compressed air pressure and same is to be read on circular pressure gauge with a range 0 to 20 ata. A proper air pressure ensure that gas mixture reaches hole bottom with a reasonable velocity. This also helps in restricting the exit velocity of hot gases into atmosphere from safety consideration.
- h) An elongation measuring device includes a simple measuring rod, a sleeve and a depth gauge. Readings on the depth gauge showing length of stud are recorded in cold condition before start of heating process, and then after heat tightening again in cold condition. The difference of these reading gives the elongation achieved.

5. Mechanical Design:

- a) The sole responsibility of mechanical design rests with supplier. Construction & material of the device should be robust to withstand thermal cycling and thermal stresses. Device should be easy to install, assemble and disassemble.
- b) Welding if used anywhere in assembly shall be checked for crack & defects. Defects to be rectified.
- c) Due precaution toward operational safety must be taken.
- d) Measuring unit consists of sleeve, depth gauge and measuring rod. Depth gauge should have least count of 0.05 mm. Depth gauge should be in general as per DIN 862. Its scale must be case hardened.

6. Compressed air system:

- a) The hole in the inlet chamber for insertion of heating torch should match with the standard torch shapes without leaving a large clearance or causing insertion problem.

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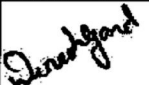
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19-06-2019

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इस प्रपोज से की गई सूचना भारत हेवी एलेक्ट्रिकल लिमिटेड की सम्पत्ति है इसका प्रयोग एवं प्रसारण इस से मिली की तरह प्रयोग, जो कि कम्पनी के हित से हानिकारक हो न किया जाय।

सावधानी सूची संख्या
INVENTORY NO.
P-5275
04/07/19

निम्नक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST 38007 पृष्ठ 12 का 5 Page 5 of 12	
SUPERSEDES INVENTORY NO. वापसी सूची में दर्ज अवधि का है	b) A clamping device to hold the heating torch should be provided. c) Regulating valve should be able to give the desired degree of regulation & placed close to heating device. d) Pressure gauge should be able to read the 0.5 ata. difference air pressure. e) In general, there should not be any burr left on any component. Threading done should of high standard for easy assembly & dissemble. Scale should be flat & move vertically upward or downward freely.				
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	7. Identification : Each gas heating device should be designated based on the stud heating hole i.e. 20mm, 25mm, 32mm or 35mm. Outer tube shall also be marked for the heating hole size. Heating tube shall also be punched with the O.D & thickness.				
इस प्रलेख में ही गई सूचना भारत हेवी एलेक्ट्रिकल लिमिटेड की संपत्ति है, इसका प्रयोग एवं प्रकाशन केवल ही इसी की परवानगी पर होगा, जो कि कंपनी के हित में हुआ करता है।	8. Functional Testing & Acceptance: Supplier shall exhibit the suitability of operation of the heating device at BHEL works or at site (to be mutually agreed at enquiry stage). Only after such successful field demonstration device will be finally accepted (if BHEL has already specified this clause in enquiry). This requirement may be waved-off if felt necessary.				
6/1/19 04/07/19	9. Packing & Dispatch: Complete gas heating device shall be dispatched in nicely parted & spaced briefcase / box for avoiding damage during transportation & should be easily carried anywhere. (Refer figure 3)				
					
Figure-3					
वापसी सूची में दर्ज INVENTORY NO. P-5275	REV. NO. 03		निर्माणकर्ता WORKED BY ANOOP KUMAR	19-06-2019	
			जांचकर्ता CHECKED BY DINESH L. GOND	19-06-2019	



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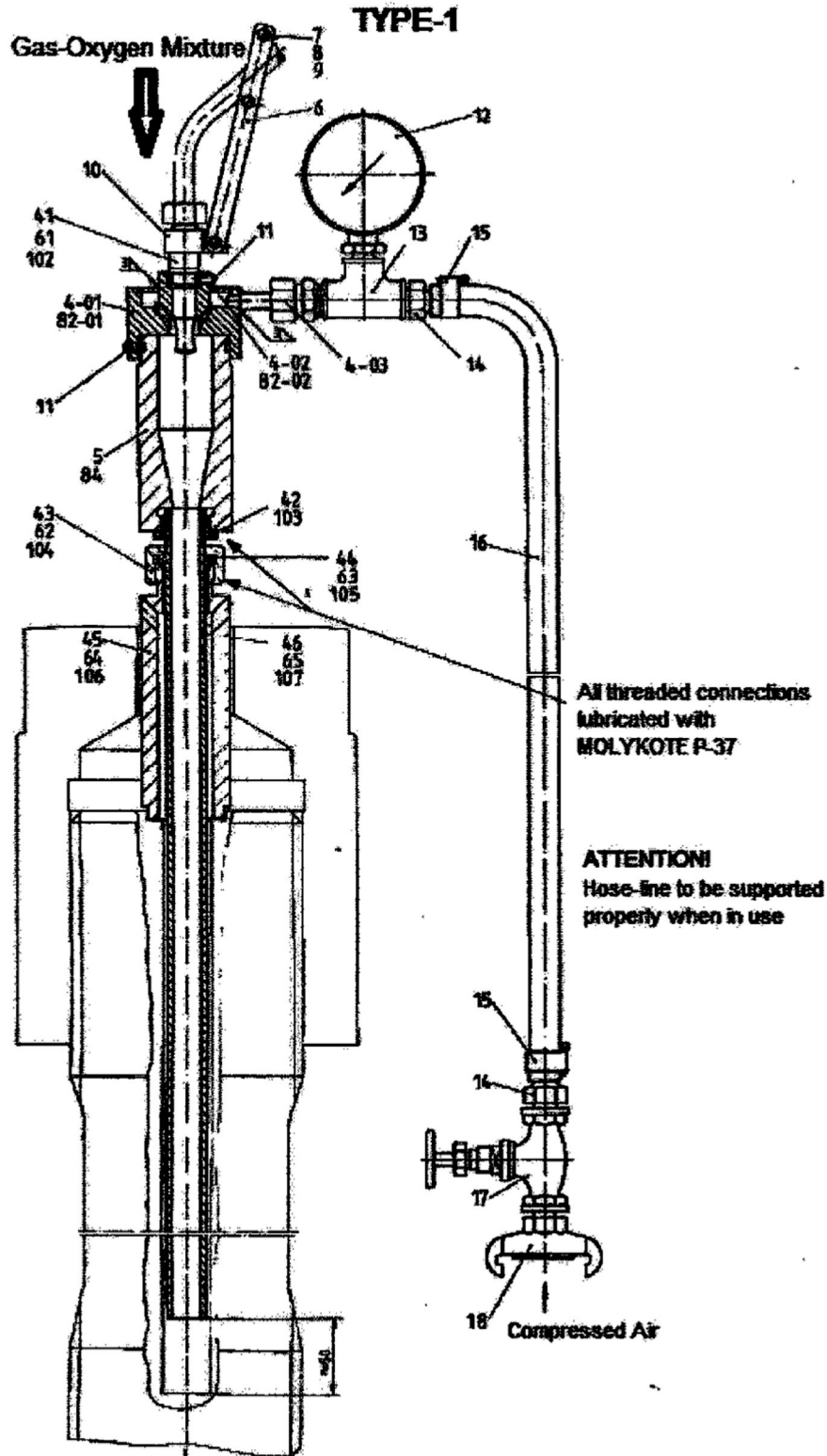


Figure-4 : TYPE - 1

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सब प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल लिमिटेड की
सम्पत्ति है इसका प्रयोग एवं अनावरण अन्य से किसी भी तरह प्रयोग
को कि कंपनी के हित में हानिकारक हो न सिया जाए।

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INVENTORY NO.

REV. NO. 03

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ANOOP
KUMAR

19-06-2019

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CHECKED BY

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GOND

19-06-2019

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उत्पाद मानक (हीप : हरिद्वार)

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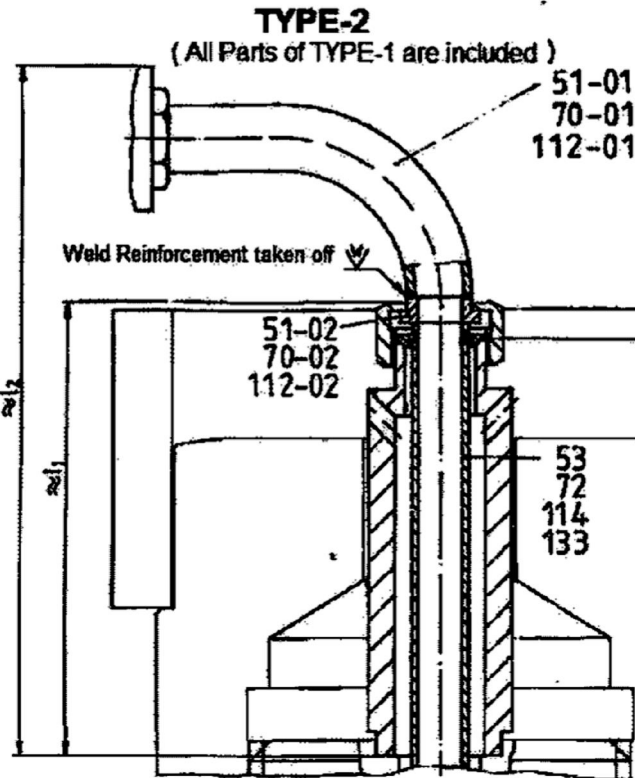
निर्माण एवं हस्ताक्षर
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परिचालित बना है

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समाप्तिकार एवं योजनाएं
इस प्रलेख में दी गई योजना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की
सम्पत्ति है इसका प्रयोग एवं प्रसारण अन्य से किसी भी तरह प्रयोग
को कि कंपनी के हित में हानिकारक हो न सके।

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Heating Hole Diameter	1 ₁	1 ₂
20	105	186
25	142	220
32	162	245
35	184	295



ATTENTION!

HOSELINE TO BE SUPPORTED
PROPERLY WHEN IN USE



Figure-5 : Type-2 (All parts of TYPE-1 shall also be included along with parts of TYPE-2)

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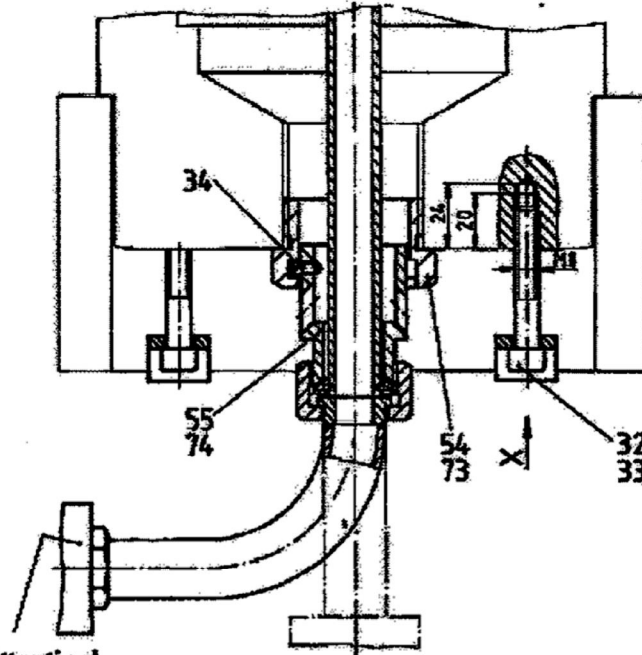
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TYPE-3

(All parts of TYPE-2 and TYPE-1 shall be included along with parts of TYPE-3)

Heating from below only for heating hole Dia. 20 & Dia. 25mm



Attention!
Hose-line to be supported
properly when in use.

View X

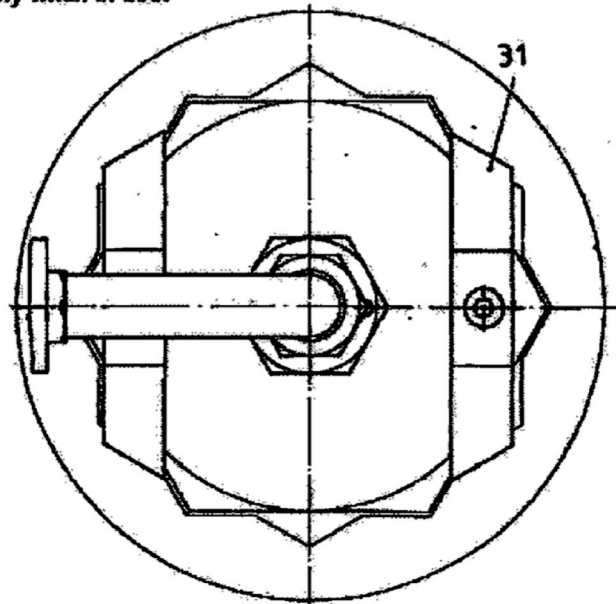


Figure-6 : Type-3 (All parts of TYPE-2 & TYPE-1 shall also be included along with parts of TYPE-3)

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भारतीय भारी विद्युत निगम लिमिटेड की
एक प्रतिलिपि है। इसका प्रयोग एवं प्रकाशन अन्य किसी भी तरह से
अनुमति के बिना नहीं किया जा सकता है।

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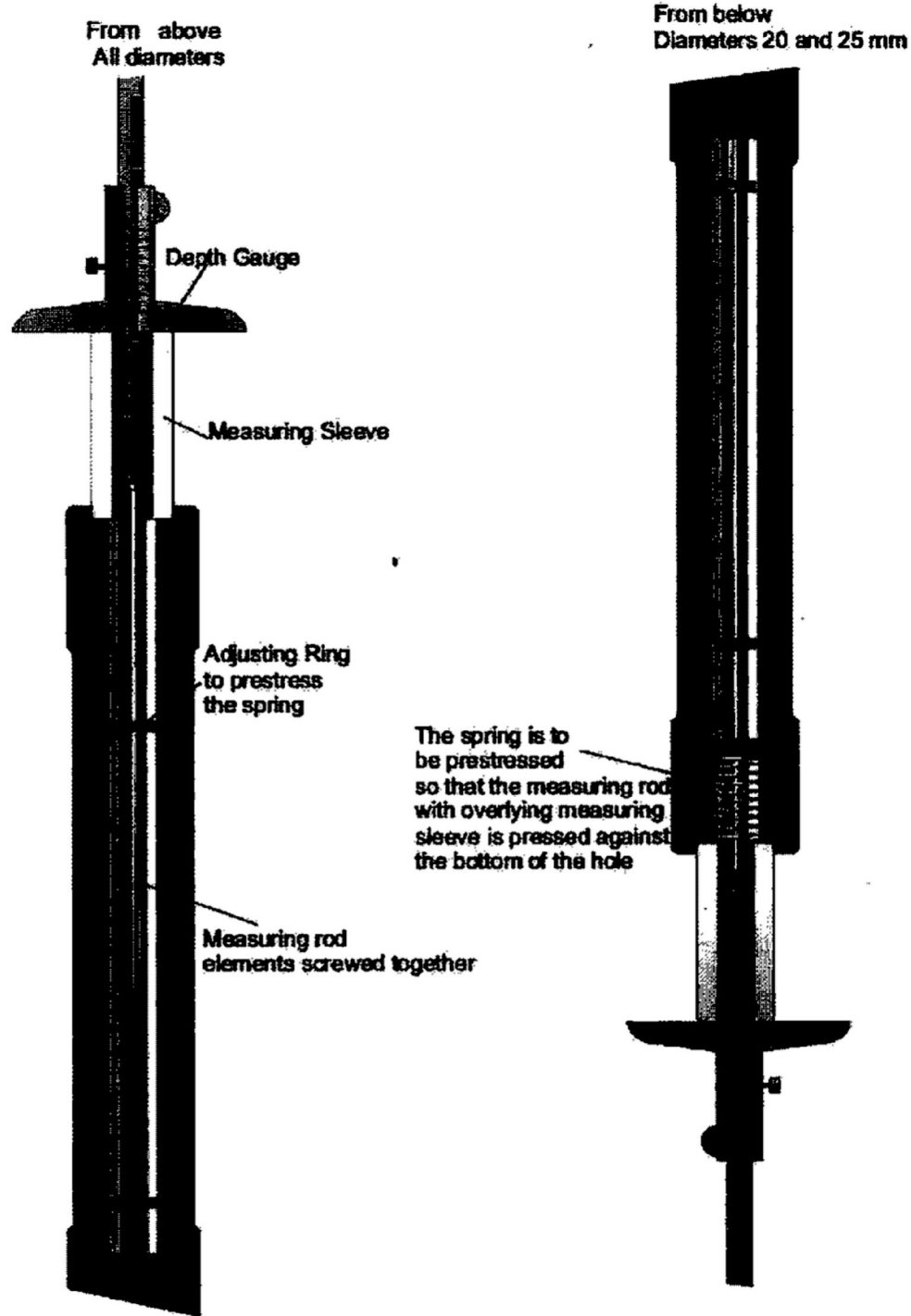


Figure-7 : Measurement scales

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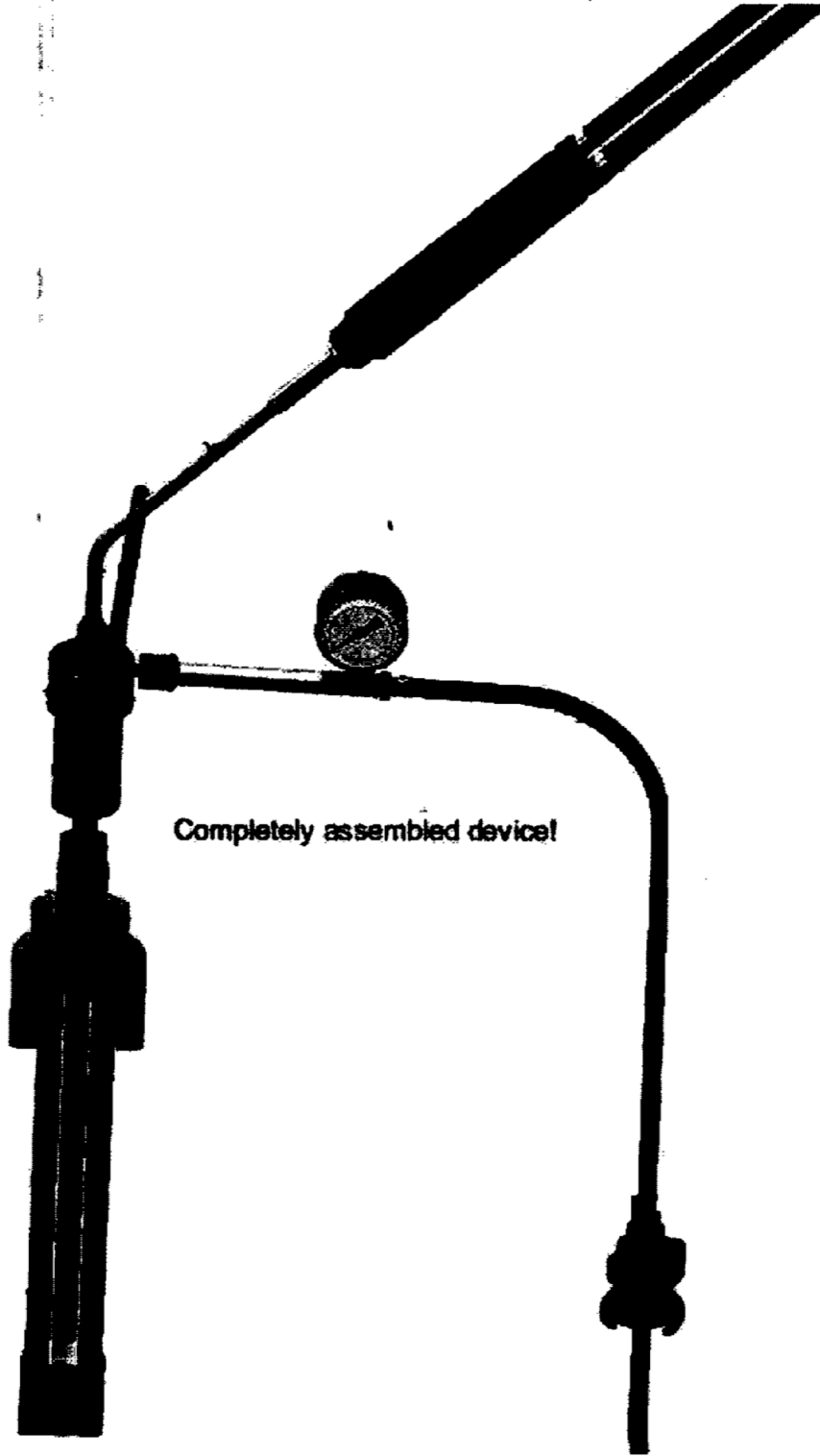
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समूची सूची संख्या से
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सम्पत्ति है इसका प्रयोग एवं वितरण अन्य से किसी भी तरह प्रयोग
नहीं किया जायेगा। जो कि कम्पनी के हित में हानिकारक हो स किता जाये।

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Completely assembled device!

Figure-8 : Standard Equipment (Type-1) Completely assembled device

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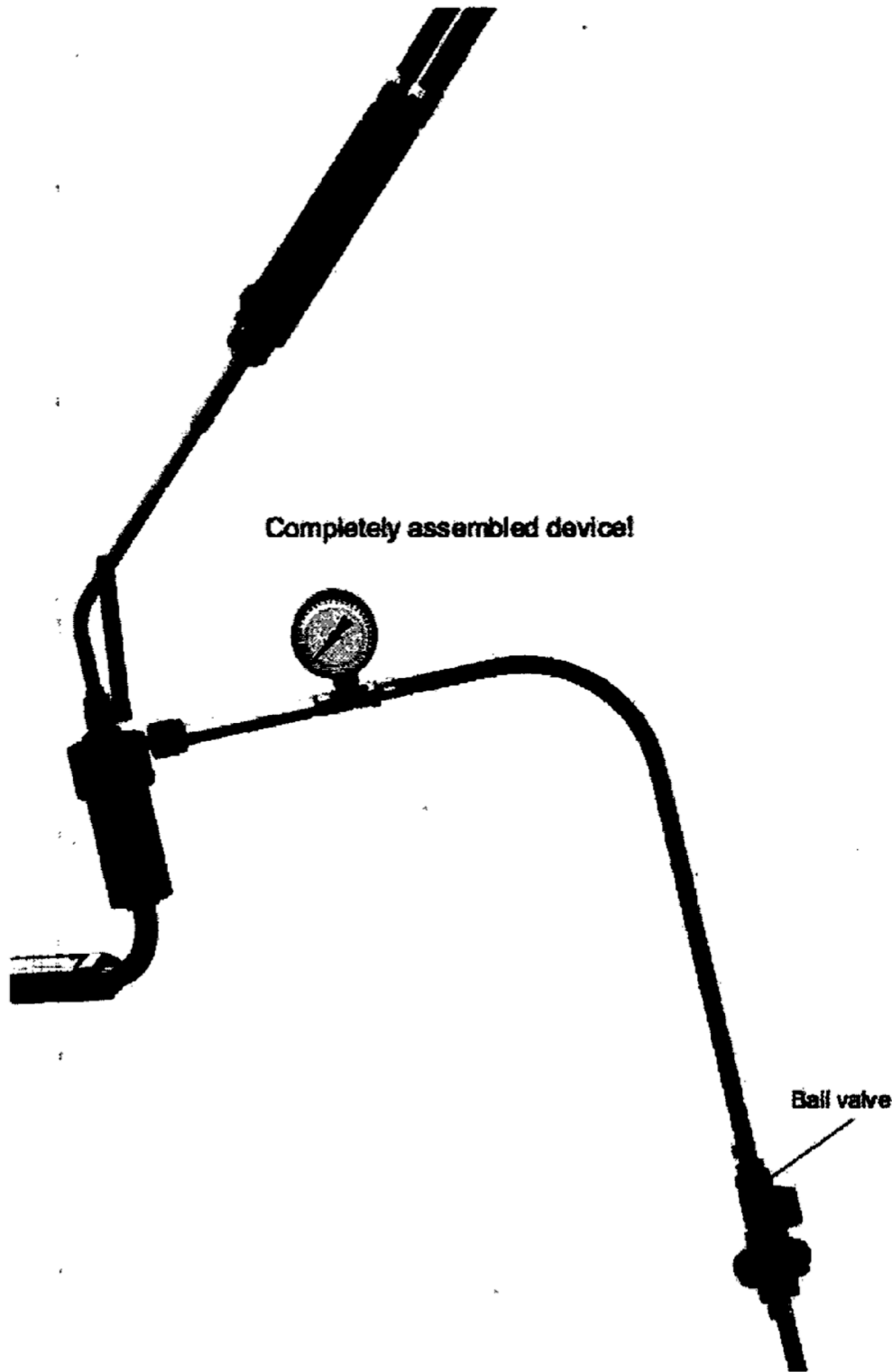
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मातृ सूची संख्या SUPERSEDES INVENTORY NO.	मातृ सूची संख्या को अधिकृत करता है	PRODUCT STANDARD (HEEP: HARIDWAR)		पृष्ठ 12 का 11 Page 11 of 12	
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इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल लिमिटेड की सम्पत्ति है। इसका प्रयोग एवं वितरण केवल ही भारत हेवी एलेक्ट्रिकल लिमिटेड के द्वारा ही किया जायेगा। This document contains confidential information of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.		Figure-9 : Type with Bend Equipment (Type-2 & 3) Completely assembled device			
मातृ सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO. 03	निर्माणकर्ता WORKED BY	ANOOP KUMAR	19-06-2019
मातृ सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO. 03	जांचकर्ता CHECKED BY	DINESH L. GOND	19-06-2019



उत्पाद मानक (हीप : हरिद्वार)

ST 38007

PRODUCT STANDARD (HEEP: HARIDWAR)

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10. Documents to be submitted by supplier:

- Three copies of Operation & Maintenance Manual of "Gas Heating Device" which shall include part item details & its item number, the correspond assembly & dis-assembly of product & its operation procedure.
- Warranty certificate.
- Certificate of Compliance.

11. Cross Reference:

- BHEL drawing no. 11201556600
- Technical Catalogue of M/s Sirius Rohr- und Brennertechnik GmbH, Germany

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स्वाधिकार एवं गोपनीय
एक प्रतीक से भी गई स्वतंत्र भारत हेवी एलेक्ट्रिकल लिमिटेड की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग जो कि कंपनी के हित में हानिकारक हो न किया जाए।

दिनांक एवं हस्ताक्षर
04/07/19

सामग्री सूची संख्या
INVENTORY NO.
P-5275

REV. NO. 03

निर्माणकर्ता
WORKED BY

ANOOP
KUMAR

Anoop

19-06-2019

जांचकर्ता
CHECKED BY

DINESH L.
GOND

Dinesh Gond

19-06-2019