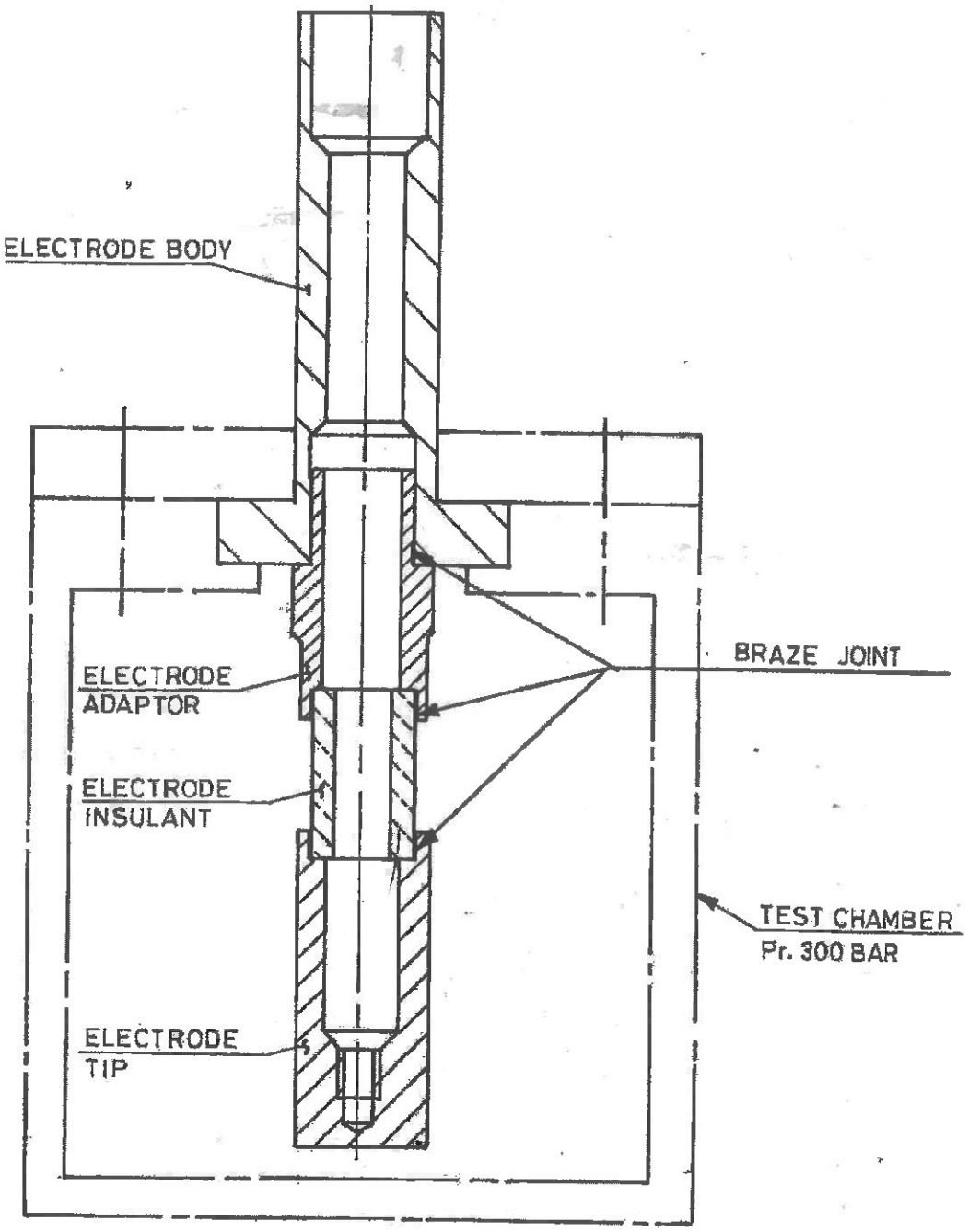
FIRST ANGLE PROJECTION ALL DIMENSIONS IN mm



TEST: JOINT IS TESTED FOR LEAK AT 300 BAR.

REV.	DATE	ALTERED / CHECKED

BHARAT HEAVY ELECTRICALS LTD.
ELECTROPORCELAINS DIVISION
BANGALORE - 560 012

	NAME	SIGN	DATE
DRN	N. CHIKKANNA		5-01-97
CHD			
APPD	V. VENKATESAN		5-01-97

DEPT. CODE	GRADE OF TOL. DIM. C/M/F	SCALE	WEIGHT (kg)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
		NTS	— (APPROX)	—	—	—

TITLE: BRAZE JOINT ASSEMBLY

CARD CODE:

DRAWING NO.: 4 987 99 00034 REV.: 00

SHEET NO. | NO. OF SHEETS

SUPERSEDES DRG. NO.

SHT. 23, SIZE - A4 - 297 x 210 mm

BHARAT HEAVY ELECTRICALS LIMITED
ELECTRIC & PHOTOVOLTAIC DIVISION
BANGALORE 560 012

WORK INSTRUCTIONS	ISSUE: 06 REF : NP/1601/WI/EWLI/05 REV : 00 DATE : APRIL 2018 Page : 1 of 5

PROCEDURE FOR BRAZING OF ELECTRODES

1.0 SCOPE

It covers the procedure for assembly of the components for brazing and the brazing procedure for the electrode probe comprising of the following components viz. Electrode insulant, electrode body, electrode tip and electrode adaptor.

1.1 METHOD

The following method for cleaning shall be followed:

i) Rinse all the components in Kerosene/ thinner and clean with cotton waste

ii) Afterwards dip the components in soap water to degrease contaminants

iii) Further clean the components in clean water to remove trace of soap

iv) Dry the cleaned components in the oven at 50±5 Degree C

v) After drying dip the components in acetone and further clean in ultrasonic cleaner for 10minutes

1.1.1 Final cleaning of all components including the preformed brazing foils in AR grade acetone before commencing assembly.

1.1.2 Do not touch the components with bare hands. Use surgical gloves while assembling and loading.

1.1.3 Assemble in the components in the following sequence:

i) Electrode Body and Electrode Adapt

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ANTARA BARAL SR EXECUTIVE IN-CHARGE/ NP	K S RAVISHANKAR HEAD/NP

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WORK INSTRUCTIONS	ISSUE: 06 REF : NP/1601/WI/EWLI/05 REV : 00 DATE : APRIL 2018 Page : 2 of 5

ii) Electrode Adaptor and Electrode Ceramic Insulant
iii) Electrode Insulant and Electrode Tip

To assemble each of the above set of components, first place the circular brazing perform at the bottom of the joint to be brazed in the first component and then place the circumferential brazing preform around the circumference of the joint to be brazed and then press in the second component using a toggle press. This procedure is to be repeated in the sequence of assembly as listed above.

1.1.4 Check for straightness of assembly using the given gauge. If found not passing the gauge remove and reassemble and repeat check.

1.1.5 Rinse the assembly in AR grade Acetone about 1 minute.

1.1.6 Place the assembled electrodes onto the graphite fixtures.

1.1.7 Keep the assembled electrodes in an oven till the furnace is ready for loading.

1.1.8 When the furnace is ready load the assembled electrodes on the graphite fixtures into the furnace taking care to ensure that the electrodes do not touch the walls of the furnace.

1.1.9 Evacuate the furnace up to 1×10^{-5} Torr.

1.1.10 Carry out the firing as per the firing cycle in page 3 of 3

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WORK INSTRUCTIONS	ISSUE: 06 REF : NP/1601/WI/EWLI/05 REV : 00 DATE : APRIL 2018 Page : 3 of 5

1.1.11 Record the details of vacuum and the time - temperature of the firing cycle at periodic intervals. Also record the firing cycle number and date and time of commencement and completion of the firing cycle and electrode batch details.

1.1.12 Unload the brazed electrode assemblies after the furnace is cooled to 50 °C

1.1.13 Check for visual defects in the brazing such as bend, improper brazing (voids, blackened brazed surface etc.) and record the same.

1.1.14 Pack the accepted brazed assemblies in sponge or air packed polythene bags and place in thermocole casing.

1.2 CALIBRATION

1.2.1 The instruments, gauges and indicators used for the process of brazing shall be under valid calibration. The copies of the valid calibration certificate shall be submitted to BHEL before commencement of work and renewed as per Defined schedule there after

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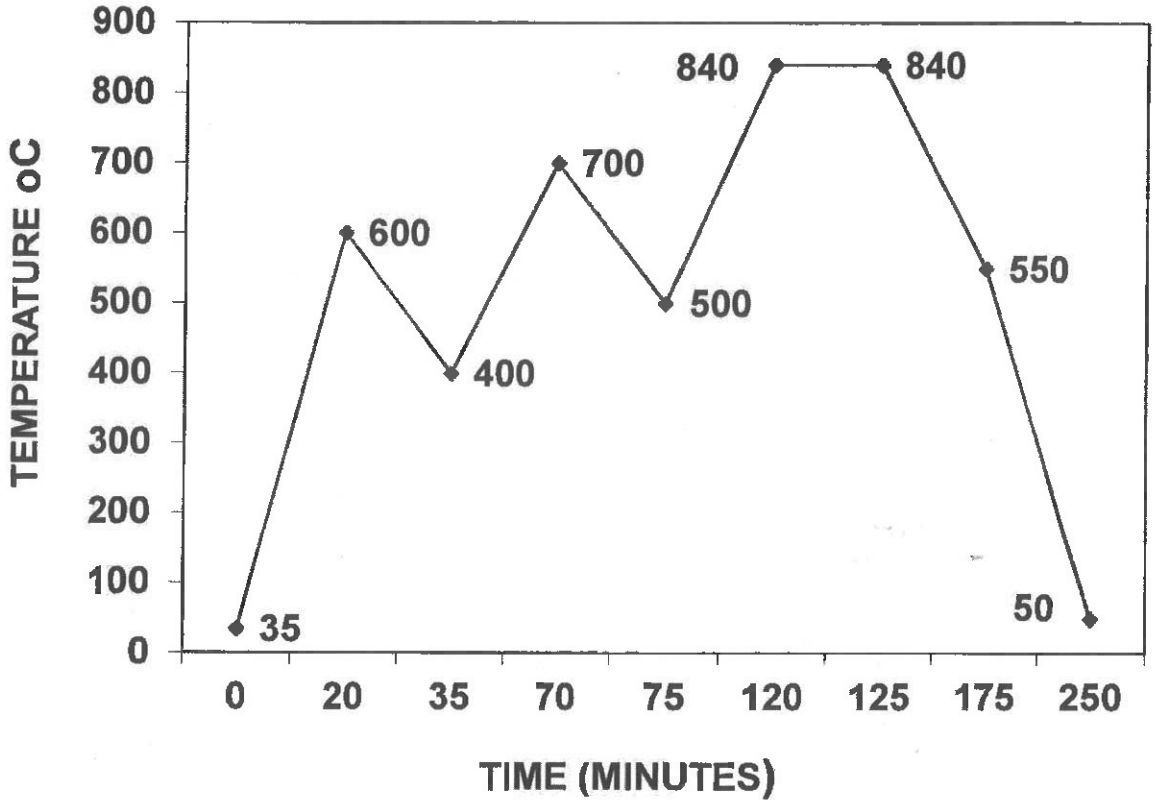
VACUUM BRAZING CYCLE FOR ELECTRODE PROBE



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ANTARA BARAL SR EXECUTIVE IN-CHARGE/ NP	K S RAVISHANKAR HEAD/NP

MANUFACTURING STANDARD QUALITY PLAN

ELECTRODE PROBE FOR EWLI

QP: 07/07-08 dt. 19.06.2014

BHARAT HEAVY ELECTRICALS LIMITED
ELECTRO PORCELAINS DIVISION
BANGALORE-560 012

EPD

	MANUFACTURER'S NAME AND ADDRESS	MANUFACTURING STANDARD QUALITY PLAN		
	BHARAT HEAVY ELECTRICALS LTD. ELECTRO PORCELAINS DIVISION BANGALORE- 560 012	ITEM: ELECTRODE PROBE FOR EWLI SUB-SYSTEM -	QP NO.: 07/07-08 REV. NO.: 05 DATE : 19.06.2014 PAGE: 1 OF 3	SIGN OF QUALITY HEAD (Y BABU RAO) AGM/Q& BE

Sl No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									M	Q	
1	2	3	4	5	6	7	8	9	**10		
1.0	**BOUGHT OUT ITEMS**										
1.1	Electrode tip and adaptor	Dimensions Surface Finish Chemical properties	Major	Measurement Visual Chemical	100 % one sample on bar stock	Purchase specifications & Drawings	Ref. Col. 7	Test Certificate	V	V	
1.2	Electrode Body	Dimensions Chemical properties	Major	Measurement Chemical	100 % one sample on bar stock	Purchase specifications & Drawings	Ref. Col. 7	Test Certificate	V	V	
1.3	Centering Washer Lock Nut Washer Knurled Nut Centre Stud Locking Cap	Dimensions Chemical Properties	Minor Minor	Measurement Chemical	10 % On Sample	Purchase specifications & Drawings	Ref. Col. 7	Test Certificate -do-	V V	V V	
1.4	Electrode Insulant	Dimensions Bulk Density Water absorption	Major	Measurement	100 % One sample per batch	Drawing NP/TD/01 Rev 00	Ref. Col. 7	Internal records	V	V	
1.5	Body insulant	Dimensions Bulk Density Water absorption	Major	Measurement	100 % One sample per batch	Drawing NP/TD/01 Rev 00	Ref. Col. 7	Internal records	V	V	
1.6	Metaflex Gasket	Dimensions Materials	Minor	Measurement	One sample per batch	Purchase Specn & Drawing	Ref. Col. 7	Test Certificate	V	V	

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** M: MANUFACTURER/SUB-SUPPLIER (SHOP) Q: **QUALITY**, **P**: PERFORM **W**: WITNESS AND
V: VERIFICATION. AS APPROPRIATE,

Note:# ***Inspection Engineer to check, approval date/ revision no. of reference documents at the time of Inspection***

MANUFACTURER'S NAME AND ADDRESS	MANUFACTURING STANDARD QUALITY PLAN		
BHARAT HEAVY ELECTRICALS LTD. ELECTRO PORCELAINS DIVISION BANGALORE- 560 012	ITEM: ELECTRODE PROBE FOR EWLI SUB-SYSTEM -	QP NO.: 07/07-08 REV. NO.: 05 DATE : 19.06.2014 PAGE: 2 OF 3	SIGN OF QUALITY HEAD (Y BABU RAO) AGM/Q& BE

Sl No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY M	AGENCY Q	REMARKS
1	2	3	4	5	6	7	8	9	**10		
2.0	**INPROCESS INSPECTION**										
2.1	Cleaning	Finish	Minor	Visual	100 %	NP/1601/05 Rev 00	Ref. Col. 7	Log Book	P		
2.2	Pre Sub Assembly	Verification of Components	Major	Visual	100 %	NP/1601/06 Rev 00	Ref. Col. 7	Log Book	V		
2.3	Brazing	Process Parameters	Major	Physical	Each Cycle	NP/1601/06 Rev 00	Ref. Col. 7	Log Book	V	V	By active brazing method
		One sample shall be cut & macrostructure shall be checked& Brazing interface integrity shall be visually checked. Ceramics-Brazing material-Titanium junctions which shall be as per BHEL work instruction.									
2.4	Sub Assembly	a) Pressure Test (Hydraulic)	Major	Physical	100 %	NP/1601/03 Rev 00	Ref. Col. 7	Log Book	P	V	
		b) Marking	Minor	Physical	100 %	NP/1601/02 Rev 00	Ref. Col. 7	Log Book	V		
2.5	Final Assembly	a) Critical Dimensions	Major	Physical	100 %	NP/1601/01 Rev 00	Ref. Col. 7	Dim.report	P		
							Ref. Col. 7	Log Book	V	V	
		b) Tightening of Lock Nut	Major	Physical-Torque	100 %	As per Drg.	Ref. Col. 7	Log Book	P	V	
		c) Insulation Resistance test	Major	Physical	100 %	NP /04- Rev 00					

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MANUFACTURER'S NAME AND ADDRESS	MANUFACTURING STANDARD QUALITY PLAN		
BHARAT HEAVY ELECTRICALS LTD. ELECTRO PORCELAINS DIVISION BANGALORE- 560 012	ITEM: ELECTRODE PROBE FOR EWLI SUB-SYSTEM -	QP NO.: 07/07-08 REV. NO.: 05 DATE : 19.06.2014 PAGE: 3 OF 3	SIGN OF QUALITY HEAD (Y BABU RAO) AGM/Q& BE

SI No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY M	AGENCY C	REMARKS
1	2	3	4	5	6	7	8	9	**10		11
3.0	**FINISHED PRODUCT**										
3.1	Acceptance Tests	a) Visual and Dimension	Major	Physical	100 %	NP/1601/01-Rev 00 Drg/PO Spec	Ref. Col. 7	Test Report	P	W	Quality will witness 10% as sample quantity selected at random for (a) to (e)
		b) Marking	Major	Physical	100 %	NP/1601/02-Rev 00 Drg/PO Spec	Ref. Col. 7	Test Report	P	W	
		c) Pressure Test (Hydraulic)	Major	Physical	100 %	NP/1601/03-Rev 00 Drg/PO Spec	Ref. Col. 7	Test Report	P	W	
		d) Insulation resistance Test	Major	Physical	100 %	NP/1601/04-Rev 00 Drg/PO Spec	Ref. Col. 7	Test Report	P	W	
		e) Provision of Metaflex Gasket	Minor	Physical	100 %	Drg/PO Spec	Ref. Col. 7	Test Report	V	W	
		f) Drop Test	Minor	Physical	1 No. per Boiler	Ref. Note (1)	Ref. Col. 7	Test Report	P	W	

Note : (1) The packaged Electrode shall be drop tested from a height of 1.5 M on to a concrete floor. The shock on the electrode should be absorbed. Each electrode shall be packaged in separate cases. After the drop test, the Electrode shall undergo Pressure test (Hydraulic) as per NP/1601/03-Rev 00

(2) The process documents indicated under Reference Document column are available at the works for verification during Inspection

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922646/2022/SBD-WEX_PROJ_IED

Scope of work:

Assembly and Brazing of Electrode components as per BHEL-Drawing (drawing enclosed)

1. Transportation of Brazing and ceramic components from BHEL-SBD to vendor work.
2. Brazing and Polishing of ceramic components.
3. Supply of Brazed and Polished components from vendor works to BHEL-SBD.
4. Point 1-3 includes cost of transportation, Assembly, Brazing and polishing of Brazed ceramic and Metal components including cost of labor, fixtures, power and fuel, tools and tackles etc. complete.
5. Bidders are requested to visit BHEL premises to understand the scope of work in detail. The assembly can be carried out on dust free work place, Brazing can be carried out in closed vacuum furnace,

Special Note:

1. All activities are to be done in a clean dust free environment.
2. The assembled item is to undergo a heat treatment in a vacuum furnace. (heating cycle attached)
3. The straightness of the item should be as per drawing given by BHEL.
4. The items are to be packed suitably to ensure that there is no damage to the item.

Quantity:

The quantity mentioned in the rate contract is for a period of 1 years. The tentative quantity is as follows:

Work Description	Quantity
Assembly and Brazing of Electrode Body: Assembly and brazing of electrode body in vacuum furnace as per Drawing, including assembly and brazing of metal to metal and metal to ceramic joints, polishing of brazed items, including cost of transportation, Abor, tools and tackles, fixtures etc. to complete the work.	180

The quantity is tentative. Firm quantity will be awarded to vendor through purchase orders issued from time to time. The actual quantity awarded can be less than the tendered quantity. Vendor can-not make any claim for award of entire tendered quantity. Work order will be awarded will be strictly as per BHEL's requirement from time to time.

Duration of Framework Agreement / Rate Contract:

The rate contract is for a period of 1 years, extendable up to 2 years as per BHEL requirement and with mutual agreement with vendor for extension at same rates and terms & conditions.

Delivery Time: 35 Days from the date of issue of material to vendor.

Payment Terms:

1. Payment will be released after 45 days of acceptance of the material, subject to final acceptance of the machined product by user department of BHEL EPD.
2. Visual inspection and dimension check will be done for the machined products supplied by the vendor. Payment will be made only for the defect free and dimensionally accepted items. No payment will be made for the rejected / damaged items.

Liquidity Damages

1. If the delivery by the vendor is delayed beyond 35 days from the date the material is drawn from BHEL EPD premises, a LD to the extent of ½% per week to a maximum of 10% shall be applied to the contractor for the undelivered portion of the material.

Technical Pre-Qualification Criterion

Bidder should have executed the following works in last seven years (from the date of opening of technical bid):

a. 1 similar works of value: Rs. 1.3 Lakhs including GST in a Single Order
b. 2 similar works each of value: Rs. 0.68 Lakhs each including GST (two single orders)
c. 3 similar works each of value: Rs. 0.45 Lakhs each including GST (three single orders).

Bidder to submit a copy of Work Order and Completion Certificate / Invoice Copy / Copies (against the order) as a proof of completion of work. In case of jobs in execution, work order copy, invoice of completed quantity along with a certificate / mail from employer for satisfactory job is also acceptable.

Definition of Similar Works: Brazing of Metal to Metal and Metal to Ceramic Components.

Security Deposit: 5% of the Work Order awarded on Quarterly basis.

Bank Guarantee for Material: In addition to the Security Deposit BG will collected for 100% of the material value being sent for machining with value as mentioned below for one component,
Total BG value= value of products X Qty. issued to vendor.

Drawing No.	**Value of one product**
49879900034	Rs. 1200/-