LIST OF BANKERS FROM WHOM BANK GUARANTEE IS TO BE OBTAINED

SEHEDULED COMMERCIAL BANKS

1. STATE BANK OF INDIA
2. STATE BANK OF BIKANER AND JAIPUR
3. STATE BANK OF HYDERABAD
4. STATE BANK OF INDORE
5. STATE BANK OF MYSORE
6. STATE BANK OF PATIALA
7. STATE BANK OF SAURASHTRA
8. STATE BANK OF TRAVANCORE

NATIONALISED BANKS

9. ALLAHBAD BANK
10. ANDHRA BANK
11. BANK OF INDIA
12. BANK OF MAHARASHRA
13. CANARA BANK
14. CENTRAL BANK OF INDIA
15. CORPORATION BANK
16. DENA BANK
17. INDIAN BANK
18. INDIAN OVERSEAS BANK
19. ORIENTEL BANK OF COMMERCE
20. PUNJAB NATIONAL BANK
21. PUNJAB & SIND BANK
22. SYNDICATE BANK
23. UNION BANK OF INDIA
24. UNITED BANK OF INDIA
25. UCO BANK OF INDIA
26. VIJAYA BANK
27. BANK OF BARODA
28. KOTAK MAHINDRA
29. HSBC BANK
30. AXIS BANK

SCHEDULED PRIVATE BANKS (INDIAN BANK)

31. ICICI BANK
32. HDFC BANK LTD
33. IDBI BANK

SCHEDULED PRIVATE BANK (FOREIGN BANK)

34. ABN AMRO BANK LTD
35. CITI BANK N.A.
36. DEUTSCHE BANK
37. STANDARD CHARTERED BANK
38. THE HONGKONG AND SHANGHAI BANKING CORPORATION LTD

Annexure-D

Annexure for procurement of heating element under rate contract

I – Rate Contract Terms and Conditions

(i) This Enquiry is for entering into Rate Contract for the procurement of Heating element required for various projects. Contractual period shall be one year (twelve months) from the date of LOI/PO.

(ii) Separate addendum will be issued against firm requirement as and when.

(iii) *The rate contract quantity indicated is tentative only*. The qty indicated are not guaranteed requirement. It may increase / decrease. Also Delivery date indicated in the Enquiry is tentative.

(iv) Rates shall be firm till completion of supplies and shall be valid for ordering for a period of twelve months from the date of Letter of Intent. This means the order can be released on the last date of the Contract period.

(v) *Delivery is essence of the contract*. Vendor shall indicate the start-up period of the delivery from the date of Letter of Intent and also clearly indicate the quantity of heating element that can be supplied there after (First lot) each month in the offer.

(vi) Vendor shall offer their prices on F.O.R .BHEL Stores, Ranipet basis i.e. price shall be inclusive of all ie. P&F and Freight & Insurance.

II - Special Terms and Conditions

(i) Suppliers shall enclosed notarized MSE copy (in original) along the Charted accountant letter (in original) to validate the MSE status . for MSE vendor who have submitted the above documents shall be considered for 45 days after SRV payment term , and for remaining all other vendor’s it shall be 90 days.

ANNEXURE-E

Reverse auction (RA) / on-line bidding on internet:

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.

2.a. BHEL reserves the right to go for Reverse Auction (RA) instead of opening Part I bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

2. b.Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit "online sealed bid" in the Reverse Auction. Non-submission of "online sealed bid"by the bidder for any of the eligible items for which techno commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.

4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.

5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.

6. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.

7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for noncompliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.]

8. Reverse auction will be conducted on scheduled date & time.

9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.

10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.

11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL ‟s standard practice.

12. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the „Business Rules of Reverse Auction‟, which will be communicated before the Reverse Auction.

13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.

14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

15. In case BHEL goes for reverse auction & depending on the number of bidders, the H1 bidders (whose quotes are highest in online sealed bid) may not be allowed to participate in further RA process. Further, in case of sufficient vendors, exclusion of H1 bidders may get extended up to 20%.

MB

MASTER COPY

BAP/BHEL RANIPET
AIR QUALITY CONTROL SYSTEMS

REF:TEP:518:HE:G:REV 04
PAGE 01 OF 06
EFFECTIVE DATE:27-10-2000

TITLE: SPECIFICATION FOR BOUGHT OUT ITEM FOR ESP

ITEM: HEATING ELEMENTS FOR HOPPER , SHAFT & SUPPORT INSULATOR

PREPARED BY				
NAME	DESIGNATION	DEPARTMENT	SIGNATURE	DATE
P.MOHANKUMAR	SPE	EDC-AQCS	P. Mohankumar	27/10/00
REVIEWED BY				
C.R.JAYACHANDRAN	MANAGER	EDC-AQCS		27/10/00
APPROVED BY				
S.JAYAPRAKASAM	DGM	EDC- AQCS		27/10/00

ISSUED BY EDC- AQCS

RECORD OF REVISION

REV NO	EFFECTIVE DATE	REMARKS
00	01-07-92	ORIGINAL
01	01-10-92	GENERALLY REVISED
02	29-07-93	Testing clause removed
03	01-03-99	1. clause no 4.3 IS 2147 is changed to IS 13947 2. clause no 6.2.23 IP 56 added 3. Clause no 6.1.24 colour of TB specified. 4. Clause 6.1.8 resistance wire changed from Kanthal -DSD to Kanthal -D.
04	27-10-2000	Recommendations of task force incorporated.

****

1.0.0 SCOPE OF SUPPLY

The scope of supply of heating elements for Hopper, shafts isulator and support insulator and includes design, manufacture, testing, packing and delivery. The heating elements shall be supplied complete in all respects, along with termination facilities, cable glands etc as per the BHEL drawing indicated in the enquiry/purchase order

2.0.0 APPLICATION

These heating elements are used in ESP to keep the Hopper, shaft and support insulator in warm condition in order to avoid any moisture condensation in the insulator chamber , which will result in failure of the insulator and to avoid choking due to condensation in the hopper. The heaters will be continously in ON condition 24 hrs a day and 365 days a year.

3.0.0 SITE CONDITIONS

The heating elements shall be designed taking care of the following site conditions

3.1.1	Ambient conditions	: 0 to 50 °C
3.1.2	Design ambient	: 50 °C
3.1.3	Relative humidity	: 95 % RH at 45 °C
3.1.4	Environment	: Highly polluted , abrasive Dust Climate is tropical and conducive to fungus growth.
3.1.5	Location	: The heating element portion is kept inside the chamber to be heated. The terminal box is kept at ambient temperature.

4.0.0 : APPLICABLE STANDARDS

The heating element shall be designed,manufactured and tested as per the following standards with latest amendments. If there is any conflict between these standards and technical specification, the most onerous conditions shall apply.

****

4.1.1 IS 302 :General and safety requirements for light electrical appliances

4.2.2 IS 4159 : Specification for mineral filled sheathed heating elements

4.2.3 IS 13947 :Degree of protection provided by enclosure for low voltage switchgear and controlgear .

5.0.0 **TERMINAL CONDITIONS**

5.1.1	Power supply available	:415v,2wire,50Hz.
5.1.2	Power supply variations	:
	Voltage	:+/- 10%
	Frequency	:+/- 5%
	Combined variations of voltage and frequency	:10% (Absolute sum).

5.2.1 RATING OF HEATERS

(a) Hopper heater : 0.5
(b) Support insulator heater : 1.0 KW
(c) Shaft insulator heater : 1.0 KW

6.0.0 CONSTRUCTIONAL FEATURES

6.1.0 The heating elements suitable for single phase 415V AC shall be of mineral filled sheathed type and shall be manufactured in accordance with the drawings indicated in the purchase order.

6.1.1 The design of the heating elements shall take into account necessary safety factor.

6.1.2 The heater shall have a design life of 25 years and shall be able to withstand the thermal cycling as well as dynamic forces such as vibrations etc.

6.1.3 All ferrous parts shall be rust protected .

6.1.4 All bolts ,nuts , washers and other components required for assembly of the terminal box with heater shall be Chromium/Nickel plated.

6.1.5 The external finish on metal components shall be of heat and moisture resisting nature and shall not be affected adversly by variations in temperature under normal operating conditions or during the endurance test.

****

6.1.6 The sheath material shall be heat resisting Stainless Steel 321 or as per our enquiry /P.O .

6.1.7 The resistance wires forming the heating coil shall be of "KANTHAL-D"alloy.The wires shall be free from twist ,bends,kinks and other flaws and shall be clean and smooth.

6.1.8 The resistance wire shall be of uniform hardness nd shall be capable of being closely wrapped without twisting.

6.1.9 The mineral shall be adequately filled to withstand thermal shock and shall not deteriorate by heating and cooling in service. The filling material shall be of Magnesium Oxide granules.

6.1.10 The terminal box shall be provided with terminal Block of ceramic material.The terminal connectors shall be of nickel plated brass material with minimum 7 microns thickness.

6.1.11 The terminal box shall be suitable to receive 2x2c-2.5 sq.mm PVC insulated, unarmoured copper cables.

6.1.12 The terminal box shall be provided with two numbers of Nickel plated Brass cable glands of M/s Comet, Braco, Sunil &co, Arup Engg ,Siemens and Quality Precision make.

13

6.1.(12) Four nos of pre-insulated ATC lugs of Dowells make to suit the above cables shall be provided. 04

6.1.14 The terminals of the heating elements shall be connected to the terminal block using 2.5 sq.mm insulated copper conductor using crimped type annealed tinned copper lugs.The insulation of this connecting wire shall be heat resistant to withstand the temperature inside the terminal box.

6.1.15 Two numbers of M6 size earthing screws with spring steel/rose courtney washers, nuts and annealed tinned copper lugs shall be provided at the outside of the terminal box to receive the purchaser's Earth conductor of size 3.15-mm solid GI wire. Earth Symbol shall be embossed or engraved on the terminal Block.

6.1.16 Make and voltage grade shall be marked on the Terminal box.

****

7.0 TESTS:

7.1 **Degree of protection requirement**

Construction of The terminal box of the heating Elements shall be suitable for outdoor use and shall meet IP55 degree of protection .

7.2 Power consumption requirements

The input power of the appliances at rated voltage and when the appliance has attained a steady state shall not differ from the input power by more than 10%.

7.3 Leakage current requirements

At steady state temperature leakage current , which may flow from the live parts to the accessible parts and metal foil on external insulating material shall not exceed 300 micro amps peak or 210 micro amps rms.

7.4 High voltage test requirements

The heating element shall be capable of withstanding 1.0 Kv AC high voltage test without flashover or breakdown .

7.5 Insulation resistance test requirements

The insulation resistance of the heater, immediately after the test for high voltage shall be more than 10Meg.ohms when measured with 500v dc Megger.

7.6 Endurance and thermal shock withstand requirements

Heating elements shall be operated in air at 1.1 times the rated input for 1000 operating hours on cycles consisting of 30 minutes switching ON followed by 30 minutes switching OFF.After every 100 hours,water at a temperature between 15 degree and 40 degree centigrade shall be poured on the element after the element has been switched OFF.At the end of the test high voltage and insulation resistant test to be conducted.

8.0 **PACKING**

8.1 Heating elements shall be packed with proper packing materials to avoid any damages to the equipment during transit or during storage for a period of one year.Each type of heating element shall be packed separately.The quantity of heating elements in each package shall be as given below.

Hopper heating element : 12 Nos.
Support Insulator heating element : 4 Nos.
Shaft Insulator heating element : 2/3 Nos.

8.2.0 The package shall contain the following information:

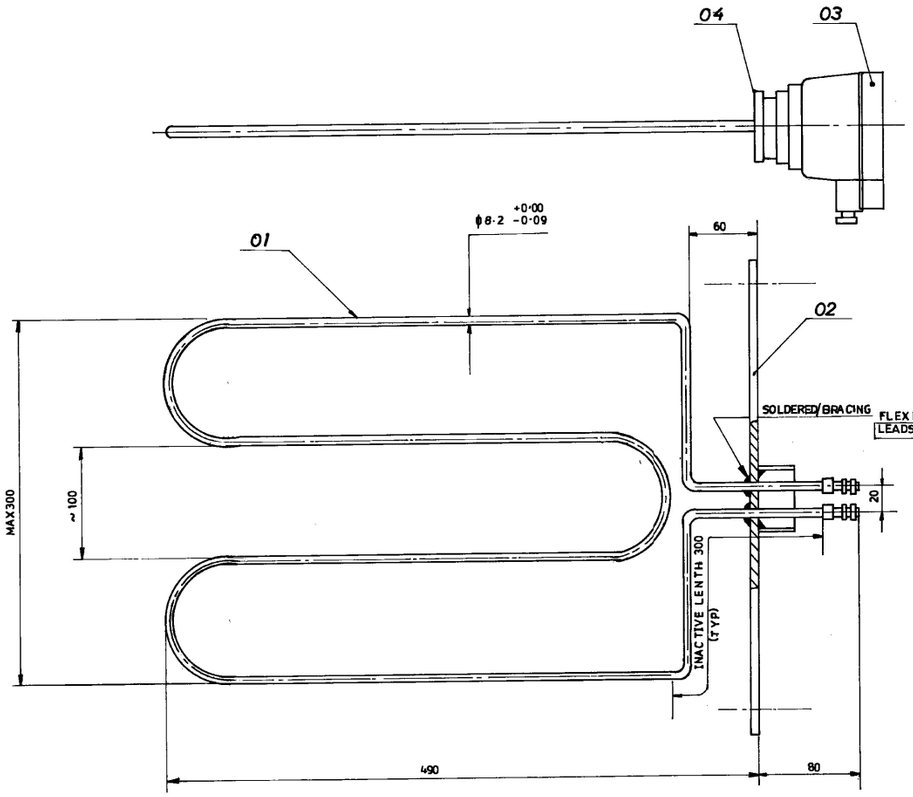
8.2.1 Purchase order number with date and address.

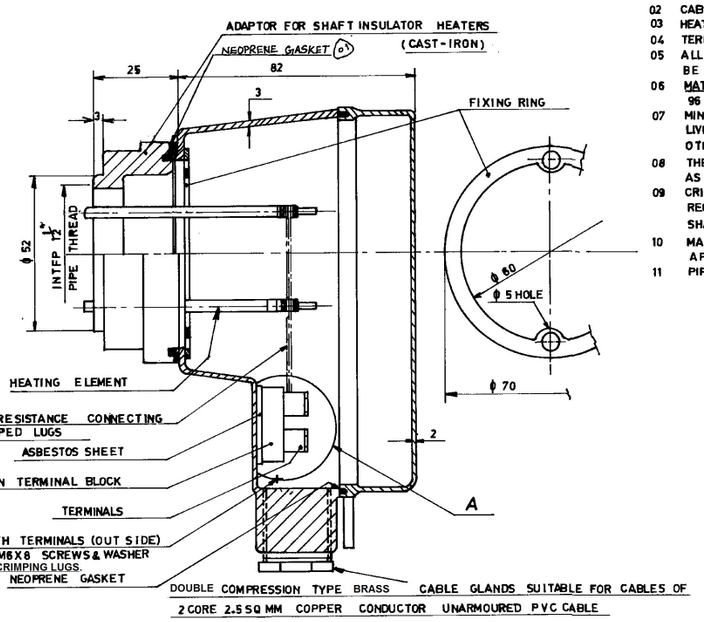
8.2.2 Name and address of the sender

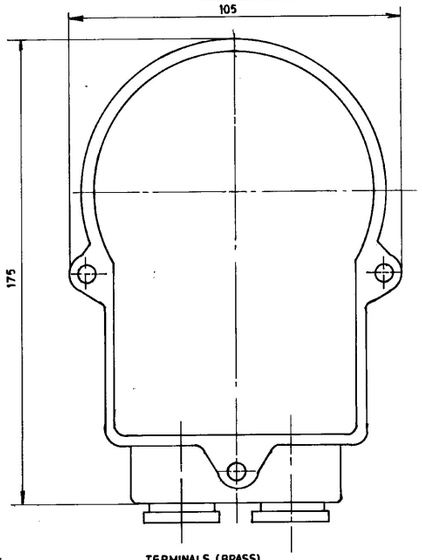
8.2.3 Quantity and Approximate weight

****

DRAWING NO. 1-79-090-00419







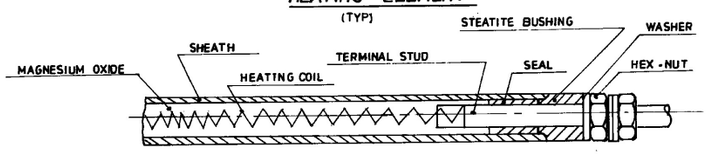
NOTES:-

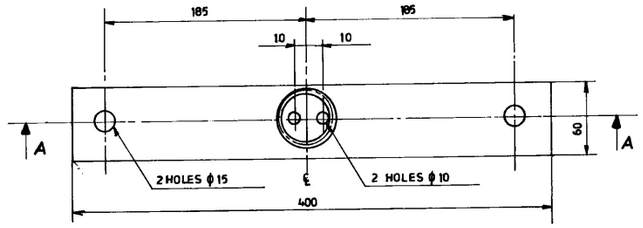
ALL DIMENSIONS ARE IN MILLIMETRES

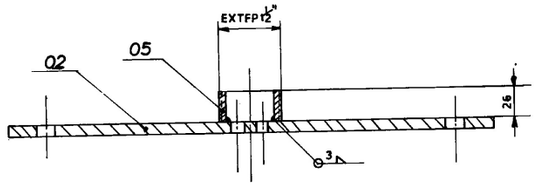
01 SHEATH MATERIAL : HEAT RESISTING STAINLESS STEEL 321.
02 CABLE GLANDS SHALL BE FIXED WITH DUMMY PLUGS.
03 HEATING COIL MATERIAL: KANTHAL DSD(NICKEL CHROME).
04 TERMINAL BOX MATERIAL: ALUMINIUM ALLOY, PRESSURE DIE CAST.
05 ALL FERROUS PARTS TO BE GALVANISED AND BRASS PARTS TO BE NICKEL PLATED.
06 MATERIAL CODE 96 150 436
07 MINIMUM CLEARANCE FROM THE TERMINAL BOX LID TO THE LIVE TERMINALS SHALL BE 15MM. OTHER CLEARANCES/ CREAPAGES AS PER RELEVANT STANDARDS.
08 THE TERMINAL BOX SHALL MEET IP55 DEGREE OF PROTECTION AS PER IS 2147.
09 CRIMPING TYPE CABLE LUGS (ATC) SHALL BE PROVOIDED TO RECEIVE 2 RUNS OF 2C - 2.5 SQMM COPPER CABLES, MAKE SHALL BE DOWELLS OR EQUIVALANT (SUBJECT TO APPROVAL).
10 MANUFACTURING DRAWING SHALL BE SUBMITTED FOR APPROVAL.
11 PIPE THREAD AS PER IS 2643.

SEE PRQA: 500 FOR PAINTING
REF: PRQA: 500 FOR UNTOL. DIMNS

CROSS SECTION OF HEATING ELEMENT (TYP)

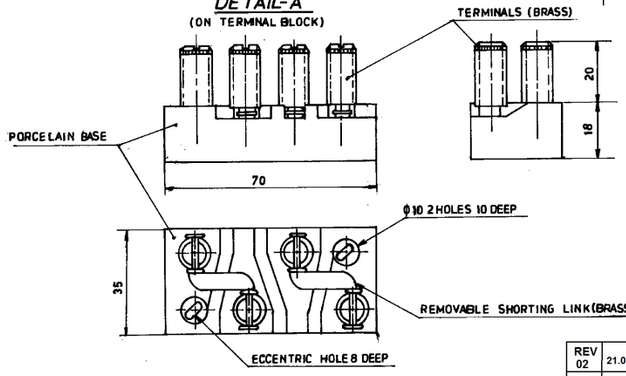






SECTION -AA
TO BE GALVANISED

DETAIL-A (ON TERMINAL BLOCK)



VARIANT NO	ITEM NO	DESCRIPTION	STD	DRAWING NO	ITEM NO	MATL-CODE	UNIT	UNIT WT	GS	ZONE
	05	TUBE ϕ48.3/3.25 L-26				IS 038-062		0.1		
						IS 1239		1		
	04	GASKET SH 2MM O.D 65 ID. 52.5						0.01		
						ASBESTOS		1		
	03	TERMINAL BOX		PRESSURE DIE CAST ALUMINIUM				0.40		
								1		
	02	MOUNTING PLATE 10X80 X 400				GALVANISED		1.8		
						IS 2062		1		
	01	HEATING ELEMENT 415V, 1PH, 1KW, 50HZ						1.0		
								1		

REV	DATE	ALTERED	CHECKED
02	21.07.11	GLAND TYPE ALTERED.	
01	02.01.08	GASKET INDICATED.	

CAUTION : The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER / PROJECT

BHARAT HEAVY ELECTRICALS LTD.
BOILER AUXILIARIES PLANT
RANIPET - 632 406

	NAME	SIGN	DATE
DRN.	DS		26.8.92
CHD.	GRJ		27.8.92
APPD.	SJP		27.8.92

DEPT. AQCS | CODE 862 | GRADE OF UNTOL. DIM C / M / F | SCALE | WEIGHT (KG.) 3.31 | REF. TO ASSY / OLD DRG. | ITEM NO. | No. of ITEMS

TITLE: HEATING ELEMENT FOR SHAFT INSULATOR. (1.0KW, 415VAC)

CARD CODE U 01

DRAWING No. 1-79-090-00419

REV. 02

Size A1