

OPEN TENDER CHECKLIST

Sl. No.	Document Name	Vendor Confirmation (Signed copy to be submitted along with Techno Commercial Offer)
01	Annexure A	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
02	Annexure B	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
03	Annexure C	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
03	Annexure D	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
04	PBG	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
05	Integrity Pact	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
06	IEM Annexure	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
07	BHEL's SPEC	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>

08	Online SRF (Original to be sent thru' courier)	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
09	CEBG	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
10	Experience certificate	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
11	SQP/RQP/Check list	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>



ANNEXURE – A to OPEN TENDER (4251428E)

Open Tender for Procurement of “HVR Transformer 95KV/ 1200 MA with silicon Oil Filled with electrical Control panel suitable for MP based controller (without BAPCON /Areca-II) as per spec.TEP:GEN:ECHVR:002:REV:00 & ADDL.REQ REF:ECI:UKAI R&M:EC-HVR-REV00 and REF:ECI:WANK:EC-HVR-REV00 (Project- UKAI-TPS Unit#5, 210MW R&M , District: TAPI, Gujarat (Customer number:R4M5) & WANAKBORI-TPS Unit 1,2&3 3x210MW , District: Kheda, Gujarat (Customer number :R4M2 ,R4M3,R4M4))”.

NOTICE INVITING TENDER :

Sealed Tenders are invited for the supply of HVR Transformer, Silicon Oil Filled, EC Panel of rating 95KV/1200MA as per the Specification, Standards and Quantities as listed below.

The Scope includes HVR Transformer Filled with Silicon Oil & EC Panel”.

SPECIFICATION: TEP: GEN: EC-HVR:002 Rev00 and special requirement: ECI:UKAI R&M :EC-HVR:Rev00. & ECI:WANAK:EC-HVR:Rev00.

Sl No	Material code	Description	Technical Specification	Special Requirement	Unit	Qty	Tentative Delivery Schedule
01	R7550467 0001	Electronic Controller, Panel Rating 95KV/1200MA suitable for MP Based Controller (Without BAPCON/ ARECA)	TEP:GEN:EC- HVR:002 Rev00	ECI:UKAI R&M:EC- HVR:Rev:00	No	20	24/06/2016
02	R7550467 0002	HVR Transformer 95KV/1200 MA Filled with Silicon Oil			No	20	
03	R7550467 0003	10% Extra Top up oil			ST	20	
01	R7550466 0001	Electronic Controller, Panel Rating 95KV/1200MA suitable for MP Based Controller (Without BAPCON/ ARECA)	TEP:GEN:EC- HVR:002 Rev00	ECI:WANK:EC- HVR:Rev:00	No	60	
02	R7550466 0002	HVR Transformer 95KV/1200 MA Filled with Silicon Oil			No	60	
03	R7550466 0003	10% Extra Top up oil			ST	60	



Destination Project- UKAI-TPS Unit#5, 210MW R&M District: TAPI , Gujarat (Customer number:R4M5) & WANAKBORI-TPS Unit 1,2&3 3x210MW , District: Kheda, Gujarat (Customer number :R4M2 ,R4M3,R4M4) Gujarat-628 004

This Tender – price bid will be opened thro’ conventional e-mode /Reverse Auction opening method only

New supplier/vendor shall submit SRF trough online as per following procedure

Online SRF Submission Procedure

We are pleased to inform you to register your firm thro' the following link.

Following are the formalities to be completed by your company for registration purpose.

Recently, we have switched over to online Supplier Registration Form as per our corporate guidelines. Supplier Registration Form is to be fed in our BHEL website portal and download the Supplier Registration Form from online portal and the same is to be sent to us for processing your registration activity.

We request to visit our Web Site : www.bhel.com and click under heading "Supplier Registration" and fill up the "**Supplier Registration Form**" which is available in the Online Supplier Registration Portal.

Or else, copy the following URL Link and paste in the web link address: [http:// www.bhel.com/vender_registration/vender.php](http://www.bhel.com/vender_registration/vender.php) and proceed with.

Or else, type directly as <http://203.129.195.108> and then before proceeding for user id & password - please search thoroughly your required material / product under the "search material" - click it and go for BHEL Plant name ie., BAP Ranipet in this case and then type under description any four letters or so for which *product / item* you are looking for and note down the *corresponding product code number suitably*.

*After completing the material search thoroughly then proceed for User Id & Password for filling up the details of registration requirements. Note: If you are an already registered supplier with any of our BHEL Unit - pls select "**existing permanent supplier**" or else select "**New Registration**" and then proceed accordingly.*

Please note that for foreign suppliers there is a separate format to be filled in, which may be taken care suitably.

After successful submission (uploading) of all the relevant documents thro' online portal, a hard copy of the same with all the annexures (as called for) may please be taken a print out and make a document folder and send the same to undersigned after affixing authorized signature with company seal in all pages.

Looking for a long successful & sustaining business association with BHEL.

Suppliers to quote for O & M spares suitable for one year trouble free operation along with the quantity & prices separately.



BHEL's Commercial terms & conditions and annexures can be downloaded from BHEL website www.bhel.com or www.tenders.gov.in or <http://eprocure.gov.in/cppp/>, <https://bheleps.buyjunction.in>, of M/s mJunction Services Limited who are our solution provider.

- 1) All corrigenda or any addendum to this enquiry shall be published in www.bhel.com and <https://bheleps.buyjunction.in>, of M/s mJunction Services Limited who are our solution provider only.
- 2) Vendor shall submit identical design type test report with validity of five year from the date of enquiry. The type test should have been conducted at reputed Govt laboratory. In case identical design type test report is not available, vendor to conduct all the type test as per IS 2026 with witness of BHEL/Customer at their own cost.

Qualifying criteria for the new vendors -Pre-qualification criteria

- (1) The supply shall be as per our Technical Specn: TEP:GEN:EC-HVR:002 Rev00 and special requirement as per ECI:UKAI:EC-HVR:Rev00 & ECI:WANAK:EC-HVR:Rev00 Deviation if any, the "deviation summary" shall be submitted for our technical evaluation.
- (2) BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false / incorrect, the offer shall be rejected.
- (3) The supplier shall fill all the details as called in the Supplier's Registration Form through online as stated above.
- (4) The suppliers should have successfully supplied the above rating sets or higher rating sets for at least one project. Details to be enclosed along with the offer.



ANNEXURE – B to TENDER

LIST OF LOOSE ITEMS PROPOSED TO BE SUPPLIED

(PRICE BREAK UP OF EACH ITEM SHOULD BE EXPLICITLY INDICATED BY THE SUPPLIERS AND ENCLOSED WITH THEIR QUOTE)

SL No	Item Description	Qty(per boiler)	Unit	<u>Total Qty</u>	Unit Price in Rs
01.	95 KV/1200 Ma transformer rectifier	2	Nos	8	
02.	High voltage insulator	4	Nos	16	
03.	HVRT stack with feedback cards	3	Nos	12	
04.	Complete set of Gaskets applicable for TR Set	16	ST	64	
05.	Indicating Lamp	10	Nos	40	
06.	Power fuse of suitable rating	25	Nos	100	
07.	Control fuse of suitable rating	5	Nos	20	
08.	Thyristor of transformer rectifier controller (each set consisting of two nos back to back assembly)	2	ST	8	
09.	Push Button (Accept)	10	Nos	40	
10.	Push Button (Start)	10	Nos	40	
11.	MCB of Suitable rating	10	Nos	40	



**ANNEXURE – C to TENDER
STANDARD TERMS & CONDITIONS
(FOR GUIDANCE TO THE SUPPLIERS)**

A] Submission of Offer

a) Invitation for bid

Tenders are invited through electronic mode from eligible suppliers.

The offers shall be posted into the system before the date and time specified in the tender.

The offer shall be sent on single part / two part / three part basis as specified in the main tender document.

Bids shall be submitted through e-Procurement portal, <https://bheleps.buyjunction.in>, of M/s mJunction Services Limited who are our solution provider.

b) Hardware and Software requirements for participating in e-tender

Requirement for participating in e-Procurement is as under:

i) A Computer with internet connectivity (Internet Explorer Version 7 and above).

ii) Digital Signature Certificate (Class 3- SHA2-2048 BIT- with both Signing and Encryption component separately).

iii) JAVA (Version 1.8 Update 45).

c) Instructions for Registered Suppliers

For all types of tenders (Single / Limited / Open) an automated email alert regarding issue of the Tender will be sent by the e-procurement portal to all Suppliers registered with BHEL, Ranipet for the item/s for which the tender is issued.

In case of open tenders, Registered suppliers with registered DSC will have to login with their user id/password & DSC and search for the Open Tender. On clicking the "Interest" button, they will get attached to that particular Open Tender.

Registered suppliers without DSC will have to first register themselves in <https://bheleps.buyjunction.in> as new supplier by clicking the "New Supplier" button.

To know the procedure for obtaining Digital Signature Certificate (DSC), suppliers who are not having the DSC are advised to visit our website www.bhel.com → Tender Notifications → Sample Checklist.

d) Instructions for new suppliers wishing to bid against open tenders

New, unregistered suppliers wanting to bid against open tender/s will have to first register themselves in <https://bheleps.buyjunction.in> as new supplier by clicking the "New Supplier" button.

After entering the Income Tax Permanent Account Number (PAN) details and pressing "Enter", they have to click the "Interested" button against the respective BHEL Unit for which they want to participate in the Open Tender and also fill up other relevant Company information as a one-time activity.

Then, a box for filling in a "preferred login id" will appear at the top of the page. After giving the "preferred login id" and then clicking the "Next" button, Supplier would have to map their DSC (which will be activated by M/s mJunction Services Limited), if available. Or else, by pressing "skip" button and selecting relevant procurement category from the list available in the next page and "agreeing" to the BHEL's terms & conditions, user id and



password will be generated/activated once in 2 hours and mailed to their registered email id. Using this user id and password, Supplier has to login and map the Digital Signature Certificate they have purchased to their code. The DSC will then be activated by M/s mJunction Services Limited.

As required by the tender, the necessary documents have to be filled-in online, in the provided template. Additional documents required are to be scanned and uploaded as .pdf file. Suppliers are advised to take note that the maximum space that is provided for uploading the documents that are to be attached is 300 MB. However the size of an individual document cannot exceed 10 MB. For any clarification on submission of offer on line, attention of the Supplier/s is invited to our document "Supplier Manual" hosted in the home-page of the e-procurement portal. During normal business hours, helpline maintained by the service provider mJunction is available for clarifying any doubts of supplier/s. The helpline numbers are 09840704941 or 09500199108.

Typical documents that would be required as part of tender submission would be

- a) Complete technical Offer with details, catalogues, as applicable.
- b) Un-priced bid (i.e. Bid without the Price) as per given format, if any.
- c) Filled-in BHEL's Standard Terms & Conditions as per Annexure enclosed with the Tender Document,
- d) Deviation summary submitted in two parts – giving the summary of technical deviations separately and the commercial deviations separately, if any and
- f) Supporting documents to substantiate equivalent material specifications / sections, where quoted for.
- g) Where asked for, Client list with their full address including detail of contact person with phone no., fax no. & e-mail ID (if any) to whom the same / similar items are supplied in the past two years. The date of supply may also be indicated, against each client.
- h) Bidders who are not already registered with BHEL Ranipet are requested to submit the Supplier Registration Form (SRF) online and a hard-copy of the same has to be sent addressed to the tender issuing authority for evaluating and registering as an approved vendor. The Supplier Development Cell (SDC) of BHEL, Ranipet would process the SRF for evaluation / registering the Supplier.

Suppliers can also upload their credentials by way of submission of Performance certificate/s issued by their customer/s detailing the quantity supplied and specification along with the un-priced PO copies and proof of supply along with the offer.

Technical acceptance of offer by BHEL shall be based on the evaluation of offer and the submitted documents.

Note

- (i) The materials offered, shall conform to the specification and scope attached in the tender.
- (ii) In case the offered materials are not conforming to the Enquiry material Specification, such offers would not be considered for evaluation and would be rejected.

Where equivalent specifications are offered, considering such offers will be at the sole discretion of BHEL. Wherever alternative standards / specifications are offered by Bidder, the Bidder shall provide sufficient documentary evidence to ensure equivalence to the designated standards / specifications, failing which the offer would be considered as not technically acceptable and hence shall stand rejected.



(iii) All taxes and duties payable as extra to the quoted price should be specifically stated in offers (as appearing in the online template).

Offer/s from within India shall be submitted along with CST & TIN No. / Tariff No. etc, failing which the purchaser will not be liable for payment of such taxes and duties. Our TIN No. 33024364741, CST No. 1141686/01.07.2014, BHEL ECC No. AAACB4146PXM008.

(iv) The un-priced bid shall be used to indicate relevant commercial terms such as scope of freight and insurance, applicability of duties and taxes etc. All Commercial terms are to be indicated clearly in the offer.

(vi) No changes shall be entertained once the bid is opened unless otherwise specifically agreed to in writing by BHEL.

(vii) Money values other than for those items appearing in the un-priced bid template shall not be indicated anywhere in the un-priced bid.

(viii) Time required for inspection (at Supplier's works), should be clearly given in terms of numbers of working days.

(x) Offers sent by FAX / E-mail: would not be entertained.

Price Bid in conformance with the specification and terms as given in the Un-Priced bid document.

Caution:

The suppliers are severely cautioned to note that the price bid document accepts the price in figures only. It does not allow the supplier to write the value by words. Therefore all care shall be exercised by the supplier while filling in the figures. Once the price bid is opened no option is available for the supplier to retract the offer under any grounds. If a supplier, for any reason whatsoever approaches BHEL with a request for change in the price, it would be treated as going back on the offer submitted. In such cases, action would be initiated by BHEL for suspending further business dealings with such suppliers as per policy of BHEL which prevails at that point of time.

Foreign / Overseas suppliers are hereby informed that offers with differential currencies are not permitted for a given tender document.

Note

(i) The price break-up should be in line with technical specification / scope of the tender. (Cost of material, packing charges, forwarding charges, freight and insurance charges shall be shown appropriately, as applicable).

(ii) Unless otherwise specified as a part of the tender condition, No Price Variation Clause will be entertained and No advance payment will be made by BHEL.

(iii) In case, there is a discrepancy in the term quoted in techno-commercial bid and price bid, the term as per the techno-commercial bid (Part I) shall hold good and the commercial term quoted in the Price Bid (Part II) shall not

be considered.

(iv) In their own interest, all Tenderers are advised to double check their prices, applicable duties and taxes.

(v) The quotation should be valid at least for a period of 90 days from the tender opening date.

(vi) Indian bidders should submit the prices in Indian Rupees only.

(vii) Foreign bidders may submit their bid in foreign currency. The currency for quoting shall be selected from the drop-down menu provided.



(x) Indian Suppliers shall quote on FOR Destination basis only. Destination is BHEL, Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India. Foreign Suppliers shall quote on CFR Chennai Seaport Delivery and Insurance will be in BHEL's scope. No other delivery terms shall be acceptable. Shipment shall be arranged by the Seller on Liner in / Liner out basis. As per Government of India guidelines, BHEL Ranipet being a Government of India Undertaking the Bill of Lading shall be made with the Shipper as "Government of India". This shall be specifically confirmed by the Bidder.

(xi) Where the cargo is containerized, Container washing charges, stuffing charges and / or any other such charges would be to the account of the supplier, where the containers are to be stuffed at the works of the supplier.

B] Opening of Offers

a) Tenders can be submitted up to 1400 Hours on tender opening due date. Part I will be opened on the same day at 1430 Hours. Results of the tender opening will be available for viewing for upto 7 days from the date of opening.

b) Price Bid opening will be done through e-mode / Reverse Auction method (English method) which will be decided after techno-commercial bid evaluation is completed. All tenderers would have to specifically give their acceptance for this in their bid/s.

Note

(i) Bids including all enclosures and supporting documents like catalogues, pamphlets, etc., shall be provided in ENGLISH language only.

(ii) At its option, BHEL may consider extending the due date/s for the tender openings. Sufficient notice would be given by BHEL for such extensions.

(iii) Deviations shall be summarized and provided in a "Deviation Statement", listing the points and the deviation against each point.

(iv) BHEL reserves the right to increase or decrease the tendered quantity and to order on more than one vendor at the lowest acceptable price to BHEL. In ordering on more than one source, the ratio of quantity split will be as specified in the tender terms.

If not explicitly specified, BHEL reserves the right to split the quantity of the enquiry as follows: 70% quantity being ordered on the original lowest bidder (L1) and balance 30% on the next higher bidder/s excluding H1, who accepts the L1 price. However, the final decision to split the order rests with BHEL only.

In the event that the other than L1 suppliers do not accept the L1 price, then the balance will be reverted to the original L1 and the original L1 shall be bound to accept the balance of the enquiry quantity kept reserved for order splitting. This decision would be given by BHEL within 60 days of the price bid opening.

(v) Offers for part quantities on item level basis are not acceptable to BHEL. While tenderers can quote for some or all the tendered items, no supplier shall quote for partial quantity of any given enquiry item. Such partial offer would not be considered in the enquiry for that item. Suppliers are to note that the evaluation unless otherwise specified will be on item level and not for the tendered items as a whole..

C] Evaluation of Offers

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a) The price bids including the impact price (if any) of the technically acceptable offers alone shall be opened.



b) Offers with pre-conditions (like conditional discounts) for price are liable to be not considered / rejected. For evaluation such conditions would be removed and only the base offer would be considered for evaluation and comparison.

d) In the event of any change in scope / quantity arising out of the discussions, offerers would be given a chance to submit their revised offer / Impact bids. The option for the revised offer / impact offer will be triggered by BHEL. The Supplier then will have the facility to feed-in the revised price / impact price as per the provision given by BHEL. The impact price can be positive or negative (or nil). The impact price option shall contain only the price addition / deletion for such change in the scope / quantities, over and above the original scope and price quoted. The original price quoted would remain unchanged. The total price would then be computed by the arithmetic addition of the original price and the impact price. Where BHEL gives the option of submitting the revised offer, the impact would be computed as the arithmetic difference of the revised price and the original price.

e) For evaluating the overseas offers, CFR Chennai Sea Port price quoted will be taken into account. The cost to BHEL will be arrived at by loading the applicable customs duty project wise, insurance charges, inland transportation charges to BHEL stores and LC charges etc.,

f) For suppliers within Tamil Nadu state, as per prevailing VAT Act, VAT input credit is currently 5%.

g) BHEL reserves the right to reject without assigning any reasons / load any offer with factors other than already specified for such offers having deviations to BHEL Specifications, Standard Terms & Conditions at its discretion. The decision of BHEL in this regard shall be final.

h) BHEL reserves the right to reject an offer due to unsatisfactory past performance during tender finalisation / execution of a contract at any of BHEL projects / units or if unsatisfactory performance report is received from the party/s referenced by the supplier at any time during tender finalisation.

i) BHEL reserves the right to operate Purchase / Price preference to Government of India Undertakings, which shall be given as per the guidelines of Government of India given from time to time and / or relax the Terms and Conditions of the tender.

j) For the purpose of comparing prices, tender prices shall be converted to Indian rupees and the conversion shall be made by using the TT Selling rate of State Bank of India (SBI) prevailing on the date of opening of Techno-Commercial / Unpriced bids. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken. This exchange rate will be followed till placement of order. Tenderers may please note that even if an impact price is taken as in (d) for purpose of price evaluation and arriving at the rank; the exchange rate will be taken as explained above.

k) Unless otherwise specified, evaluation will be on individual line item basis only and ordering will be on respective L1 vendors.

l) BHEL reserves the right to conduct negotiations on the "Price" and "Other Commercial Terms and Conditions" with the lowest ranked offerer at any time after the bid opening but before the release of the Purchase Order and If so required by BHEL, Supplier may have to share their costing sheet with BHEL.

D] Execution of the Order

a) BHEL will have the option to pre-inspect the materials at Supplier's works by BHEL's own inspector or by third party agency appointed by BHEL or BHEL's end customer/s but this does not absolve the Supplier from giving the specifications as agreed upon.

b) In the case of overseas suppliers Inspection call for carrying out the inspection shall be given 30 days before the scheduled contract delivery date. BHEL requires clear 10 days notice to arrange for inspection. The Inspection



date/s given by the Supplier shall be on firm basis. For local Suppliers the Notice period of Inspection shall be 10 working days.

c) Deviations, if any pointed out by the visiting Inspection team of BHEL shall be corrected and the items as per specification shall be dispatched on or before the contract delivery date.

d) The final inspection for acceptance will, however, be carried out at Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India.

e) The contract delivery date is the date of receipt at Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India. for suppliers in India and the date of dispatch clearance given by BHEL for overseas suppliers.

f) Travel & other local stay cost for the Inspectors sent by BHEL will be to BHEL account, but other Inspection Charges, if any shall be to the account of the Seller only.

The supplier shall arrange for packing suitably in all respects for normal transport by sea / rail / road and Materials shall be suitably protected against effect of tropical salt laden atmosphere in the event of shipment being delayed at ports / Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India. yards and as per BHEL TDC.

g) Foreign suppliers shall dispatch on FOB or C&F agreed Sea-Port basis, according to the contract conditions. Indian suppliers shall dispatch on free delivery (door-delivery) at Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India. basis only. Unloading the materials at Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India. would be to the account of BHEL only.

h) In the event of any short supply, it shall be the responsibility of the supplier to deliver such short supplied/ missing items on Free-of-Cost basis at Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India. Including customs clearances at Indian Ports in the case of foreign suppliers.

i) Materials shall be dispatched only after getting the dispatch clearance of BHEL (Dispatch clearance would either be faxed / e-mailed as a scanned document / couriered.)



k) PAYMENT TERMS: Indigenous Suppliers: 100% payment will be made directly thru' EFT within 45 days for MSE and Non-MSE 90 days after receipt of site acknowledgement copy of LR. If any supplier is asking for payment terms other than the above specified, then suitable loading on cost will be considered. **Loading of any deviation in the payment terms w.r.t tender terms will be "Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bids) + 6%, will be considered for loading for the periods of relaxation sought by bidders.**

ii) Foreign Suppliers "100% thru" irrevocable & unconfirmed LC at sight. All bank charges in India to BHEL's account and all other charges outside India to Supplier's account. **BHEL reserves the right to load the price of foreign suppliers in order to bring them on common platform as per Indigenous Suppliers on the account of differential payment terms to Indigenous Suppliers. Loading of payment terms will be "Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bid opening in case of two part bids) + 6%, will be considered for loading for the periods of relaxation compared to indigenous suppliers i.e. 90 days.**

m) Any incidence of tax like Income tax, Service Tax and with holding any other similar tax / duties /levies imposed by the Government of India, or the State Government, where the BHEL Unit is located, deductible at Source, during the tenure of the Order shall be deducted by BHEL and necessary certification of the deduction (Tax deduction at Source) would be given.

n) The Guarantee period shall start from the "Date of receipt and acceptance of the materials at **Thermal Power Station,Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India.**

E] Liquidated Damages Clause:

BHEL will levy penalty as Liquidated Damages (LD), for delay in delivery. The damages shall be at the rate of ½% per week or part thereof subject to a maximum of **10%**. The contract delivery date for purpose of L.D is the date of receipt at **Thermal Power Station,Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India.**,for suppliers in India and the date of dispatch clearance given by BHEL for overseas suppliers. Supplier shall deduct the applicable LD from the first payment when raising the claim for the same. The applicable LD if any would be communicated by BHEL along with the dispatch clearance. The LD would apply on the undelivered portion only. In case of reasons attributable to BHEL for the delay in delivery (for e.g. delay in arranging the pre-inspection) then the delivery time would be reset to the extent of the time delay attributable to BHEL, with waiver of the LD. Delivery being the essence of BHEL"s contract requirements, In the event that a **Supplier does not accept the LD condition above, the offer would be loaded to the extent of the shortfall with respect to upper limit specified above.**

F] Termination of Inquiry / Orders:

a) BHEL reserves the right to cancel any inquiry before opening of the tender, without assigning any reason.

b) BHEL reserves the right to cancel any tender and refloat a fresh tender, at any time after opening of the tender, in case it finds the response to its tender as not meeting its requirement. This shall be at the sole discretion of BHEL.

c) BHEL reserves the right to cancel the order for delay in supply beyond penalty period without any monetary or legal obligations and at the risk and cost of the Supplier. Any delay in getting the Export Licence cannot be quoted as an excuse for delayed delivery. BHEL reserves the right to cancel the order without any monetary or legal obligations, in case of delay in this regard.

d) BHEL reserves the right to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the time



stipulated or if the same were not available, the best and the nearest available substitute therefor. The supplier shall be liable for any loss which BHEL may sustain by reason of such rick purchases in addition to penalty at the rate mentioned in "Penalty" clause.

G) Miscellaneous

i) Role of Agents:

BHEL prefers to deal directly with the OEMs only. BHEL strongly discourages the engagement of Agents in India by foreign principals, to deal with BHEL, in BHEL's tenders. BHEL will not enter into any correspondence with an Indian Agent. The Indian Agent will not be extended the privilege given to the principals, such as that of attending the tender openings, attending technical discussions, commercial discussions or price negotiations and such like. In case, in spite of the above, a foreign principal insists on engaging an Indian Agent, It is made clear by BHEL that:

- a) It is the sole responsibility of the foreign principal to ensure the Agent does not represent any other foreign principal in a given tender. An undertaking to this effect shall be given by the foreign principal that his / her Agent does not represent any other foreign principal in the tender. This document shall form a part of the techno-commercial offer.
- b) If at any stage of the tender, BHEL finds that an Indian Agent has represented more than one foreign principal, all such offers of and all the foreign principals would be disqualified summarily in the tender inquiry. BHEL will only give an intimation of notice of the disqualification. No correspondence would be entertained by BHEL, on their decision. Such decision of BHEL shall be irrevocable, firm and final and shall be binding on the tenderer.
- c) BHEL, due to business reasons would ban, would have banned Indian agents from dealing with BHEL. Any foreign principal who engages such a banned agent, or an employee of the banned agency, or any other person connected with the banned agency, at any time during the tender proceedings, would be disqualified from the tender proceedings. The decision of BHEL in this regard shall be final and be binding on the OEM.

Hence in their own interests, prospective tenderers may check with BHEL, the status of their proposed agent vis-à-vis BHEL. In view of the requirement of BHEL, it is strongly suggested that in their own interest, foreign principals may desist from engaging any Indian agent and deal with BHEL directly and it is stressed that any OEM proposing to deal with BHEL by engaging and through an Indian Agent does so at their own risk. BHEL shall in no way be responsible for any consequences that may arise to the foreign principal on account of the antecedents / actions of their Indian Agent.

In the event of the foreign principal engaging an Indian Agent:

a) **The Supplier shall furnish an authenticated copy of the Agency Agreement with his agent detailing the precise relationship between them and their mutual interest in the business along with techno-commercial bid.**

b) The Supplier shall furnish original authorization letter for the Indian Agent. The letter shall contain name, contact person, complete postal address including phone, fax and e-mail ID. It shall also spell out the type of services to be rendered by Indian Agent.

c) Indian Agent & Agency commission: An Indian Agent can represent only one Foreign Manufacturer against a particular Tender. The FOB price quoted by the foreign bidder shall include the agency commission. However, the agency commission component payable to their Indian Agents shall be shown separately in the Offer, either as a lump-sum or as a percentage of the quoted price. This will be paid by BHEL in Indian Rupees, on satisfactory receipt & acceptance of the materials. For calculation of Rupee equivalent of Agency Commission, exchange rate as prevailing on the date of Purchase Order will be taken and

d) For all discussions, technical clarification and negotiations etc. only the principal would be authorized for interaction with BHEL. The Agent shall not be a party to the discussions / negotiations and would not be normally allowed to participate.

ii) Terms & Conditions of Letter of Credit (L/C) for overseas suppliers (indicated for acceptance).

a) Unconfirmed irrevocable Letter of Credit at Sight only will be opened by BHEL. Confirmation of L/C is not



preferred by BHEL. Also L.C will be opened in Lots in line with the staggered delivery.

b) All Bank charges out side India are to the Supplier's account and within India to BHEL's account.

c) In case of L/C extension caused by delays attributable to the Supplier, the L/C extension / commitment charges are to be borne by the Supplier.

iii) Other terms & conditions for letter of credit: - Documents for negotiation

a) Signed Commercial invoice in quadruplicate, for a value not exceeding the draft amount, quoting the import Licence No and certifying goods evidencing shipment of the merchandise are as per Applicant's Purchase Order. The amount of invoice after deducting Indian Agent's commission, if any, should not exceed the Credit amount. (The Indian agent's commission, if any, is payable in India in Indian rupees only.)

b) Certificate of Country of Origin, from the country of manufacture, issued by the Chamber of Commerce.

c) One set of Original and two sets of Non-negotiable copies of 'signed', „unmarked“, 'clean on board' Ocean Bill of Lading, showing Shipper as "Government of India" Account M/s. Bharat Heavy Electrical Ltd, Unit: BHEL, Ranipet as consignee (The opening bank should not be notified as consignee), marked freight payable / prepaid at destination.

d) Packing list in 4 copies in English, indicating Size wise Number of bundles / pieces shipped and weight.

e) Certified copy of the fax / e-mail sent by the beneficiary to the applicant giving the following particulars of shipment, as the insurance is to be arranged by the Applicant in India: (a) Purchase Order Number & date; (b) Bill of Lading Number & date (c) Name of vessel; (d) Port of Loading; (e) Number of bundles / pieces and weight; (f) Invoice Number, date and value (g) Purchase Order item number's despatched. The cable / fax is to be sent within 2 working days of shipment.

f) Beneficiary's certificate showing the relevant airmail / courier reference no. and date that the following clauses have been complied with:

1] Beneficiary to forward by Registered Airmail / Courier one complete set of original documents and one set of non-negotiable documents within 3 working days of obtaining shipping documents to Regional Manager (ROD), Bharat Heavy Electricals Ltd, No. 165, Thambu Chetty Street, Chennai – 600 001. India. (Phone: +91-44-25341249, 25341240 / Fax - +91-44-25340787; e-mail: raja@rodchn.bhel.co.in)

2] Beneficiary to courier at his cost 3 copies of complete set of non-negotiable documents to the Officer who released the Purchase Order.

3] Declaration by the Supplier certifying that the contents in each case are not less than those entered in the invoices / packing list and that the invoicing for the supplies effected is strictly in accordance with agreed rates as stipulated in the Purchase Order.

4] Declaration to the effect that all other documents as per purchase order has been couriered to the Purchase order releasing authority

5) The carrying steamer should be seaworthy, less than 25 years of age and approved by Lloyds / Classification Societies / General Insurance Corporation of India from time to time and

6) Copy of Dispatch Clearance / Instruction issued by BHEL.

iv) Documents to be sent directly to the Purchaser prior to shipment

a) Manufacturer's Original Internal Inspection / Test certificate in triplicate.



b) Manufacturer's Original Guarantee certificate as per Purchase Order. The material shall be guaranteed for a period of 12 months from the date of commissioning at **Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India.** or 18 months from the date of supply whichever is earlier. The acceptance would be evidenced by the Site acknowledge copy which will be raised by BHEL.

c) Inspection / Test Certificate issued by BHEL / Inspection agency specified in the Purchase Order. In the event that Inspection prior to dispatch is not carried out by the Engineers of BHEL, the Inspection certificate of the third party so authorized by BHEL and

d) Any other documentation as specified in the Purchase Order.

v) Conditions for transportation:

a) All shipping documents shall show the Purchase Order Number & Date, Import Licence Number & Date, and Letter of Credit Number & Date.

b) Transshipment is to be avoided.

c) Loading on deck is not permitted. The transport document must not contain a provision that goods may be carried on deck.

d) A transport document which is produced or appearing to have been produced by reprographic, automated or computerized systems or as carbon copy will be accepted as an original document provided that it is marked as original and is ink-signed.

e) The transport document must contain all the conditions of carriage on the original document.

f) The transport document must not indicate the place of destination as being different from the port of discharge.

g) The transport document must not contain the indication 'intended' or similar qualification in relation to the vessel or other means of transport or port of loading or port of discharge.

h) The transport document must be issued by the carrier or his agent and not by any freight forwarder.

i) Transport documents bearing reference by stamp or otherwise, to costs additional to the freight charges are not acceptable.

j) The Bills of Exchange must be dated and presentation of documents for negotiation must not be later than 15 days after the date of shipment and in any case not later than the expiry date of the Credit.

k) Material shall be dispatched through the agency nominated by BHEL.

l) Indian suppliers shall dispatch the materials on freight prepaid and on door-delivery basis (FOR Destination – Destination: **Thermal Power Station, Ukai & Wanakbori, Dist: TAPI & KHEDA, Gujarat, India.**) and

m) In the event there is a delay by the Supplier in negotiating / submitting the document, any demurrage / wharfage arising out of the same shall be to the account of the Supplier and shall be deducted from the final payment. Also, in such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a "Surrender Bill of Lading". Over-seas Suppliers have to give a No-Objection Certificate to BHEL, authorizing BHEL to get the Delivery Order from the Steamer Agent without producing the Original Bill of Lading. This is required to ensure avoidance of incidence of demurrage at Chennai Sea-port that may arise in case of delayed presentation of documents by the Seller.



H] Force Majeure

If at any time during the currency of this contract, the performance in whole or in part, by either party of any obligations under this contract shall be prevented or delayed by reason, of any war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, explosions, epidemics, quarantine, restrictions or acts of GOD (hereinafter referred to as events), then provided notice of happening of any such events is given by either party to other within ten days from the date of occurrence thereof, neither party shall reason of such events be entitled to terminate this contract nor shall either party have any such non performance and delay is resumed as soon as practicable after such events has come to an end or ceased to exist. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason or any such event claims for extension of time shall be granted for period considered reasonable by the purchaser subject to prompt notification by the seller to the purchaser of the particulars of the events and supply to the purchaser if required of any supporting evidence. Any waiver of time in respect of partial installment shall not be deemed to be a waiver of time in respect of remaining deliveries.

I] Cancellation of Order:

In the event of non-performance of the contract by the Supplier, BHEL reserves the right to cancel the order with issue of a written notice. BHEL would provide a curing period of 30 days, for the Supplier to rectify the situation. If the Supplier fails to rectify the reason/s that led to the issue of cancellation notice by BHEL, then the cancellation order would be issued automatically by BHEL, without further recourse to the Seller. BHEL will not pay any cancellation charges or any other charges / damages to the Supplier, arising out such cancellation. In the event of the non-performance of the supply contract, by the Supplier, the rights of BHEL include, in addition to cancelling the order, to take alternate purchase action at the cost and risk of the supplier. The additional expenditure to be incurred by BHEL in such alternate purchase would be to the account of the supplier. (Risk Purchase). This remedy would be in addition to the invoking of the CEBG on grounds of failure of the Supplier in executing the Contract and any other legal remedies."

J] Contract Execution Bank Guarantee:

To demonstrate the fidelity of the successful bidder, in executing the Contract, on receipt of the Letter of Intent / Purchase Order, the Supplier shall arrange to provide a contract execution bank guarantee (CEBG) within 30 days from LOI/PO. The format of the CEBG is a part of this enquiry. The format may be downloaded and necessary stamping may be obtained from the Banker towards submission of the CEBG. The indigenous suppliers have to provide the CEBG from any one of the Nationalized Banks, listed in the annexure to these terms. Overseas suppliers can submit the CEBG from any of the reputed International / National Bankers. However the CEBG is to be confirmed by any of the Bankers listed by us. In the event of failure by the Supplier to execute the contract either fully or partially, BHEL would encash the entire CEBG. The CEBG shall be valid for the period covering the agreed delivery date of the order with a further claim period of 3 months on the last specified delivery date. In the event of the failure of delivery BHEL would proceed with encashing the CEBG without reference to the Supplier. In the event of BHEL granting extension of the delivery dates, then the CEBG validity shall also be got extended by the Supplier to the extent of the extended delivery times together with the claim period as specified elsewhere. **The CEBG shall be for a value of 2% of the Purchase order.**

Suppliers who are all already registered with BHEL and having a vendor performance rating of A or A1 grade would be exempted from submission of CEBG.

K] Others

a) In case of any contradiction in the terms and conditions given here and elsewhere in the other documents of the tender, it shall be the responsibility of the tenderer to get it clarified from BHEL. The officer authorized to provide



such clarifications is Sr.Manager / Purchase e-mail: gravi@bhelrpt.co.in

b) Alterations to the conditions of the Tender can be done only by the authorized officer, at any time before the date and time of tender opening. Such changes, if any, would be communicated in writing and / or hosted in the web-page.

c) **Applicability of Integrity Pact:-** Integrity Pact are applicable for all the BHEL enquiries whose estimated value is equal to or more than Rupees 5 Crores. Submission of duly-filled & signed BHEL standard format of Integrity Pact (without any deviation) by Suppliers along with the un-priced (Techno-Commercial) bid is pre-requisite condition for evaluation of the offer. Copy of Integrity Pact with applicable nominated IEM is attached along with the tender documents for ready reference of Suppliers. If any Supplier attempts to bribe, or pay commission, gift or any advantage or bring in undue influence either by himself or on his behalf any one including a stranger to the tender, in addition to instituting legal proceedings as per the extant laws prevailing, will disqualify the supplier from this tender and all future tenders of BHEL. Decision of the Purchaser would be final in this matter.

d) The laws governing this transaction shall be the laws in India.

e) Wherever not specified, Inco terms 2010 shall be used to interpret the Commercial terms and conditions and

f) In the event of an order, Supplier shall agree to settlement of disputes or differences, if any, by way of arbitration, in accordance with the "Rule of Arbitration" of the Indian Council of Arbitration.

The language in the tender documents downloaded by the Bidders shall at no point of time be changed, altered or modified in any manner by the Tenderer. If such changes are made by any tenderer, it shall be considered as tampering with BHEL's terms and the offer shall be summarily rejected, whenever it is noticed by BHEL. Such Bidders would be disqualified from the Bidding Process and their offers would be forfeited / Bank Guarantees invoked. They would also not be allowed to participate in future tenders of BHEL.



**Annexure - D to OPEN TENDER 4251428E/OT
STANDARD COMMERCIAL TERMS & CONDITIONS
[FORMAT TO BE FILLED-UP BY THE SUPPLIER]**

S No.	BHEL Standard Terms	Supplier Confirmation	Deviation
01	Price: Supplier shall be quoted on " FIRM PRICE " basis only. No price variation clause will be entertained.		
02	Terms of Delivery:		
(a)	Indigenous Supplies : FOR - Destination means FOR - R4M5-UKAI-TPS U#5, 210MW retrofitting, WANAKBORI-TPS U#1,2,3 210MW retrofitting,Gujarat [Packing & Forwarding, Freight & Insurance are in Supplier's scope i.e. included in the quoted prices.		
(b)	Foreign Supplies : CFR - Chennai Port basis inclusive of SEA / AIR-worthy packing and inclusive of all charges till Chennai Port. Port of Loading should be indicated in Techno-Comemrcial offer. Freight charges up to Chennai Port Should be quoted separately in the price bid.		
03	Time Period for 'Supply' : To be indicated in weeks from date of receipt of Letter of Intent (LoI). The bidders should quote their earliest schedule for Supply against the schedule indicated in the NIT. Supply period indicated by bidder should include reasonable time required for approval of drawings and other inputs from BHEL. In the Techno-Commercial Bid, the bidder shall submit milestones for various activities in co-relation with Supply and E&C period quoted by him. BHEL, however, reserves the right to accept an offer not meeting the NIT schedule.		
04	Penalty: Supplier should quote a definite delivery period and any delay in delivery beyond the P.O delivery date will attract Penalty of 0.5% per week subject to a max. of 10% of order value.		
	Loading Factor for non-acceptance of Penalty Clause: In case any bidder is not accepting the above penalty for delayed Supply, the offer of bidder shall be loaded to the extent to which it is not agreed by the bidder. Example: If the Supplier has accepted for maximum 5% penalty clause, then balance 5% will be loaded for evaluating lowest bidder.		
05	Payment Terms: If payment terms as mentioned by BHEL are not agreed by bidder, such bidder have to submit Bank Guarantee at the time of payment / opening of LC in the prescribed Format of the amount, exceeding 80% of the PO value, valid till issue of E&C Certificate for the equipment. However, in no case, payment against dispatch shall exceed 90% of the PO Value. Additionally, for any deviation sought including as mentioned above, in Payment Terms by bidder w.r.t. tender conditions, following loading shall be followed: (a) Base rate of SBI as applicable on the scheduled date of tender opening (Technical Bid) + 6%, for the amount & period of relaxation sought by bidder. (b) On account of payment through LC, if insisted by bidder, Bank charges shall also be loaded for the deviation in (i) opening of LC by BHEL and (ii) period and amount of LC w.r.t. NIT norms, as per the prevailing bank rates.		
(a)	Terms of payment for Indigenous Offer: Dispatch of Goods on door delivery basis only. Goods dispatched with documents presented through Bank will be loaded with corresponding bank charges.		
(i)	90% payment of Supply value shall be made within 90 days (45 days for MSME suppliers) from the date of receipt of material at Destination. Balance 10% of Supply value (of all sets) plus 100% of the Commissioning supervision charges (of the first set) will be paid against Commissioning certificate issued by BHEL (for the first set) and submission of Performance Bank Guarantee (PBG) valid for 3 months beyond the warranty period by Supplier from any of the Consortium Banks of BHEL for 10% of total PO Value in the prescribed Format. The PBG confirmation charges shall be borne by vendor.		

S No.	BHEL Standard Terms	Supplier Confirmation	Deviation
(b)	Terms of Payment for Foreign Offers:		
(i)	An irrevocable unconfirmed Letter of Credit for 90% value (less Agency Commission if any) shall be opened after receipt of acceptable CEBG and inspection call or 2 months prior to the agreed delivery date whichever is later and valid for 75 days for shipment and for 15 days thereafter for negotiation. (Or if the supplier so requires: 69 + 21 days). Supplier shall ensure shipment within the LC validity period. LC opening charges within India is BHEL's account and out side India is suppliers account. In case of any default, the LC amendment charges in such cases shall be to supplier's account.		
	The balance payment of 10% of Supply value (of all sets) plus 100% of the Commissioning supervision charges (of the first set) will be made directly against submission of a Joint Protocol signed by BHEL and vendor for successful commissioning and prove out (of the first set). This is subject to the submission of Performance Bank Guarantee (PBG) valid for 3 months beyond the warranty period by Supplier for 10% of total PO Value in the prescribed Format. The bank guarantee is to be confirmed by any of the approved Banks of BHEL.		
(ii)	Whenever there is an Indian Agent to represent a Supplier, it is mandatory to give the details of services to be rendered by Indian Agent and / or the details of agreement between Supplier and Agent. Supplier to indicate the Agency Commission payable. Indian Agency Commission will be paid only in Indian Rupees, calculated at the rate of exchange prevailing on the date of Purchase Order. This is payable on satisfactory completion of the contract. Note: In order to maintain sanctity of the tender system, it is mandatory that one Agent cannot represent two Suppliers or quote on their behalf in a particular tender enquiry. If any Agent represents more than one Suppliers all such offers will be rejected.		
06	CEBG: The successful tenderer shall be required to execute within 30 days from the date of PO, a contract execution bank guarantee for 2% (two percent) of the Contract Price in favour of the BHEL. Suppliers who are all already registered with BHEL and having a vendor performance rating of A or A+ grade would be exemption from submission of CEBG		
(i)	Bank Guarantee (CEBG and PBG) from indigenous suppliers shall be in the prescribed form and from the list of bankers, provided by BHEL.		
(ii)	Bank Guarantee (CEBG and PBG) from foreign suppliers should be in the prescribed form from any Bank of international repute. The bank guarantee is to be confirmed by any of the approved Banks of BHEL.		
07	Guarantee Period: Guarantee regarding workmanship, materials used, design and performance should be for a period of 24 months from the date of supply. Loading Factor for non-acceptance of Guarantee Period: Less than 24 months from supply will attract loading of AMC charges for difference of quote with guarantee period. Example : If a Supplier provides 18 months guarantee period, in place of 24 months, then the difference 6 months will be loaded with AMC charges of 4% per annum for difference period of 6 months i.e. 2% of total cost will be loaded for evaluating lowest bidder.		
08	Performance Bank Guarantee (PBG): The Supplier shall submit a PBG for 10% of the contract value or acceptance for retaining 10% of contract value by BHEL in lieu of PBG valid for Guarantee period. Loading Factor for non acceptance of Performance Bank Guarantee / retaining of 10% of contract value by BHEL or acceptance of a PBG with lesser percentage or lesser period than specified: Will attract disqualification of the offer.		
09	Commissioning Supervision Charges: Supplier to specify clearly the Commissioning supervision Charges in their price bid. Service tax shall be extra as applicable. Requirement of technical specification needs to be complied with.		

S No.	BHEL Standard Terms	Supplier Confirmation	Deviation
10	Essential / Mandatory Spares: Suppliers to quote for O & M spares suitable for one year trouble free operation post warranty period along with their individual quantity & price separately.		
11	Validity: Supplier to mention clearly the validity date of the offer. [Minimum 180 days from tender opening date]		
12	Risk Purchase: Supplier specific confirmation is required for this clause - The purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefor. The supplier shall be liable for any loss which the purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in "Penalty" clause.		
13	Reverse Auction (R/A) / Bidding through Internet: Supplier confirmation required.		
14	Taxes & Duties:		
(i)	Excise duty in % (for Indigenous supplier): To be indicated by supplier. ED invoice is required for availing Cenvat benefit		
(ii)	Sales tax in % (for Indigenous supplier): VAT / CST to be indicated by the supplier.		
(iii)	Service Tax for services: To be indicated by supplier.		
(iv)	Income Tax: Wherever applicable income tax shall be deducted at source as per the rules and regulations of the Government of India. Necessary Tax Deduction at Source (TDS) certificate will be issued by BHEL for which supplier shall submit Permanent Account Number (PAN) and Tax Residency Certificate (TRC).		
15	Test Certificate: To be submitted.		
16	O & M Manual: 1 set per Set of Equipment in english language.		
17	Training / Demonstration: Supplier's scope.		
18	Pre-Despatch Inspection (PDI): BHEL will have the option to pre-inspect the equipment at Supplier's works by BHEL's own inspector or by third party agency appointed by BHEL before despatch. Inspection call for carrying out the inspection shall be given 15 days before the scheduled contract delivery date for indigenous sources. BHEL requires clear 30 days notice to arrange for inspection for foreign sources.		
19	For Foreign Offers:		
(i)	Manufacturers' Name and address:		
(ii)	Country of Origin:		
(iii)	Nearest - 1. Seaport; 2. Airport		
(iv)	Approximate weight, cubage of the consignment and number of containers required for shipment.		
<p>The above Commercial Terms and Conditions are confirmed by us for this tender. In case there is a variance between the conditions confirmed above and the main offer, we certify that the Commercial Terms and Conditions given above shall take precedence.</p>			

Signature and Office Seal of Vendor

Bank Guarantee No. _____ Date _____

Banker Name _____ Bank Guarantee Value _____

Page - 2/4

5. NOW, THEREFORE, WE the Bank do hereby undertake to pay the Company an amount not exceeding Rs. _____ (Rupees _____ only) against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reason of any breach by the said Contractor of any of the terms and conditions contained in the said Contract.

6. We, the Bank, do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor of any of the terms and conditions contained in the said Contract or by the reason of the said Contractor's failure to perform the said Contract. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, the Bank's liability under this Guarantee shall be restricted to an amount not exceeding Rs. _____ (Rupees _____ only).

7. The Bank's liability under this Guarantee is absolute and unequivocal and we, the Bank, undertake to pay unconditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority and such payment under this guarantee shall not wait till the disputes, if any, have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority.

8. This Guarantee comes into force immediately and shall remain in full force and effect up to and including _____ (date) (including a claim period of 3 months after the date of completion of warranty period).

9. We, the Bank, further agree that, subject to Clause-8, the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged or till the Purchase Department of the Company certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said Contractor and accordingly discharges this Guarantee.

.....3

Sign & Seal of the Issuing Bank

Bank Guarantee No. _____ Date _____

Banker Name _____ Bank Guarantee Value _____

Page - 3/4

10. Unless a demand or claim under this Guarantee is made on the Bank in writing on or before the date specified under Clause-8 above, the Bank shall be discharged from the liability under this Guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank on or before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date.

11. For the purpose of Clause-10, any letter making claim or demand on the Bank by the Company lodged in person or dispatched by Registered Post or by Fax or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank on or before the date specified under Clause-8 above, shall be deemed to be the claim/demand in writing referred to above irrespective of the fact as to whether and when the said communication reaches the Bank.

12. We, the Bank, further agree that the Company shall have the fullest liberty, without our consent and without affecting in any manner our obligations hereunder, to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by virtue of any such variation or extension being granted to the said Contractor or for any forbearance, act or omission on the part of the Company or any indulgence by the Company to the said Contractor or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of so relieving us.

13. This Guarantee shall not become void due to any change in the constitution of the said Bank or the said Contractor.

14. The Guarantee herein contained shall not be determined or affected by the liquidation or winding up or insolvency of or change in the constitution of the said Contractor, but shall in all respects and for all purpose be binding and operative until all payments of all moneys due or that may hereafter become due to the said Company are settled irrespective of any liability or obligation of the said Contractor under the said Contract.

15. It shall not be necessary for the said Company to proceed against the said Contractor before proceeding against the guarantor bank and the Guarantee herein contained shall be enforceable against the said Bank notwithstanding any security, which the said Company may have obtained or obtain from the said Contractor.

.....4

Sign & Seal of the Issuing Bank.

Bank Guarantee No. _____ Date _____

Banker Name _____ Bank Guarantee Value _____

Page - 4/4

16. Any claim or dispute arising under the terms of this document shall be subject to the jurisdiction of the Courts at Ranipet, Tamilnadu.

17. The said Bank declares that it has powers to issue this Guarantee under the Bank's Memorandum and Articles of Association and the undersigned has full powers to do so on its behalf under the powers granted to him by the proper authorities of the said Bank.

18. We, the Bank hereby undertake not to revoke this Guarantee during its currency except with the previous consent of the said Company in writing.

In witness whereof we _____ (name of the Bank) have hereunto setout Bank Seal the _____ day of _____ month _____ year.

SIGN & SEAL OF THE ISSUING BANK



BHEL BAP RANIPET

INSTRUCTIONS FOR BANK GUARANTEE

- 1.1 Bank Guarantee shall be issued by any one of BHEL's Bankers. Please refer to List of BHEL's Bankers enclosed.
- 1.2 If it is not possible, then BG can be issued by a Scheduled Commercial Bank with the prior approval of BHEL.
- 1.3 BG from Co-operative Banks is not acceptable.
- 2.1 Pre-printed BG Form of BHEL only shall be used.
- 2.2 Only the relevant information like Supplier Name, BG Value, Contract No., validity etc. shall be typed in the pre-printed form and executed by Bank.
- 2.3 Special adhesive stamp of the required value shall be affixed on the 1st Page of the Form.
- 2.4 If Special Adhesive Stamps are not available, then applicable stamp duty shall be paid at the Bank/Agency nominated by the concerned State Government to collect stamp duty, who will affix their signature, date and seal in the first page of the BG Form clearly marking it as "SPECIAL ADHESIVE" & "STAMP DUTY".
- 2.5 Stamp Duty for the BG shall be at the rate as applicable in the State where the BG is executed.
- 2.6 Bank Seal shall be affixed on the special adhesive stamp.
- 3.1 The executing officer of the Bank shall indicate his name, designation and power of attorney number/signing power number etc. on the BG.
- 3.2 Any correction/overwriting on the BG shall be duly authenticated under the Seal and signature of the executing officer of the Bank.
- 3.3 Each page of the BG shall be duly signed/initialed by the executing officer of the Bank and the last page is to be signed with full particulars under the seal of the Bank.
- 3.4 Fax number, e-mail Address, contact person, phone number and complete postal address shall be indicated in the covering letter of the BG from Bank.
- 4.1 The validity of the BG shall cover a period of 18 months (or such other period as per Purchase Order, if otherwise specified) from the last date of dispatch as per Purchase Order or actual date of last dispatch under the Purchase Order, whichever is later.
- 4.2 The BG shall have a claim period of 3 months. If no separate claim period is indicated in the BG, then the validity shall be 18 months (or such other period as per Purchase Order, if otherwise specified) plus 3 months.

- 5.1 No clause of the BHEL BG Form shall be altered, deleted or new clauses added by the Issuing Bank under any circumstances. Bank Guarantees with altered/deleted/added clauses will not be accepted by BHEL under any circumstances.
- 5.2 If the Issuing Bank wants to add any additional clauses, it shall be intimated to BHEL well in advance with exact text of the clause, which shall be subject to approval by BHEL Law Department. Those clauses specifically accepted by BHEL Law Dept. can be added in the last page of the BG Form and executed by Bank.
- 6.1 Bank Guarantee shall be forwarded by Issuing Bank directly to Accounts Officer/Stores Bills, BHEL/BAP, Ranipet-632406 .
- 6.2 If it is not directly forwarded to BHEL due to unavoidable circumstances, then the Issuing Bank shall send a letter directly to BHEL confirming the issue of the BG enclosing a photocopy of the Original BG.
- 6.3 The Bank Guarantee should not be routed through Bank along with other dispatch documents under any circumstances.
- 7.1 In case of any extension of a BG the same shall be executed on non-judicial stamp paper of the required value.
- 7.2 Only the due date and claim period shall be extended.
- 7.3 The extension should not result in alteration of any material facts of the BG.

Bank Guarantees executed as per the above instructions only shall be accepted at our end. Hence kindly ensure compliance with the above instructions for early processing of the bills and to avoid hold up of the bills.

Date : 10-11-2005.



LIST OF BANKERS FROM WHOM BANK GUARANTEE IS TO BE OBTAINED

SEHEDUED 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 MAHARASHTRA
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

NATIONALISED BANKS

- 9. ALLAHABAD BANK
- 10. ANDHRA BANK
- 11. BANK OF INDIA
- 12. BANK OF MAHARASHTRA
- 13. CANARA BANK
- 14. CENTRAL BANK OF INDIA
- 15. CORPORATION BANK
- 16. DEWA BANK
- 17. GUJARAT BANK
- 18. INDIAN OVERSEAS BANK
- 19. ORIENTAL BANK OF COMMERCE
- 20. PUNJAB NATIONAL BANK
- 21. PUNJAB & SIND BANK
- 22. UNITED BANK
- 23. UNION BANK OF INDIA
- 24. UTTAR BANK OF INDIA
- 25. VINDHYA BANK
- 26. BANK OF BARODA
- 28. KOTAK MAHINDRA
- 29. HSBC BANK
- 30. AXIS BANK

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT AND THE EXPIRY DATE OF BG MUST BE AFTER 3 MONTHS FROM THE DATE OF COMPLETION OF SUPPLIES)

CONTRACT EXECUTION BANK GUARANTEE

In accordance of M/s. Bharat Heavy Electricals Limited (A Government of India undertaking, a company incorporated under the Companies Act 1956 having its Registered Office at "BHEL House", SIRI Fort, New Delhi 110 049) through its Boiler Auxiliaries Plant located at Ranipet – 632 406, (hereinafter called 'the Company') having entered into a contract with M/s.....
..... hereinafter called 'the said contractor' which term includes 'suppliers' for the purpose of this Bond and under the terms and conditions of the Contract No.....Dt.....between BHEL, Ranipet and as per the Contract, the Contractor / Supplier is to furnish a Contract Execution Bank Guarantee for Rs.....in words.....
.....for the due performance of the contract and for the fulfillment of all the terms and conditions of the contract.

Sign and seal of issuing bank
Please affix Non Judicial Stamp
here, as per Stamp Act

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

1. We.....
.....
.....(Bank's name, Branch, Place – address to be mentioned [herein after referred to as the Bank) at the request of.....
.....(Contractor(s)] do hereby undertake to pay the company an amount not exceeding Rs.....in words
.....
.....against any loss or damage caused to or suffered or would be caused to or suffered by the company by reason of any breach by the said Contractor(s) of any of the terms and conditions contained in the said agreement.

2. We.....
.....
.....(name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the Contractor(s) 'failure to perform' the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.....in words.....

Sign and seal of issuing bank

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

3. We undertake to pay conditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We.....(name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Purchase Department of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. (i) Unless a demand or claim under this guarantee is made on us in writing on or before(date) (After 3 months from the date of completion of supplies) we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date. (ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL dispatched by Registered Post with Ack. Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim / demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the Bank personally.

Sign and seal of issuing bank

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

6. We.....(name of the Bank), further agree with the company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of not so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

8. The guarantee herein contained shall not be determined or affected by the liquidation or winding up or insolvency of or change in the constitution of the Contractor, but shall in all respects and for all purpose be binding and operative until all payments of all moneys due or that may hereafter become due to the said company or settled irrespective of any liability or obligation of the Contractor under the said Contract.

9. It shall not be necessary for the company to proceed against the Contractor before proceeding against the guarantor-bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the company may have obtained from the Contractor shall, at the time when proceedings are taken against the Guarantor hereunder be outstanding or unrealized.

10. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Ranipet, Tamilnadu Jurisdiction.

11. The Bank declares that it has powers to issue this Guarantee under the Bank's Memorandum and Articles of Association and the undersigned has full powers to do so on its behalf under the power granted to him by the proper authorities of the Bank.

12. We(name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the company in writing.

In witness whereof we.....
(name of Bank) have hereunto setout Bank Seal the.....
day of.....month 2015.

Sign and seal of issuing bank.

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT AND THE EXPIRY DATE OF BG MUST BE AFTER 3 MONTHS FROM THE DATE OF COMPLETION OF SUPPLIES)

CONTRACT EXECUTION BANK GUARANTEE

In accordance of M/s. Bharat Heavy Electricals Limited (A Government of India undertaking, a company incorporated under the Companies Act 1956 having its Registered Office at "BHEL House", SIRI Fort, New Delhi 110 049) through its Boiler Auxiliaries Plant located at Ranipet – 632 406, (hereinafter called 'the Company') having entered into a contract with M/s.....
..... hereinafter called 'the said contractor' which term includes 'suppliers' for the purpose of this Bond and under the terms and conditions of the Contract No.....Dt.....between BHEL, Ranipet and as per the Contract, the Contractor / Supplier is to furnish a Contract Execution Bank Guarantee for Rs.....in words.....
.....for the due performance of the contract and for the fulfillment of all the terms and conditions of the contract.

Sign and seal of issuing bank
Please affix Non Judicial Stamp
here, as per Stamp Act

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

1. We.....
.....
.....(Bank's name, Branch, Place – address to be mentioned [herein after referred to as the Bank) at the request of.....
.....(Contractor(s)] do hereby undertake to pay the company an amount not exceeding Rs.....in words
.....
.....against any loss or damage caused to or suffered or would be caused to or suffered by the company by reason of any breach by the said Contractor(s) of any of the terms and conditions contained in the said agreement.

2. We.....
.....
.....(name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the Contractor(s) 'failure to perform' the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.....in words.....

Sign and seal of issuing bank

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

3. We undertake to pay conditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We.....(name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Purchase Department of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. (i) Unless a demand or claim under this guarantee is made on us in writing on or before(date) (After 3 months from the date of completion of supplies) we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date. (ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL dispatched by Registered Post with Ack. Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim / demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the Bank personally.

Sign and seal of issuing bank

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

6. We.....(name of the Bank), further agree with the company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of not so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

8. The guarantee herein contained shall not be determined or affected by the liquidation or winding up or insolvency of or change in the constitution of the Contractor, but shall in all respects and for all purpose be binding and operative until all payments of all moneys due or that may hereafter become due to the said company or settled irrespective of any liability or obligation of the Contractor under the said Contract.

9. It shall not be necessary for the company to proceed against the Contractor before proceeding against the guarantor-bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the company may have obtained from the Contractor shall, at the time when proceedings are taken against the Guarantor hereunder be outstanding or unrealized.

10. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Ranipet, Tamilnadu Jurisdiction.

11. The Bank declares that it has powers to issue this Guarantee under the Bank's Memorandum and Articles of Association and the undersigned has full powers to do so on its behalf under the power granted to him by the proper authorities of the Bank.

12. We(name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the company in writing.

In witness whereof we.....
(name of Bank) have hereunto setout Bank Seal the.....
day of.....month 20__.

Sign and seal of issuing bank.

Annexure for IEM of Integrity Pact

Enquiry No : OPEN TENDER: 4251428E / 08.03.2016

Tender Due on: 04.04.2016

Items : HVR transformer

Total Qty : 80 Sets

The nominated IEM for IP for the above enquiry is

Mrs. Pravin Tripathi, IAS (Retd.)

And she can be contacted at :

D-243, Anupam Gardens,
Lane IB, Neb Sarai,
Sainik Farms,
New Delhi – 110 068

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi – 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
 - 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved

in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors". framed by the Principal.

Section 4 – Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors

- 6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from all subcontractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20 % of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/ Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).
- 6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- 6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 – Criminal Charges against violating Bidders/ Contractors /Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 –Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- 8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- 8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the

Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On behalf of the Principal

For & On behalf of the Bidder/ Contractor

(Office Seal)

(Office Seal)

Place-----

Date-----

Witness: _____

Witness: _____

(Name & Address) _____

(Name & Address) _____


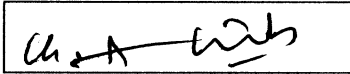
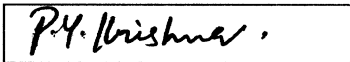
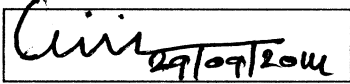
Tender NIT 26698/OT

EXPERIENCE PARTICULARS for HVR Transformer

EXPERIENCE FOR THE PARTICULAR TYPE OF EQUIPMENT / ITEM INDICATED IN THE ENQUIRY:

CUSTOMER NAME, PROJECT NAME	TYPE / RATING / MODEL/ CAPACITY/ SIZE/ TONNAGE ETC (AS APPLICABLE)	SUPPLIED QUANTITY	DATE OF SUPPLY	NO. OF YEARS IN OPERATION/ DATE OF COMMISSIONING (*)

(*) End User Certificate

 RANIPET	STANDARD QUALITY ASSURANCE AND CONTROL PLAN FOR HIGH VOLT RECTIFIER TRANSFORMER AND ELECTRONICS CONTROLLER PANEL	
REF.NO.	REVISION NO.	EFFECTIVE DATE
QP : E:835	00	26 09 2014
<p>TITLE : HIGH VOLT RECTIFIER TRANSFORMER AND ELECTRONICS CONTROLLER PANEL</p> <p>SIGNATURE</p> <p>PREPARED BY : CH.ANILSINGH , AE-1/QA </p> <p>REVIEWED : P.YASODA KRISHNA, ENGG/QA </p> <p>APPROVED BY : C.SRINIVASAN, DGM/QA </p>		
ISSUED & CONTROLLED BY :: QUALITY ASSURANCE BHEL, RANIPET – 632 406		
<p>DOCUMENT STATUS</p> <p style="text-align: center;"><input type="checkbox"/> INFORMATION COPY</p> <p style="text-align: center;"><input type="checkbox"/> CONTROL COPY</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> * It is a control of copy only if the mark against the control copy is in other than black color. Otherwise it will be an uncontrolled copy. Check for current revision. </div>		
ISSUED TO :	CONTROL COPY NO.	



RANIPET

**STANDARD QUALITY ASSURANCE AND CONTROL PLAN FOR
HIGH VOLT RECTIFIER TRANSFORMER AND ELECTRONICS
CONTROLLER PANEL**

REF.NO.	REVISION NO.	EFFECTIVE DATE
QP : E:835	00	26 09 2014

RECORD OF REVISION

REV.NO	Effective Date	Remarks
00	26 09 2014	Original Issue



SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			M	B		
1	2	3	4	5			7	8	9		10	11

A) RECEIVING INSPECTION AND TESTING (RAW MATERIAL AND BROUGHT OUT ITEMS)
CONTROL PANEL

1	Thyristor (Silicon controlled rectifier)	1) Appearance 2) Make, type & Rating 3a) Gate trigger voltage and current (Igt, Vgt) 3b) Peak reverse current at peak reverse voltage at room temperature 3c) Peak leakage current at peak off state voltage at room temperature	Major Major Major	Visual Visual Functional test	100% 100% 1 per lot of every 100 Nos.	10% -- --	-- BHELApprd. Docs. / Drgs. / data sheet / Catalogues Thyristor Catalogue	Free from scratches, dents on mounting surface. As per BHELApprd. Docs. / Drgs. / data sheet Manufacturer 's data sheet	IF/TC --do-- -do-	P P V	-- V V	-- COC for total quantity.
2	AC Contactor, Fuse Switch Unit, Thermal Overload Relay	1) Appearance 2) Make, Type & rating 3) Routine test 1) Appearance 2) Make, Type & rating	Major Major Major Major	Visual Visual Electrical Visual	100% 100% 100% 100%	-- -- 100% --	-- BHELApprd. docs / drgs. / data sheet IS 13947 --	Free from any cracks / breakages / scratches / dents / rust As per BHELApprd. docs. / drgs. / data sheet IS 13947 Free from any cracks / breakages / scratches / dents / rust As per BHELApprd. docs. / drgs. / data sheet	TC/IR --do-- Manufacturer COC TC/IR --do--	P P V P P	-- V V V V	--
3	HRC Fuses	1) Appearance 2) Make, Type & rating	Major Major	Visual Visual	100% 100%	-- --	BHELApprd. docs / drgs. / Data sheet	As per BHELApprd. docs. / drgs. / data sheet	--do--	P P	-- V	--

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SOP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014

Page 2 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	9	AGENCY		REMARKS
					M	B				M	B	
1	2	3	4	5		6	7	8	9	10	11	
		3) Continuity	Major	Functional	100%		Check continuity across fuse	The fuse should not be open	--do--	P	--	
4	Current Transformer (CT)	1) Appearance 2) Make, Type & Rating 3) Dimensions 4) Routine tests as per IS 2705	Major	Visual	100%	--	BHEL Apprd. Docs. / Drgs. / data sheet CT Manufacturer's Catalogue IS 2705	a) Free from any cracks / breakages / scratches b) Rating plate shall be fixed As per BHEL Apprd. Docs. / Drgs. / Data sheet Within -0%, +10% of basic inner dimensions IS 2705	TC/IR	P	--	
5	Over Voltage Protector (Glow Tube)	1) Appearance 2) Make, Type and Rating 3) DC firing Voltage	Major	Visual	100%	--	BHEL Apprd. Docs. / Drgs. / Data Sheet --do--	Free from any breakages / cracks / scratches / rust As per BHEL Apprd. Docs. / Drgs. / Data Sheet --do--	TC/IR	P	--	Connect OVP to DC Supply and increase the voltage slowly. Observe the glow voltage.

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SQP:QP.E.835
 REV. NO: 00
 DATE: 26 09 2014

Page 3 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			9	10		
1	2	3	4	5	6		7	8	9	10	11	
6	Meters	1) Appearance	Major	Visual	100%	--	--	Free from any cracks / breakages / scratches / dents / rust	TC/IR	P	--	
		2) Make, Type & Rating	--do--	--do--	--do--	--	BHELApprd. Docs / Drgs. / Data Sheet	As per BHELApprd. Docs / Drgs. / Data Sheet	--do--	P	--	
		3) Routine test including calibration and accuracy	Major	Electrical	100%	1 per lot	IS 1248, BHELApprd. Docs / Drgs. / Data Sheet	IS 1248, BHELApprd. Docs / Drgs. / Data Sheet	--do--	V	V	
7	Control Transformer	1) Appearance	Major	Visual	100%	--	--	Free from any cracks / breakages / scratches / dents / rust	TC/IR	P	V	
		2) Rating	--do--	--do--	100%	--	BHELApprd. Docs / Drgs. / Data Sheet	Wiring color code should be as per drawing	--do--	P	V	
		3) Overall & Mounting dimensions	Major	Dimensional	1 Per Lot	--	Transformer drawing	As per transformer drawing, tolerance as per IS 2102 (Very Coarse)	--do--	P	V	
		4) Routine tests	Major	Electrical	100%	1 per lot	IS 12021	IS 12021	--do--	P	V	

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		REMARKS
					M	B			M	B	
1	2	3	4	5	M	B	7	8	9	10	11
8	Push Button switches	1) Appearance 2) Make and Type 3) Routine test	Major --do-- --do--	Visual --do--	100% 100% 1 per lot	-- -- 1 per lot--	-- BHELApprd. Docs / Drgs. / Data Sheet MFRPurchase order	Free from cracks / breakages / scratches. Color shall be as per MFR Purchase Order BHELApprd. Docs. / Drgs. / Data Sheet	TC/IR --do-- --do--	P P P	V V V
9	Time Totalizer	1) Appearance 2) Make and Type 3) Accuracy&Voltage rating	Major --do-- --do--	Contact configuration Visual	100% 100%	-- 1 per lot	BHEL Approved documents / drawings / data sheet	Free from cracks / breakages / scratches. BHEL Approved documents / drawings / data sheet	--do--	P	V
10	Indicating Lamp	1) Appearance 2) Make, Type and rating	Major --do--	Visual --do--	100% 100%	-- --	BHELApprd. Docs. / Drgs. / Data Sheet	Free from cracks / breakages / scratches. Color shall be as per MFR Purchase Order As per BHELApprd. Docs. / Drgs. / Data Sheet	TC/IR	P	V
11	Auxiliary Contactors	1) Appearance 2) Make, Type & rating 3) Contact Configuration	Major --do-- --do--	Visual --do-- --do--	100% 100% 1 per lot	-- -- 1 per lot	MFR Purchase order	Should be free from cracks / breakages / scratches. As per BHELApprd. Docs. / Drgs. / Data Sheet Should be as per MFR Purchase order	TC/IR --do--	P P P	V V V



STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL AND HIGH VOLTAGE RECTIFIER.

SQP-OP-E:835
 REV. NO: 00
 DATE: 26 09 2014

Page 5 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			M	B		
1	2	3	4	5	6	B	7	8	9	10	11	
12	Hooter	1) Appearance 2) Make and rating 3) Audio Output test	Major --do-- --do--	Visual --do-- Functional	100% 100% 100%	-- -- --	-- BHELApprd. Docs / Drgs. / Data Sheet Apply rated voltage to the Hooter	Should be free from cracks / dents / scratches / rust. Marking should be clear. As per BHELApprd. Docs / Drgs. / Data Sheet. The Hooter should give audible alarm	TC/IR --do-- --do--	P P P	V V V	
13	Wire wound Resistors	1) Appearance 2) Make and Rating 3) Resistance Measurement	Major --do-- --do--	Visual --do-- Functional	100% 100% 1 per lot /type	-- -- -1 per lot /type	-- BHELApprd. Docs / Drgs. / Data Sheet --do--	Free from scratches / breakages The rating should be clearly marked Lead finish should be good As per BHELApprd. Docs / Drgs. / Data Sheet --do--	TC/IR --do-- --do--	P P P	V V V	
14	Terminal blocks and control terminals (For HV TR set and Control Panel)	1) Appearance 2) Make, type & rating 3) HV test	Major --do-- --do--	Visual --do-- Dielectric strength	100% 100% 1 per lot	-- -- 1 per lot.	-- BHELApprd. Docs / Drgs. / Data Sheet 1.5 KV AC for 60 seconds across terminal and mounting	Free from any cracks / breakages / rust Terminal screws shall be fitted properly As per BHELApprd. Docs / Drgs. / Data Sheet Should withstand	TC/IR --do-- --do--	P P P	-- -- V	
15	Capacitor	1) Appearance	Major	Visual	100%	--	--	Free from any cracks / breakages / dents Rating should be clearly marked	TC/IR	P	--	

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL AND HIGH VOLTAGE RECTIFIER.

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS	
					M	B			M	B			
1	2	3	4	5	6	7	8	9	10	11			
		2) Make and Rating	--do--	--do--	100%	--	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet	--do--	P	--		
16	EC Panel (Panel Fabrication) (Powder Coated Panel)	1) Appearance 2) Verification of raw material w.r.t. Tensile strength, bend test, chemical composition (% of carbon) 3) Dimensions & Cutouts 4) Pretreatment 5) Paint shade 6) Paint Thickness 7) Adhesion test 8) Degree of protection	Major	Visual	100%	1 per lot	IS 513, GRADE-D	As per BHELApprd. Docs./ Drgs. / Data Sheet	free from damage, scratch, dent, rust and pitting	TC//R	P	V	Only qualified welders as per AWS/ASME SEC IX shall be deployed and records shall be available.
		2) Dimensions & Cutouts	--do--	Meas.	100%	--	Fabrication Drawing	Should be as per drawing / Tolerance as per IS 2102 (Very Coarse)	--do--	V	V		
		3) Dimensions & Cutouts	--do--	Meas.	100%	1 per lot	IS 513, GRADE-D	IS 513 GRADE-D	--do--	V	V		
		4) Pretreatment	--do--	Visual	100%	--	HR:PR:02	HR:PR:02	--do--	V	V	Vendor shall show the TC//R for surface preparation process as part of pretreatment.	
		5) Paint shade	--do--	Visual	100%	--	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet	--do--	V	V		
		6) Paint Thickness	--do--	Meas.	100%	5 per Lot	--	Minimum 50 Microns	--do--	V	V		
		7) Adhesion test	--do--	Vis.	1 per lot	--	Cross cut test	No peel off	--do--	V	V		
		8) Degree of protection	--do--	Vis.	--do--	--	Paper Insertion	Not possible in Closed door	--do--	P	V		
17	Bare copper (For Panel Bus bars) electrolytic grade	1) Appearance 2) Size 3) Conductivity at 20°C 4) Hardness No.	Major	Visual	100%	--	--	Free from any scratches/breakages As per MFR Purchase order specifications	IS 1897	TC//R	P	V	
		1) Appearance	--do--	Dimensional	1 sample from lot	--	MFR Purchase order specifications	As per MFR Purchase order specifications	--do--	P	V		
		2) Size	--do--	Electrical	--do--	--	IS 1897	IS 1897	--do--	V	V		
		3) Conductivity at 20°C	--do--	Mechanical	--do--	--	--do--	--do--	--do--	V	V		
		4) Hardness No.	--do--						--do--	V	V		

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SQP:QP.E:835
 REV. NO: 00
 DATE: 26 09 2014

Page 7 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REM
					M	B						
1	2	3	4	5		6	7	8		9	10	
		5) Ultimate Tensile strength Elongation	--do--	--do--	--do--	--	--do--	--do--	--do--		V	V
		6) Appearance	--do--	Visual	1 sample from lot	--	--	Free from cracks / holes. Should be uniform	TC/IR		V	--
		1) Appearance	Major	Visual	1 sample from lot	--	--	Should be as per MFR Purchase order / specifications/IS 11149	--do--		V	V
		2) Size	--do--	Dimensional	--do--	1 sample from lot	MFR Purchase order / specifications/IS 11149	Free from cracks / breakages / scratches. As per BHELApprd. Docs./ Drgs. / Data Sheet	--do--		P	--
		3) Hardness & Elongation	--do--	Test	--do--	1 sample from lot	MFR Purchase order / specifications/IS 11149	Free from cracks / breakages / scratches. As per BHELApprd. Docs./ Drgs. / Data Sheet	--do--		V	V
		4) Neoprene content & Ageing	--do--	Test	--do--	1 sample from lot	MFR Purchase order / specifications/IS 11149	Free from cracks / breakages / scratches. As per BHELApprd. Docs./ Drgs. / Data Sheet	--do--		V	V

RECEIVING INSPECTION AND TESTING (RAW MATERIAL AND BROUGHT OUT ITEMS)

TR SET												
1	Pressure Relief Valve	1) Appearance	Major	Visual	100%	10%	--	Free from cracks / breakages / scratches. As per BHELApprd. Docs./ Drgs. / Data Sheet	TC/IR	P	--	
		2) Make and Type	--do--	--do--	100%	10%	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet	--do--	P	V	
		3) Pressure setting	--do--	Functional	100%	--	MFR Purchase order	Should be as per MFR Purchase order / specifications / breakages / scratches.	--do--	P	V	
		1) Appearance	Major	Visual	100%	10%	--	Free from cracks / breakages / scratches. As per BHELApprd. Docs./ Drgs. / Data Sheet	TC/IR	P	--	
		2) Make and Type	--do--	--do--	100%	10%	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet	--do--	P	--	
		3) Contact Configuration HV Test	--do--	Functional	1 per lot	--	MFR Purchase order	As per MFR Purchase order / specifications / breakages / scratches.	--do--	P	V	
		4) Contact Configuration HV Test	--do--	Dielectric Test	--do--	1 per lot	MFR Purchase order / specifications / breakages / scratches.	Should withstand	--do--	P	V	

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SQP-OP-E:835
 REV. NO: 00
 DATE: 26 09 2014

Page 8 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	TC/IR	AGENCY		REMARKS
					M	B				M	B	
1	2	3	4	5	6		7	8	9	10		11
3	Buchholz Relay	1) Appearance 2) Make and Type 3) Contact Configuration check in test mode and service mode by simulation 4) Routine tests	Major	Visual	100%	10%	--	Free from cracks / breakages / scratches and rust	TC/IR	P	--	
						10%	BHELApprd. Docs / Drgs. / Data Sheet	As per BHELApprd. Docs / Drgs. / Data Sheet	--do--	P	--	
						--	MFR Purchase Order Specifications	As per MFR Purchase Order Specifications	--do--	P	--	
						100%	IS 3637	IS 3637	--do--	V	V	
4	HV Bushing	1) Appearance 2) Make 3) Overall dimensions 4) Acceptance tests and Routine tests	Major	Visual	100%	10%	Drawing	Scratch and damage free Should be as per BHEL Approved documents / drawings / data sheet	TC/IR	P	V	
						10%	BHEL Approved documents / drawings / data sheet	As per BHEL Approved documents / drawings / data sheet	--do--	P	V	
						1 per lot	HV Bushing Manufacturer's Drawing.	--do--	--do--	P	V	
						100%	IS 3347/ 2099	IS 3347/ 2099	--do-	V	V	

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SQP:QP-E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 9 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS	
					M	B			M	B			
1	2	3	4	5			7		9		10	11	
5	Oil Temperature Indicator	1) Appearance	Minor	Visual	100%	--	--	Free from cracks / breakages / scratches As per BHEL Apprd. Docs./ Drgs. / Data Sheet	TC/IR	P	--		
		2) Make & Range	--do--	--do--	--do--	--	--	Manufacturer's Docs./ Drgs. / Data Sheet	--do--	P	--		
		3) Dimensions - Overall, stem & control cable	--do--	Dimensional	1 per lot	--	--	Manufacturer's catalogue	--do--	P	--		
		4) HV Test	--do--	Dielectric test	100%	1 per lot	--	2 KV/ AC for 1 minute	Should withstand	--do--	P	V	
		6) Calibration and contact switch functional test	--do--	Functional test	1 per lot	1 per lot	--	Place the stem in an oil bath along with standard thermometer. Slowly heat the bath. Monitor reading on the thermometer and compare with the standard thermometer	The error should be within +/- 5°C at set point The contact should change over when the temperature exceeds the set value	TC/IR	V	V	
		1) Appearance	Minor	Visual	100%	--	--		Free from scratch, break, cracks, dents, visual track shorting	TC/IR	P	--	Single sided Glass Epoxy FR-4 grade
6	Printed Circuit Board (For rectifier stack and resistor column inside the TR set)	2) Overall Dimensions and Mounting Dimensions	--do--	Dimensional	1 per lot	--	PCB Drawing	Track should be intact Masking should be proper	--do--	P	--		
		3) Thickness and copper clad thickness	--do--	--do--	100%	--	--do--	As per PCB drawing + tolerance as per IS 2102, very coarse	TC/IR	V	V		
		1) Appearance	Minor	Visual	100%	--	--	Free from cracks / breakages	TC/IR	P	--		
7	Double paper	1) Appearance	Minor	Visual	100%	--							



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STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL AND HIGH VOLTAGE RECTIFIER.

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 10 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS
					M	B				M	B	
1	2	3	4	5	M	B	7	8	9	10	11	
		2) Covered and bare dimensions	Major	Dimensional	1 sample from each roll	1 sample from each roll	MFR Purchase order specifications	As per MFR Purchase order specifications	--do--	P	--	
		3) Electrical Resistivity at 20°C	--do--	Test	1 sample from each batch	1 sample from each batch	IS 13730 PART 27	IS 13730 PART 27	--do--	V	V	
		4) Elongation	--do--	--do--	--do--	do-	--do--	--do-	TC/IR	V	V	
		5) Test on paper a) Thickness	Major	Dimensional	1 sample from each batch	1 sample from each batch	IS 13730 PART 27.	IS 13730 PART 27.	--do--	V	V	
		b) No. of layers	Major	Review of TC	--do--	--do--	--do--	--do--	--do--	V	V	
		c) Insulation	Major	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		d) Make of paper	Major	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		e) Top most Layer	Major	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		f) Bottom Layer	Major	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		g) Staggering	Major	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		h) Overlap	Major	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		i) Direction	Major	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
	6) Double paper	7) Tests on paper										
	8) Double paper	9) Tests on paper										

covered copper strip (Electrolytic grade for primary winding of transformer and AC reactor)

Double paper covered copper strip (Electrolytic grade for primary winding of transformer and AC reactor)
 Continued



BOILER
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RANIPET - 632 406.

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL AND HIGH VOLTAGE RECTIFIER.

SQP-Q.P.E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 11 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			M	B		
1	2	3	4	5	6	7	8	9	10	11		
	covered copper strip (Electrolytic grade for primary winding of transformer and AC reactor) - Continued	a) Thickness b) Density c) Moisture content d) Electric strength in air e) Ash content f) Conductivity of aqueous extract g) PH value of aqueous extract h) Tensile strength MD& CMD i) Heat stability	--do-- --do-- --do-- --do-- --do-- --do-- --do-- --do-- --do--	Dimensional Review of TC	1 Sample from each lot 1 sample per batch	IEC 554	Should be as per MFR purchase order specification IEC 554/IS 6160	TC/IR	V	--		
8	Lamination for transformer and reactor core	1) Appearance 2) All dimensions 3) Core loss at 1.5 T at 50 Hz	Major Major Major	Visual Dimensional Functional	100% 1 per lot 100 %	Document of Supplier. MFR Core assembly & Lamination Drawing --do--	Free from crack, breakage, scratches, dents and rust MFR core assembly & lamination drawing + tolerance as per IS 2102 (very course) Should be as per drawing	TC/IR	P	--		



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**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SQP:QP-E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 12 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS	
					M	B			9	10			
1	2	3	4	5	M	B	7	8	9	M	B	11	
9	High Voltage resistor	4) Insulation Resistance of coating Stacking Factor	Minor	Insulation Resistance	1 per lot	1 per lot	Check the insulation with multimeter	> 100 Ohms	--do--	P	V		
		5) Aging Test	Minor	Dimensional	1 per lot	Do	--	Min. 96%	--do--	P	V		
		6) Resistance Measurement Appearance	Major	Functional	1 per lot	Do	One piece of lamination in oil at 100°C for 24 hour	core losses after test at 1.5T at 50Hz shall be as per drawing	--do--	P	V		
		1) Appearance	Minor	Visual	100%	--	--	Free from scratches, breakages, and cracks.	Lead finish should be good	TC/IR	P		--
		2) Make	Major	--do--	100%	--	BHEL Apprd. Docs / Drgs. / Data Sheet	As per BHEL Apprd. Docs. / Drgs. / Data Sheet	As per MFR Purchase order Specifications	--do--	P		--
		3) Rating	--do--	--do--	1 per lot	--	MFR Purchase order Specifications	As per MFR Purchase order Specifications	Free from breakage, cracks, scratches	--do--	P		V
		4) Resistance Measurement Appearance	Major	Electrical	--do--	--	--	Should be as per MFR Purchase order specifications for press board	Free from breakage, cracks, scratches	--do--	P		--
10	Press board	1) Thickness	--do--	Dimensional	1 sample per lot	--	--do--	--do--	--do--	P	--	Verification of test report	
		2) Type	--do--	--do--	--do--	--	MFR Purchase order specifications for press board	Should be as per MFR Purchase order specifications for press board	--do--	P	--		
		3) Electric strength in oil	Major	Visual	100%	--	--	Free from breakage, cracks, scratches	TC/IR	P	--		
		4) Density Tensile strength (MD, CMD) Shrinkage in air (MD, CMD / CD)	Major	Review of TC	1 sample from batch	1 sample from batch	Manufacturer's catalogue / IEC 641 / IS 1576	Manufacturer's catalogue / IEC 641 / IS 1576	TC/IR	V	V		
		5) Density	--do--	--do--	--do--	--do--	--do--	--do--	V	V			
		6) Tensile strength (MD, CMD)	--do--	--do--	--do--	--do--	--do--	--do--	V	V			
		7) Shrinkage in air (MD, CMD / CD)	--do--	--do--	--do--	--do--	--do--	--do--	V	V			



BOILER
AUXILIARIES PLANT,
RANIPET - 632 406.

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SQP:Q.P.E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 13 of 30

Sl. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			9	10		
1	2	3	4	5	M	B	7	8	9	10	11	
8)		Shrinkage in oil (MD, CMD)	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
9)		Oil absorption	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
10)		Conductivity	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
11)		PH value of aqueous extract	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
12)		Mineral ash content	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
13)		Moisture content	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
14)		Compressibility in air	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
15)		Compressibility in oil	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
16)		Compatibility with Silicon Oil	--do--	Compatibility with Silicon Oil	1 sample	1 sample	(ASTM D 5282-05) 2012	No discoloration	Compatibility Test Report	P	V	
11	Enameled copper wire for HV winding of transformer	1) Appearance	Major	Visual	100%	--	--	Damage free	TC/IR	P	--	--
		2) Bare & enameled dimensions	--do--	Dimensional	1 per lot	--	MFR purchase order specifications	Winding on the bobbin should be proper and tight	--do--	P	--	--
		3) Elongation	--do--	Review of TC	1 sample per batch	1 sample per batch	IS 13730	Conductor should be non oily Should be as per MFR purchase order specifications IS 13730	--do--	V	V	
		4) Springiness	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		5) Mandrel test (Flexibility and adherence)	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		6) Jerk test	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	
		7) Abrasion resistance	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V	



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AUXILIARIES PLANT,
RANIPET - 632 406.

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SOP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 14 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			M	B		
1	2	3	4	5	6	7	8	9	10	11		
		8) Heat shock at elevated temperature	--do--	--do--	1	1	--do--	--do--	TC/IR	V	V	
		9) Peel Test	Major	Review of TC	1	1	IS 13730	IS 13730	TC/IR	V	V	
		10) Heat Shock Test	--do--	--do--	1	1	--do--	--do--	--do--	V	V	
		11) Cut Through Test	--do--	--do--	1	1	--do--	--do--	--do--	V	V	
		12) Continuity of insulation covering	--do--	--do--	1	1	--do--	--do--	--do--	V	V	
		13) Break down voltage at room temperature and at elevated temperature	--do--	--do--	1	1	--do--	--do--	TC/IR	V	V	
		14) Resistance	--do--	--do--	1	1	--do--	--do--	--do--	V	V	
		15) Solvent test	--do--	--do--	1	1	--do--	--do--	--do--	V	V	
		16) Compatibility with Silicon Oil	--do--	Compatibility with Silicon Oil	1	1	(ASTM D 5282-05) 2012	No discoloration	Compatibility Test Report	P	V	
12	Kraft Paper	1) Appearance	Major	Visual	100%	--	--	Should be damage free	TC/IR	P	--	
		2) Thickness	--do--	Dimensional	1	--	MFR purchase order specification	Should be as per MFR purchase order specification	--do--	P	--	
		3) Density	--do--	Review of TC	1	--	IEC 554	IEC 554/IS 6160	--do--	V	--	
		4) Moisture content	--do--	--do--	1	--	--do--	--do--	--do--	V	V	
		5) Electric strength in air	--do--	--do--	1	--	--do--	--do--	--do--	V	V	
		6) Ash content	--do--	--do--	1	--	--do--	--do--	--do--	V	V	
		7) Conductivity of 5% aqueous extract	--do--	--do--	1	--	--do--	--do--	--do--	V	V	



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

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 15 of 30

Sl. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		REMARKS																																																																																																			
					M	B			M	B																																																																																																				
13	Silicon fluid	1) Appearance 2) Specific gravity 3) Refractive index 4) Break Down Voltage 5) Viscosity 6) Dissipation Factor 7) Volume Resistivity 8) Fire point 9) Flash Point 10) Pour Point 11) Water content 12) Aging Test	Major	Visual	100%	100%	Manufacturer's catalogue.	Should be clear, free from extraneous matter Certificate of Analysis	TC/IR	P	V																																																																																																			
												1	2	3	4	5	6	7	8	9	10	11																																																																																								
																							8) PH value of aqueous extract	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																																													
																																		9) Tensile strength MD& CMD	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																																		
																																													10) Heat stability	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																							
																																																								11) Compatibility with Silicon Oil	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	P	V																																												
																																																																			1) Appearance	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																	
																																																																														2) Specific gravity	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																						
																																																																																									3) Refractive index	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V											
																																																																																																				4) Break Down Voltage	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V
6) Dissipation Factor	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																																																																					
7) Volume Resistivity	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																																																																			
												8) Fire point	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																																																								
																							9) Flash Point	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																																													
																																		10) Pour Point	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																																			
																																												11) Water content	--do--	--do--	--do--	--do--	--do--	--do--	--do--	V	V																																																									
14	Radiator	1) Appearance 2) Dimensional	Major	Visual	100%	100%	MFR Purchase order specifications	Free from damage, scratch, dent, bend, rusting etc. As per MFR Purchase order specifications	TC/IR	P	--																																																																																																			
												1	2	3	4	5	6	7	8	9	10	11																																																																																								

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SOP: QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 17 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	AGENCY		
					M	B					
1	2	3	4	5	M	B	7	8	9	10	
		6) WPS/PQR/WPQ	Major	Verify	100%	100%	ASME Section IX	ASME Section IX	Welder's qualification (W/PQ) certified by personnel of AWS	V	V

BI IN PROCESS INSPECTION AND TESTING

1	Coil	1) Appearance	Major	Visual	100%	--	MFR Electrical specifications for the project	Free from damages. Conductor type as per MFR Electrical specifications	Sub Tag	Assembly	P	--
		2) Conductor, Axial Length, Inner Diameter, Outer Diameter	Major	Dimensional	100%	--	MFR Electrical Specifications for the project	Should be as per MFR Electrical specifications for the project + instructions for tolerance	--do--		P	--
		3) Lead Length			100%	--	--do--	Should be as per electrical specifications for the project. Tolerance: -1 mm, +10mm	--do--		P	--
2	Assembled Rectifier card	1) Appearance	Major	Visual	100%	--	--	Free from damage	Sub tag	Assembly	P	--
		2) Soldering			100%	--	--	No component body touching to each other & PCB Smooth solder points (Half rounded type without a single sharp point)	--do--		P	--
		3) No. Of diodes	Major	Visual	100%	--	Mfr/Part List cum Master List	Free from flux on PCB. No visible dry solder Should be as per Mfr Partlist cum Master List	--do--		P	--



BOILER
AUXILIARIES PLANT,
RANIPET - 632 406.

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SOP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 18 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		REMARKS			
					M	B			AGENCY	AGENCY				
1	2	3	4	5	100%	--	7	8	9	M	B	10	11	
		4) Polarity			100%	--	Polarity marking on rectifier PCB	Diode polarity should be as per polarity marking on rectifier PCB.	--do--			P	-	
		5) Polarity check (IR)	Major	Functional	-100%	--	500 V DC Megger in forward & reverse direction	Values: Forward <0.1M Ohms Reverse > 10M Ohms No breakdown	Sub Assembly Checklist			P	--	
		6) Burn in test	Major	Environmental	1 per lot	1 per lot	Keep for heat run test for 4 hours At 65°C elevated temperature		--do--			P	V	
3	Rectifier Bridge Assembly	1) Appearance a) Insulation on PCB b) Alignment of PCB c) Polarity of PCB d) Connections	Major	Visual	100%	--	MFR Assembly Drawing	Should be as per drawing.	Sub-Assembly Checklist			P	--	



STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SQP:Q.P.E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 19 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	Sub-Assembly Checklist	AGENCY	REMARKS		
					M	B							
1	2	3	4	5	M	B	7	8	9	M	B	10	11
4	AC Linear reactor	1) Appearance a) Free from damages b) Insulation tube on tie rod and core stud c) Connections shall be as per electrical specifications d) Covering for all joints e) Lug crimping should be proper f) Connections shall be tight	Minor	Visual	100%	--	MFR Electric specification/ assembly drawing.	As per MFR Electric specification/ assembly drawing.	Sub-Assembly Checklist	P	--		
	AC Linear reactor (Continued)	2) insulation resistance between a) Core bolt and core b) Windings and core 3) HV test between winding and core 4) Voltage drop/current rating 5) Inductance	Major	Insulation resistance test (Megger test) --do-- HV test (dielectric test) Functional test --do--	100% --do-- --do-- --do--	-- -- -- --	-- 3KV AC for 60 sec. MFR Electric specification BHEL Apprd. Docs. / Drgs. / Data Sheet	>5 M ohms >5 M ohms Should withstand MFR Electric specification for voltage drop at rated current As per BHEL Apprd. Docs. / Drgs. / Data Sheet	Sub-Assembly checklist --do-- --do-- --do-- --do--	P P P P	-- -- -- --		

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 20 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			M	B		
1	2	3	4	5	6	7	8	9	10	11		
5	DC HF Choke	1) Appearance	Minor	Visual	100%	--	--	Free from damages	Sub Assembly Checklist	P	--	--
		2) Connection	--do--	Visual	-do-	--	MFR Electrical specification for HF choke	Joints should be tight.	-do-	P	--	--
		3) Winding resistance	--do--	Resistance measurement	--do--	--	MFR Electric specification for choke	As per MFR Electrical specifications.	--do--	P	-	--
		4) Inductance at rated current	Major	Functional	1 per lot	--	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet, Tolerance \pm 10%	Sub Assembly checklist / Test Report	P	-	--
6	Assembled HV resistor column	1) Appearance	--do--	Visual	100%	--	Free from damages	--do--	P	-	-	
		2) Resistance value	--do--	Functional	-do-	--	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet, Within \pm 5%	-do-	P	-	--

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SQP:QP-E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 21 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS	
					M	B				M	B		
1	2	3	4	5	M	B	7	8	9	M	B	10	11
7	Feedback assembly	1) Appearance and component mounting 2) Resistance value across feedback terminal Appearance	Major --do-- Major	Visual Resistance measurement Visual	100% --do-- 100%	-- -- 100%	-- Schematic Drawing -- Core assembly / lamination drawing	Free from damages touching each other and PCB / mounting surface As per schematic Drawing Free from damages, rust Should be as per core assembly / lamination drawing + Tolerance as per IS 2102 Very coarse > 5 M Ohms	Sub Assembly checklist --do-- Sub assembly checklist	P P P	-- -- --		
8	Core assembly	1) Appearance 2) Stack height and overall dimensions 3) Insulation Resistance between core bolt and core	Major Major Major	Insulation Resistance test Visual	100% 100%	100% --	MFR Electrical Specifications for Transformer, Assembly drawing	Connection should be as per MFR Electrical Specifications for Transformer, Assembly drawing	Test registers	P	V		
9	Transformer assembly	1) Connections	Major	Visual	100%	--	MFR Electrical Specifications for Transformer, Assembly drawing	Connection should be as per MFR Electrical Specifications for Transformer, Assembly drawing	Test registers	P	V		



BOILER
AUXILIARIES PLANT,
RANIPET - 632 406.

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SQP-QP.E:835

REV. NO: 00

DATE: 26 09 2014

Page 22 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B			M	B		
1	2	3	4	5	6	7	8	9	10	11		
		2) HV Winding resistance measurement	Major	Resistance measurement	100%	--	MFR Specifications for Transformer	Should be as per Mfr Electrical specifications for transformer, Tolerance +/- 15% > 5 M Ohms	--do--	P	--	
		3) Insulation Resistance: 3.1 Primary to earth 3.2 Secondary to earth 3.3 Primary to secondary	Major	Dielectric Tests	100%	1 sample per lot	--		Test registers.	P	V	
		4) HV test Primary and core	Major	Dielectric Tests	100%	--do--	3 KV AC for 60 seconds	Should withstand	--do--	P	V	
		5) Turns Ratio Test and Polarity	Major	Turns Ratio	100%	--do--	MFR Electrical specifications for Transformer	MFR Electrical specifications for Transformer	--do--	P	V	
10	Intermediate assembly / Lid assembly	1) Verification of status of sub assemblies 2) Mounting of sub assemblies / components 3) Earthing 4) Connections (Input, Output, Inter-connections and feedback wiring)	Minor Major --do-- --do--	Visual	100%	--	Drawing / MFR Electrical Specifications --do-- Assembly Drawing Drawing, Schematic Diagram	All sub assemblies shall have passed status Should be as properly mounted Core, Tie Rod, Shield for primary voltage feedback wire. Shield should be earthed with main earth bushing Connections should be as per schematic diagram	Test register	P	--	



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

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL AND HIGH VOLTAGE RECTIFIER.

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 23 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B						
1	2	3	4	5	M	B	7	8	9	10	11	
		5) Contact assembly location	--do--	--do--	100%	--	Assembly drawing	Should make firm contact with bushing > 5 M Ohms	--do--	P	--	
		6) Insulation Resistance between: a) Input and earth b) Output and earth c) Input and output	Major	Dielectric Test	100%	100%	--	Should withstand	Test register	P	V	
		7) HV Test between: Input and earth	--do--	HV Test	--do--	--do--	3 KV AC for 60 seconds	Should be as per MFR Electrical specifications for transformer, Tolerance +/- 15%	--do--	P	--	
		8) Resistance measurement across primary winding	--do--	Resistance measurement test	--do--	--	MFR Electrical specifications for transformer	Should be as per MFR Electrical specifications for transformer, Tolerance +/- 15%	--do--	P	--	
		9) HV Resistance column measurement	--do--	--do--	--do--	--	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet, tolerance +/- 5%	--do--	P	--	
11	Processing (Drying and Impregnation)	Oven Processing	Major	Oven processing	100%	1 sample per lot	HR:PR:07	HR:PR:07	--do--	P	V	

C] FINAL INSPECTION AND TESTING

High Voltage Transformer Rectifier set and Control Panel												
1	Control panel	1) Appearance	Major	Visual	100%	100%	BHELApprd. Docs./ Drgs. / Data Sheet	Free from damages Check for passed status of sub assemblies	Test Report	P	W	



Bharat Heavy Electricals Ltd
AUXILIARIES PLANT,
RANIPET - 632 406.

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL AND HIGH VOLTAGE RECTIFIER.

SQP-OP-E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 24 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		REMARKS	
					M	B			M	B		
1	2	3	4	5	M	B	7	8	9	10	11	
		2) Mounting of sub assemblies	--do--	--do--	--do--	--do--	--do--	Sub assemblies should be properly mounted as per drawings As per BHELApprd. Docs. / Drgs. / Data Sheet	--do--	P	W	
		3) Type, Make and rating of components	--do--	--do--	--do--	1 per lot	--do--	As per BHELApprd. Docs. / Drgs. / Data Sheet	--do--	P	W	
		4) Paint shade	Major	Visual	100%	100%	BHELApprd. Docs. / Drgs. / Data Sheet	As per BHELApprd. Docs. / Drgs. / Data Sheet	Test Report	P	W	
		5) Paint thickness	--do--	--do--	100%	5 No. per Lot	--	> 50 Microns	Test Report	P	W	
		6) Paint adhesion	--do--	Adhesion	1 per lot	1 per lot	Cross cut test	No peel off	Test Report	P	W	
		7) Continuity, wire size, type, ferruling, neatness	--do--	Wiring check	100%	--do--	BHELApprd. Docs. / Drgs. / Data Sheet	Wiring should be as per drawing Lug crimping should be proper	checklist	P	W	
		8) Check for degree of protection by paper insertion	--do--	Physical check	100%	1 per Lot	Put paper between door gasket and close and lock the door.	After pulling paper should not come out easily	-do-	P	W	
		9) Insulation Resistance between Input, Output to earth with 500 V DC megger (Input and output shorted)	Major	Dielectric Tests	100%	100 %	--	> 5 M Ohms	Test Certificate	P	W	Disconnect electronic controller, PCBs and buzzer.
		10) HV test between Input, Output to earth (Input and output shorted)	Major	Dielectric Tests	--do--	--do--	1.5 KV RMS for 60 Seconds	Should withstand	--do--	P	W	
		11) Overall dimensions	Major	Dimensional checks	--do--	1 per Lot	BHELApprd. Docs. / Drgs. / Data Sheet	As per BHELApprd. Docs. / Drgs. / Data Sheet	--do--	P	W	



BOILER
AUXILIARIES PLANT,
RANIPET - 632 406.

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SOP:OP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 25 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS
					M	B						
1	2	3	4	5	6	7	8	9	10	11		
		12) Fault annunciation test	Major	Functional test	--do--	100%	Schematic drawing	All faults should be annunciated as per schematic drawing.	--do--	P	W	
2	High Voltage Transformer Rectifier Set	1) Type, Make & rating of External components 2) Earthing 3) Labeling 4) Dimensions 5) Leak proof test 6) Test BDV of oil	Major	Visual	100%	1 per Lot	BHELApprd. Docs./ Drgs. / Data Sheet --do-- --do-- --do-- --do-- 0.5Kg / cm ² for 1 Hour With 2.5 mm gap (with sample from bottom valve)	As per BHELApprd. Docs./ Drgs. / Data Sheet --do-- --do-- --do-- No leakage should be observed Minimum 35 KV	Test Report --do-- --do-- --do-- --do--	P P P P P P	W W W W W W	
	High Voltage Transformer Rectifier Set (Continued)	7) Insulation Resistance between a) Input to earth b) Output to earth c) Input to output 8) HV test Between input and earth	--do--	Dielectric Test	100%	100%	Remove wires from feedback bushings 3 KV AC for 60 seconds	> 5 M Ohms > 50 M Ohms > 50 M Ohms Should withstand	Test report --do--	P P	W W	
	High Voltage Transformer Rectifier Set (Continued)	9) HV Between output and earth 10) No Load test At rated input voltage and +/- 10% of rated input voltage	Major	Dielectric Test Tests	100%	100%	Apply 2 X Rated Voltage (2 x 373V =746V) at 100 Hz +/- 5 Hz frequency at the TR set input for one minute. BHELApprd. Docs. / Drgs. / Data Sheet	Should withstand As per BHELApprd. Docs./ Drgs. / Data Sheet	Test report	P	W	



STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
AND HIGH VOLTAGE RECTIFIER.

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 26 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS	
					M	B			M	B			
1	2	3	4	5	M	B	7	8	9	M	B	10	11
		11) Load losses and impedance measurement by Short Circuit method	--do--	--do--	--do--	--do--	--do--	--do--	--do--	--do--	P	W	
		12) Measurement of current feedback with the help of voltmeter / multimeter during short circuit test	--do--	--do--	--do--	--	--	Current feedback at rated DC current should be @ 1.2 V	--do--	--do--	P	W	
		13) Induced over Voltage test	Major	Test	100%	100%	Apply 747 V AC at the Transformer input at 100 Hz, +/- 5 Hz frequency	Should withstand	Test report		P	W	
		14) Functional checking of Accessories	Major	Functional	100%	100%	Schematic drawing, operate the accessories by simulation	Operation should be as per schematic diagram	--do--	--do--	P	W	
		Paint shade	Major	Visual	100%	100%	BHELApprd. Docs./ Drgs. / Data Sheet	As per BHELApprd. Docs./ Drgs. / Data Sheet	Test report		P	W	
		Paint adhesion	--do--	Cross cut test	1 per lot	1 per lot	Cross cut test	No peel off.	--do--	--do--	P	W	
		Paint Thickness	--do--	Measuremen	100%	5 per Lot	--	Minimum 150 microns	Test report		P	W	
3	Test on HVR Transformer and EC Panel with test sample Electronic Controller (Continued)	Load test (R+C Load) Spark Test with 'S' and 'T' control test	Major Major	Routine test Routine test	100% 100%	100% 100%	Connect 100% load and operate the panel at more than 50% rated output current and at the spark rate of minimum 5 spark per minute, for 10 minutes	Test report --do--	Test report --do--	P P	W W		

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 27 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	RECORDS	AGENCY		REMARKS
					M	B				M	B	
1	2	3	4	5	6	7	8	9	10	11		
	Test on HVR Transformer and EC Panel with test sample Electronic Controller (Continued)	Semi pulse operation test	Major	Routine test	100%	1 per lot	Operate the unit at change ratio, Initially keep Charge Ratio as 1:1 and switch on HT, observe the performance After this switch off HT and keep Charge Ratio as 1:3, switch on HT and observe the performance. Similarly repeat test for Charge ratio 1:17 From rated load to short circuit	The unit should operate satisfactorily	Test report	P	W	
	Test on HVR Transformer and EC Panel with test sample Electronic Controller	Supply Regulation	Major	Routine test	1 per lot	1 per lot	Vary the input supply from -10% to +10% of rated supply voltage	The output current should be within the limits as specified by the controller	Test report	P	W	
		T/O Test	Major	Routine test	1 per lot	1 per lot	Keep 'T' control to maximum, Switch on HT and press 'T/O' push button. Measure the time required for full current build up		--do--	P	W	



BHEL
BOILER
AUXILIARIES PLANT,
RANIPET - 632 406.

STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL AND HIGH VOLTAGE RECTIFIER.

SOP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 28 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY	REMARKS	
					M	B							
1	2	3	4	5	100%	--	7	8	9	M	B	10	11
	Preparation for Packing and dispatch	Completeness of the Equipments 1. Check MFR QC Passed sticker on the equipment 2. Meters shall be covered with packing materials to remove cover before commissioning 3. All accessories are available	Major	Verification	100%	--	--	Should be OK	Packing slip	P	--	--	

1	Type Test (Identical design Type test report with Validity of five year from date of release of Purchase order to be shown for BHEL /TPI review)	1.Measurement of capacitance & tan delta of winding			Major	Electrical	1 per lot	1 per Lot	BHEL appd data sheet	BHEL appd data sheet	TC/IR	P	V
		2. Temperature Rise Test	3. Lightning impulse voltage Test	4.Jacking Test on transformer load bearing members (if applicable)									
					Major	Electrical	1 per lot	1 per lot	IS 2026 Part-3	IS 2026 Part-3	TC/IR	P	V
					Major	Mechanical	1 per lot	1 per lot		No cracks / Deformation of Jacking pads.	TC/IR	P	V
					Major	Electrical	1 per lot	1 per lot	IS: 2026	IS: 2026	TC/IR	P	V
					Major	Mechanical	1 per lot	1 per lot	Fix a pressure gauge on the HV transformer rectifier unit.	OPERATE AT 0.4+/- 0.05 Kg/cm2	TC/IR	P	V



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

**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SOP:OP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 29 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		REMARKS	
					M	B			M	B		
1	2	3	4	5	M	B	7	8	9	10	11	
		7.Short Circuit Test	Major	Electrical	1 per lot	1 per lot	Apply air pressure through a regulator valve. Increase the pressure till pressure release valve operates. Measure the maximum pressure at the point of operation of pressure release valve. Slowly release the pressure and observe the closure of pressure release valve.	should function satisfactorily	TC/IR	P	V	
		8.Oil Leakage Test for 24 hours	Major	Mechanical	1 per lot	1 per lot	Operate pressure of 0.2 Kg/cm ² . Lock for 24 hours	No leakage of oil	TC/IR	P	V	
		9. Vacuum test	Major	Mechanical	1 per lot	1 per lot	Connect the vacuum gauge to the empty tank of Transformer Rectifier unit. Create a vacuum of 250 mm of Hg. Lock the vacuum for 15 minutes	No deformation / cracks	TC/IR	P	V	
	Type test (continued)	10. Pressure test	Major		1 per lot	1 per lot	Connect the pressure gauge to	No deformation / cracks	TC/IR	P	V	

BOILER



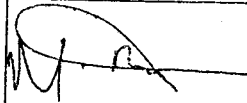


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**STANDARD QUALITY PLAN FOR ELECTRONIC CONTROL PANEL
 AND HIGH VOLTAGE RECTIFIER.**

SQP:QP:E:835
 REV. NO: 00
 DATE: 26 09 2014
 Page 30 of 30

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	TC/IR	AGENCY	REMARKS
					M	B					
1	2	3	4	5	M	B	7	8	9	10	11
		11. Induced Overvoltage test	Major	Electrical	1 per lot	1 per lot	the empty tank of Transformer Rectifier unit at 1 kg/ sq cm for 15 minutes	No collapse of voltage should occur	TC/IR	P	V
		12. Measurement of No load losses and current	Major	Electrical	1 per lot	1 per lot	IS: 2026	IS: 2026 and BHEL approved data sheet	TC/IR	P	V
		13. Measurement of Impedance voltage / Short circuit Impedance and load losses	Major	Electrical	1 per lot	1 per lot	IS: 2026	IS: 2026 and BHEL approved data sheet	TC/IR	P	V
		14. Measurement of Insulation resistance (Input terminals to Earth, HT bushing to Earth, Input terminals to HT bushing)	Major	Electrical	1 per lot	1 per lot	IS: 2026	Greater than 50 Mega ohms	TC/IR	P	V
	Type test (continued)	15. Measurement of Acoustic sound level	Major	Mechanical	1 per lot	1 per lot	NEMA TR 1	Maximum 80 db	TC/IR	P	V
		16. DOP test for panel (IP 54 test)	Major	Electrical	1 per lot	1 per lot	IS: 13947(part 1)	IS: 13947(part 1)	TC/IR	P	V
		17. DOP test for Marshaling box (IP 55 test)	Major	Electrical	1 per lot	1 per lot	IS: 13947(part 1)	IS: 13947(part 1)	TC/IR	P	V

TITLE : TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS FOR ESP
 ITEM : ELECTRONIC CONTROLLER PANEL & HIGH VOLTAGE RECTIFIER
 TRANSFORMER (EC-HVR)
 PROJECT : BHEL STANDARD

NAME		DESIGNATION	SIGNATURE	DATE
PREPARED	M. BOOPATHY	EF		07.12.2004
CHECKED	C.R.JAYACHANDRAN	SR.MGR		07.12.2004
APPROVED	C.R.JAYACHANDRAN	SR.MGR		07.12.2004

ISSUED BY
 EDC - AQCS

1.0.0 SCOPE

1.1.0 The high voltage DC Power supply equipment having High voltage transformer rectifiers (HVR) and Electronic controller Panel (EC) shall be supplied complete with all fittings and accessories as detailed in specification and as required to make the system complete. The scope also included commissioning of EC – HVR at site.

1.2.0 BHEL / BAP / Ranipet will supply microprocessor based TR set controller (BAPCON) along with the following accessories directly to site, for mounting and wiring in the Electronic control panel. However necessary fixing provision, termination provision and wiring provision for Firing card shall be provided by supplier and suitable fixing clamps shall be provided for interconnecting cable support.

- a) Microprocessor based controller.
- b) Firing (Triggering) card.
- c) 1.8 m length screened connecting with disconnecting type plug in connector at both ends.

1.3.0 One set of typical microprocessor based controller shall be collected from BHEL / BAP / Ranipet on returnable basis at the time of Routine / type test as applicable and the same shall be duly returned to BHEL / BAP / Ranipet immediately on completion of such tests.

1.4.0 The HVR and EC shall be suitable Electrostatic Precipitator (ESP) application. It is the responsibility of the bidder to know all aspects of ESP, which decides the design & performance of the HVR & EC.

2.0.0 PROJECT INFORMATION :

2.1.0 Ambient conditions :

2.1.1 Ambient temperature 1°C to 50°C.

2.1.2 Humidity Upto 100%.

2.2.0 Location :

2.2.1 High voltage transformer Rectifier unit Outdoor, on top of ESP.

2.2.2 Electronic controller Indoor.

2.3.0 Quantity As per enquiry.

2.4.0 Environment The atmosphere will be very dusty and of very high abrasive nature. The equipment shall be suitably tropicalized, designed and manufactured for such environment.

3.0.0 APPLICABLE STANDARDS:

3.1.0 GENERAL

The equipment shall be designed, manufactured and tested as per applicable standards listed below and as per this technical specification.

If there is any contradiction between the specification and standards, the specification shall apply. If there is any contradiction between standards listed or between various clauses, the most onerous condition shall apply. Further to above, the panels & transformer shall meet local statutory regulation as applicable.

3.2.0 STANDARDS:

IS 5, IS 5578, IS 11353, IS 694, IS 1248, IS 3947 , IS 2026, DIN 57146, IS 9924, IS 3043, IS 4064, IS 4237, IS 6875, IS 9000

4.0.0 TERMINAL CONDITIONS :

- | | |
|---|---|
| 4.1.1 Power supply available | 415V, 1Phase, 2 Wire, 50HZ AC (In case any other power source is indicated, the same shall be complied with) |
| 4.1.2 Power supply variation | |
| 4.1.2.1 Voltage. | + / - 10%. |
| 4.1.2.2 Frequency. | + / - 5%. |
| 4.1.2.3 Combined variation of Voltage & Frequency | 10% (Absolute sum). |
| 4.2.1. Rated output voltage and out put current will be as per Enquiry. | |
| 4.2.2 Capacitance of precipitator (PF) | 200 X rated output ct. (mA). |
| 4.2.3 Form factor to be considered for HVR | : 1.4 max. for input current and 1.15 for input voltage. |
| 4.3.1 Output terminal | : Through single horizontal terminal. |

5.0.0 FUCNTION

The Transformer Rectifier unit along with the Electronic Controller with Microprocessor based controller is meant as automatic constant current source of power to the Electrostatic Precipitator.

6.0.0 DESIGN & OPERATIONAL REQUIREMENTS :

- 6.1.0 The HVR unit along with its Electronic controller is meant as a source of DC supply for ESP. The unit shall be thyristor controlled type suitable for 24 hours a day operation continuously, with frequent sparking in the precipitator load, occasionally having 200 sparks per minute. The basic mode of operation of the rectifier shall be constant current regulation.
- 6.2.0 The EC – HVR, fitted with the BHEL supplied microprocessor based TR set controller (BAPCON) , shall regulate the output current to the set value within + / - 5 % for any non sparking load conditions between 0 to 100% of the rated output current for any / all of the following conditions :

1. Variation in impedance of EP load.
 2. Variation in EC – Panel input voltage between $415 + 10\%$ to $415 - 10\%$. The HVR shall deliver the rated secondary voltage and current with load connected, when the transformer primary voltage is 373.5 V.
- 6.3.0 It shall be noted that the precipitator is a dead load, the electrodes inside the Precipitator keep swinging slightly with frequency of 5 to 10 HZ. Under certain conditions, the precipitator may act like a tuned – circuit, since the precipitator can be regarded as a capacitive load. A critically adjusted controller may be completely stable when connected to a resistive load but not necessarily when connected to a Precipitator load, such regulator instability will not be accepted. The unit shall be capable of operating at any secondary current provided the primary current is not exceeded. The unit shall be capable of operating under accidental no load, which may occur during startup, maintenance and operation, without damage. The unit may be subjected to short circuit condition when the ESP Electrodes gets snapped during operation. The EC –HVR unit shall be suitable for the above condition.
- 6.4.0 The EC & HVR, in association with BAPCON, the Microprocessor based TR set controller, shall regulate and control the electric power input to the Electrostatic Precipitators. The EC & HVR shall maintain the spark rate at a set level for great variations of gas temperature, dust composition, gas flow etc. The EC & HVR shall regulate the thyristor in such a way, that current through Electrostatic Precipitator is corrected as the conditions for sparking are changed.
- 6.5.0 The EC –HVR to be supplied shall be field proven type and shall be type tested type.
- 7.0.0 BHEL MAKE MICROPROCESSOR BASED TR SET CONTROLLER:
- The EC & HVR shall be completely suitable for BHEL make microprocessor based TR set controller (BAPCON). The bidder is advised to know the necessary details about BHEL make microprocessor based controller (BAPCON), so that the EC& HVR can be designed to suit BHEL make microprocessor based controller (BAPCON).
- 8.0.0 CONSTRUCTIONAL & DESIGN FEATURES OF TRANSFORMER RECTIFIER :
- 8.1.0 The high voltage transformer rectifier shall be as per IS 2026 & DIN 57146. the transformer rectifier shall be suitable for operation with Microprocessor based TR set controller with charge ratio 1 : 1 to 1 : 159 and base charge range of 0 – 49 % of set current. The controller will limit current peaks to 204 % under intermittent charging mode .
- 8.2.0 The HV transformer rectifier shall consist of suitably rated single phase high voltage step-up transformer, the secondary of which is connected to a full wave bridge connected rectifier. The transformer windings, magnetic circuit and other associated components and rectifier stack shall be housed in a common transformer tank made of robust, leak proof welded steel structure, rectangular in shape and shall have “ON” type cooling. The transformer shall be filled with mineral oil as per IS 335 or silicon oil as per the enquiry / purchase order. Suitably sized CONSERVATOR shall be provided to take care of the oil expansion due to the operating conditions & ambient conditions. Access shall be provided to the internals for convenience and

ease of maintenance and repairs. The wheels of HVR shall be separated at a distance of 900 mm (along the Bushing) and at a distance of 550 mm (across the Bushing). The wheels shall have approximate thickness of 50 mm. The distance between Bushing center line and the wheel bottom shall be 700 mm. Other dimensions of the transformer shall be decided by the vendor to suit the rating. The winding shall be of copper. The transformer shall be designed to meet all type acceptance and routine tests indicated in this specification and Quality plan referred in the enquiry / purchase order.

- 8.3.0 Following accessories and fittings shall be provided for the transformer in addition to those covered under IS 2026 Part – I.
- (i) Two float Buchholz relay with isolating valves on either side.
 - (ii) Dial thermometer with two sets of contacts. The sets of contacts shall have a setting difference of 5 to 10°C. the dial thermometer shall be housed in a weather proof box. The first set of contact shall be for alarm only and the other set of contact shall be for trip and alarm.
 - (iii) Thermometer pocket.
 - (iv) Magnetic oil level indicator (MOG) with marking to indicate the minimum level of oil. One set of contact shall be provided to interface with controller to trip under oil level low. Apart from MOG, prismatic oil type level indictor shall also be provided.
 - (v) Two numbers of filter valves. The bottom valve will be used for draining oil and shall have sampling port.
 - (vi) An explosion vent / Pressure Relief valve.
 - (vi) Bottom supporting frame with bolting arrangement castors, lifting lugs and bi directional wheels.
 - (vii) Danger plate – 2 Nos.
 - (viii) The HVR shall be provided with Double compression type nickel coated Brass cable Glands (COMMET / BRACCO make) and Pre insulated Annealed Tinned Copper lugs (Dowells / Commet make) to receive the external cables. The quantity and size of Glands & Lugs will be indicated during drawing approval
- 8.4.0 The feedback DC current shunt shall be located outside the transformer tank. The shunt shall be enclosed in a weather proof box for external termination. A high voltage resistor column for measurement of DC output voltage shall be located in side the transformer tank. Measuring terminals shall be brought out for external termination. Necessary protections in the form of glow tube and voltage clamping devices shall be provided.
- 8.5.0 Power connections for LT supply shall be extended with adequate support such that power cables can be terminated vertically without bending the cable cores.
- 8.6.0 The positive lead of rectifier output shall be taken through an earth bushing. The earth bushing shall be located on the transformer tank. The negative terminal of the rectifier output shall be through side mounted high voltage busing insulator. This bushing shall be provided on the side wall of the transformer. The terminal side of the bushing shall have M10 threading.

- 8.7.0 A suitable metallic duct enclosing the negative bushing shall be provided with flange for the protection of the Bushing Insulator against adverse condition such as rain and accumulation of dust.. This flange shall match the flange provided in the Disconnecting Switch (supplied by BHEL), The metallic duct shall have square flange of dimension 650 mm X 650 mm with 24 nos. 9.5 mm dia. holes, to connect the duct with purchaser's equipment. An opening to clean the insulator shall be provided in the duct.
- 8.8.0 There shall be two separate grounding terminals for +ve grounding of tank. The positive busing terminal shall be connected by tinned copper strips to the earth terminal, externally. The positive terminal shall also be earthed, internally within the TR set.
- 8.9.0 There shall be a Marshalling box mounted on the transformer. The Marshalling box shall house terminations for Bucholzs relay, dial type thermostat contacts. Heavy Duty brass double compression cable glands and pre insulated Annealed tinned Copper lugs shall be provided for terminating external power, control cable and screened cables.
- 8.10.0 The HVR shall be provided with Double compression type nickel coated Brass cable Glands and Pre insulated ATC lugs to receive the external cables. The quantity and size of Glands & Lugs will be indicated during drawing approval.
- 8.11.0 Interlocking type or colour coded ferrules of proper size shall be used for control and signal wiring.
- 8.12.0 Non conducting barrier shall be provided between LV and HV connection. Hylam is not accepted as barrier.
- 8.13.0 The rectifier shall be made of silicon diode stacks. The diodes shall have adequate safety factor and protections and shall be mounted on printed circuit / moulded discs.
- 8.14.0 A suitable linear reactor with adequate impedance to limit short circuit current 2.5 to 3 times rated current shall be located inside the tank. The reactor shall be designed to generate minimum vibration and noise.
- 8.15.0 A suitably rated Radio Frequency Choke shall be located inside the Transformer Tank to protect the HVR from the sparking that may occur in the ESP.
- 8.16.0 The HVR Transformer shall be provided with Danger Plate.
- 8.17.0 The HVR Transformer shall deliver the rated Secondary voltage & current with load connected, when the Transformer primary voltage is at 90% of the system voltage.
- 8.18.0 The HVR shall be designed to pass the Double voltage Double frequency testing.
- 8.19.0 SEALED OR HERMETICALLY TYPE TRANSFORMER:

Whenever, the Enquiry / Purchase Order calls for Sealed Type or Hermetically Sealed type HVR, then the HVR Transformer shall be provided with Expandable Fins at the HVR side walls to take care of oil expansion. In addition the HVR shall be provided with Oil Level switches,

Pressure Relief valve, Dial Type Thermometer, Oil level Gauge, Pressure switch etc. CONSERVATOR and Bucholz Relay should not be provided in such cases. All other requirements are, as per the HVR Transformer with Conservator.

9.0.0 ELECTRONIC CONTROLLER PANEL (EC):

- 9.1.0 The Electronic controller shall be suitable for operation with HV transformer rectifier unit and BHEL supplied BAPCON. It shall be dust and vermin proof, free standing floor mounted type-having opening from rear and front with enclosure meeting IP54 degree of protection Neoprene gaskets / natural rubber shall be provided for all metal-to-metal joints. The panel shall be suitable for continued trouble free operation in dusty atmosphere. The construction of panel shall be such that free access is possible to all components for eases of troubleshooting and maintenance.
- 9.2.0 The Electronic controller shall have provision of mounting BHEL supplied Microprocessor based TR set controller (BAPCON) module on front door at a suitable operating height. Terminal blocks for interfacing of microprocessor based TR set controller & its Firing Card, shall be provided in the ELECTRONIC CONTROLLERS. The EC panel shall be provided with a cut-out of dimensions 255 x 180mm for mounting the BAPCON. The dimensions of BAPCON are 280 mm (W) X 200 mm (D) and 210 mm (H). The EC panel lay out shall be such that, the BAPCON shall not foul with any component. The General Arrangement of the EC panel., the components lay out inside the EC panels and the Electrical Scheme of EC & HVR are subjected to BHEL approval.
- 9.3.0 The panel shall be made of 2 mm thick steel sheet. (If higher thickness is asked in the Enquiry / Purchase order then higher thickness shall be provided). The panel doors shall be rigid enough to avoid wobbling. Cubicle light with door operated switches and 15A, 230V single phase 5 pin socket for soldering iron / blower supply shall be provided at the incoming supply terminal through a adequately rated transformer. The front door of cubicle shall be interlocked to ensure that the interior of panel can not be reached until the mains supply is made OFF.
- 9.4.0 Apart from this, cutouts as per the sketch indicated in the Annexure, for mounting a special rotary interlock, which shall be fitted by buyer, shall also be provided on cubicle front to de – energies the rectifier when the key of the special interlock is removed. This facility is intended for interlocking of the HV transformer rectifier with the Precipitator for safety of operating personnel and equipment. Necessary wiring and terminations shall be made to include the NC contact of this key interlock in the coil circuit of main contactor.
- 9.5.0 Supplier shall provide LED TYPE INDICATING LAMPS wherever applicable.
- 9.6.0 All controls and instrumentation shall be insensitive to vibration, dust & humidity and shall be fully tropicalized
- 9.7.0 Necessary foundation frames (min 75 mm height), bolts, nuts, washer etc shall be provided along with controller for installation. Ant vibration pads, where specified in the enquiry shall be provided. The total dimensions of the panel shall be 700 mm (W) X 650 mm (D) X 2000 mm (H). However if any specific dimension is as in the Enquiry /Purchase order, then the panel shall have the dimensions indicated in the Enquiry / Purchase order. In order to meet various criteria

specified in this specification and if the manufacturer's design requires higher dimensions, then the panel shall have higher dimension to meet such requirements. The operating height shall be between 700 mm and 1800 mm . The height of the panel is subjected to the approval of BHEL, which is based on end user's requirement. There shall not be any commercial implications on account of such approvals.

9.8.0 The bus bar support shall be of moulded type, non – hygroscopic, anti – tracking and non – inflammable. The location of power terminals shall be above 270 mm from gland plate. Bus-bar shall be suitable to terminate four runs incoming power cables and 4 runs of out going power cable. All hardwires such as bolts, nuts and washers shall be nickel / cadmium plated / zinc passivated.

9.9.0 The Electronic controller shall house the following:

- a) Heavy duty load break Fuse switch unit with HRC fuse or MCCB, as per Enquiry / Purchase order (of L&T / SIEMENS / ABB make)
- b) Thyristor units with rear mounted black insulating painted heat sinks along with necessary protections.
- c) Control and other auxiliary power circuit shall have double pole MCB (L&T/ SIEMENS make). Glass fuses are not acceptable.
- d) Audible alarm in the form of hooter to annunciate fault conditions.
- e) Visual indications for ON / OFF , ALARM & TRIP signals by LED lamps. (L&T / SIEMENS make)
- f) Accept pushbutton (of L&T / SIEMENS make) shall be provided for alarm. The accept pushbutton operation shall make the Hooter OFF, while lamps shall be kept glowing, unless the fault is rectified or removed. First fault shall be annunciated along with visual alarm while subsequent faults shall be annunciated even if previous fault is not cleared. However they shall be indicated by visual alarm.
- g) Resin cast current transformer for protection and metering.
- h) Auxiliary contactors as required. The contactors shall be of heavy duty. (L&T / SIEMENS make). Relays are not acceptable. MOVs shall be provided across all contactors.
- i) Control supply transformer of adequate rating and class B insulation with primary tappings for + / - 10% shall be provided. For firing card 18 VAC power supply with primary tappings for + / - 1- % shall be provided.
- j) Double compression type nickel plated Brass cable glands (COMMET / BRACCO make) and Pre insulated Annealed Tinned Copper Lugs (Dowells / Commet make), to terminate external cables, shall be provided in the EC panel. The quantity and size of Glands & Lugs will be indicated during drawing approval. The cable glands shall be fitted on removable gland plate of thickness of 3mm.
- k) Following connectors are to be provided with EC panel to interface BAPCON & FIRING CARD

BAPCON

Cable No	Phoenix Make	Male / Female
	Type reference	

1 to 7	MSTBVK 2.5/7-G-5.08	F
8 TO 13	MSTBVK 2.5/7-G-5.08	F
18 - 19	MSTBVK 2.5/4-G-5.08	F
28 - 29	MSTBVK 2.5/4-G-5.08	F
20 - 23	MSTBVK 2.5/4-G-5.08	F
24 - 27	MSTBVK 2.5/4-G-5.08	F
14 - 17	MSTBVK 2.5/4-G-5.08	F

FIRING CARD

Connector	Phoenix Make Type reference	Male / Famale
J1 - J2	MVSTBW 2.5/ 2	M
J3 - J6	MVSTBW 2.5/ 4	M
J7 - J10	MVSTBW 2.5/ 4	M

- (l) Din rail EN50045 shall be provided for mounting terminals required for BAPCON interface.
- (m) Suitable DIN RAIL(EN50045) of length 220 mm, shall be provided to mount the Firing card. The details of FIRING CARD are indicated in the Annexure.
- (n) DIN rail shall comply with latest European standards and make up of steeling accordance with DIN - VDE 0611 part 3.
- (o) 5 digit time totalizer of Non Reset able type.

9.10.0 All internal wiring shall be neatly laid out. Ferrule numbering shall be adopted for wiring. Inter component wiring shall be done with extra flexible stranded copper conductor PVC insulated wires. More than two wires shall not be terminated in a terminal block. Each wire shall be provided with a separate lug for termination. Suitable pre - insulated ATC lugs and clip on type terminals shall be used in wiring. All power wiring shall be done with tinned copper bus bars of suitable size to withstand 50 KA for 1 Sec. For CT shorting link, ELMEX CATD or equivalent type shall be provided. All the wires shall be laid down through cable tray channel. For control and signal wiring, 1 sq mm copper PVC insulated wires to be used.

9.11.0 20% spare control terminal blocks shall be provided in the panel for each row / group of terminal. Terminal block of phenolic, polyetelene or hylum are not acceptable. It shall be made of melamine. The insulating material of epoxy or fibreglass shall be preferred. The current rating of terminal blocks shall be at least twice that of terminated wires.

9.12.0 The Earth Bus shall be provided with 9 nos. lugs to receive screening of external cables.

9.13.0 GROUNGING

A tinned copper ground bus of minimum 150 sq mm cross - section shall be run along the entire width of the panel. Two external grounding points with M12 bolts, nuts and washer for connecting purchaser's ground conductor (50 x 6 GI) shall be earthed to the ground bus separately. All ground points shall be connected to ground separately. Insulated ATC lugs to earth, screens of external screen cable shall be provided.

9.14.0 MEASURING INSTRUMENTS :

Separate C.T's shall be provided for metering and protection. All instrument transformers required for metering shall be of class 1 accuracy and those for protection shall have class 5P3 accuracy. Adequate burden shall be provided for transformer. The indicating meters shall be of flush mounting type. The dial range shall be such that it shall read rated value at 75% deflection of indicator. Ammeter and current coil of meters shall continuously withstand 120% of rated current and 5 times rated current for 0.5 sec without loss of accuracy. Voltmeters and potential coils shall withstand 120% of rated voltage continuously and twice the rated voltage for 0.5 sec.

Instrument dial shall be white with black numerals and lettering. Knife-edge pointers are preferred. There shall be red mark on dial corresponding to rated value. The measuring instruments shall be identified as follows. All indicating meters shall be of AE / IMP make.

AC ammeter to measure primary current shall be labeled as "AC PRIMARY CURRENT" and AC Voltmeter to measure primary voltage shall be labeled as "AC PRIMARY VOLTAGE".

DC milli-ammeter to measure precipitator current shall be labeled as "PRECIPITATOR CURRENT". The signal to meter shall be from shunt resistor. The meter shall be of moving coil type giving arithmetic mean reading. DC kilo voltmeter to measure precipitator voltage shall be labeled as "PRECIPITATOR VOLTAGE". The meter shall be of moving coil type giving arithmetic mean reading.

5 digit time totalizer shall be labeled as "POWER SUPPLY OPERATION". This shall be non reset able type. The time totalizer shall indicate the cumulative time in hours up to last digit. At the time of dispatch the initial reading of time totalizer shall not exceed two digits.

9.15.0 The EC panel shall be provided with separate LED (Clustered LED) type indication lamps to indicate MAINS ON, HT ON, ALARM(Common), TRIP (Common), SCR TEMPERATURE HIGH, TR TEMPERATURE HIGH, TR TEMPERATURE VERY HIGH, BUCH. TOP FLOAT, BUCH. BOTTOM FLOAT, UNDER VOLTAGE, ASH LEVEL HIGH, HOPPER TEMPERATURE HIGH, CONVEYOR NOT RUNNING, MINIMUM OIL LEVEL, THERMAL OVERLOAD etc. Necessary Auxiliary contactors shall be provided for this purpose.

9.16.0 No loose component shall be terminated to any of the components. Potentiometers for calibration if any shall be provided in PCB's / Part of cards.

9.17.0 Danger plate and rating shall be fitted on the door front.

9.18.0 Potential free, 5A 230V AC rated "NO" contacts shall be provided for customer use for HT "ON", HT "OFF", Main supply "ON", Trip and Alarm. Also provision shall be made in the panel to receive HVR ON , OFF commands from Remote.

9.19.0 The panel shall be provided with Anti-vibration pads.

9.20.0 COMPONENT IDENTIFICATION AND LABELLING :

All the components of Electronic controller shall be identified by fixing anodized Aluminium labels for the items mounted on the door. For components mounted inside the panel / Marshalling box, Aluminium foil sticker shall be followed.

10.0.0 PAINTING OF HV TRANSFORMER :

The internal and external surfaces including fluids filled chambers and structural steel work of transformer shall be sand blasted / approved equivalent method , to remove all rust and scales or foreign adhering material. All steel surfaces in contact with insulating fluid shall be painted with two coats of heat resistant fluid insoluble in insulating fluid. All steel surfaces exposed to weather shall be given a primary coat of zinc chromate, second coat of weather resistant epoxy paint of colour distinct from primary. Finally two coats of glossy fluid and weather resistant non fading paint of shade 631 of IS 5 or as specified by Enquiry / Purchase order, shall be provided . Air drying may be followed for transformers painting. Minimum thickness of paint shall be 50 micron. **If the Enquiry / Purchase order calls for any other painting process, then the same shall be followed.**

11.0.0 PAINTING OF ELECTONIC CONTROLLER

All sheet steel shall be pretreated in tanks in accordance with IS 6005. Degreasing shall be done by alkaline cleaning, rust and scales shall be removed by pickling with acid. After pickling the parts shall be washed in running water. These items shall be rinsed in slightly alkaline hot water and dried. The phosphate coating shall be of class "C" as specified in IS 6005. The phosphates surface shall be rinsed and passivated prior to application, of stove lead oxide primer coating. After primer application, finishing synthetic enamel stoving paint shall be applied. Thickness of paint shall not be less than 50 microns. The final shade shall be 631 of IS 5 or as specified by customer. Peelable coating shall be applied on panel after final painting. **If the Enquiry / Purchase order calls for any other painting process, then the same shall be followed.**

12.0.0 MAKES OF COMPONENTS :

12.1.0 The makes of components indicated above are only tentative. The makes of components are subjected to BHEL approval, which is based on end user requirements. Only the Make of components which are approved by BHEL shall be used. If any specific makes of components are indicated in the Enquiry / Purchase Order, then the specific makes only shall be used. There shall not be any commercial implication on account of such approvals.

13.0.0 DOCUMENTS TO BE SUBMITTED FOR APPROVAL ON PLACEMENT OF PURCHASE ORDER..

13.1.0 General arrangement of HVR, General arrangement of EC, Inside component layout of the EC, Wiring drawing for EC and HVR, Bill of material for EC, Bill of material for HVR. Power and control scheme, Rating and Diagram plate and technical particulars as per IS 2026.

13.2.0 Detailed calculation for selection / sizing of KVA rating of transformer , Rating of Linear reactor, RF choke, Diode stack, HV resistor column, Conservator sizing and transformer tank sizing.

13.3.0 Interconnection diagram between HVR and EC panel / other panels.

13.4.0 Six sets of the above drawings shall be submitted to BHEL for approval, before taking up with manufacture.

14.0.0 O & M MANUAL:

14.1.0 O&M manual in required numbers, as per Enquiry / Purchase order, shall be supplied along with the dispatch of the EC & HVR. The O&M manual shall be directly sent to BHEL RANIPET.

14.2.0 The O & M manual shall contain relevant GA drawings, power & control schemes, operational write up, detailed bill of materials indicating description, rating, quantity, make etc., wiring drawings, Rating and diagram plate, Do's and Don'ts, details on storage, handling, pre – commissioning points, set parameters, operation spares with part numbers, manufacturer's catalogue for various bought out components etc.,

14.3.0 The scheme drawings shall indicate all the components so that trouble shooting can be made easier. A single drawing explaining all circuit connection shall be furnished.

14.4.0 Exhaustive BOM shall be furnished.

15.0.0 TESTING :

The EC & HVR shall be tested based on the following documents:

- (i) BHEL Purchase order
- (ii) BHEL Technical specification
- (iii) Project specific requirements, if any, indicated in the P.O
- (iv) Quality checklist / Quality Plan indicated in the P.O
- (v) Test Procedure TP:109: (latest revision).
- (vi) BHEL approved vendor drawings.

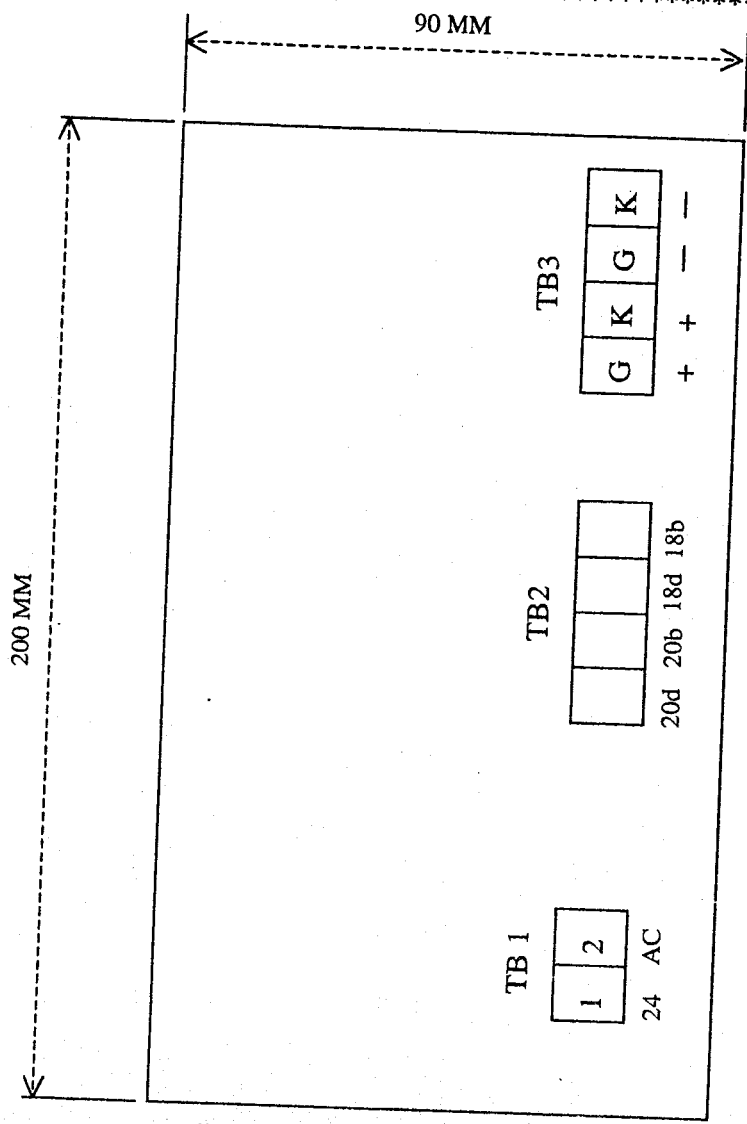
16.0.0 PACKING

16.1.0 The equipment shall be properly packed to avoid any damage during storage / transit. The packing shall be weather proof and suitable for out door storage. Necessary provisions / marks for handling shall be provided. Each packing shall contain a packing slip showing all the components, instruction manual, name of supplier, brief equipment description, purchase order number, relevant test certificate, serial number of equipment and destination address. Loose components if any, shall be clearly indicated in packing slip.

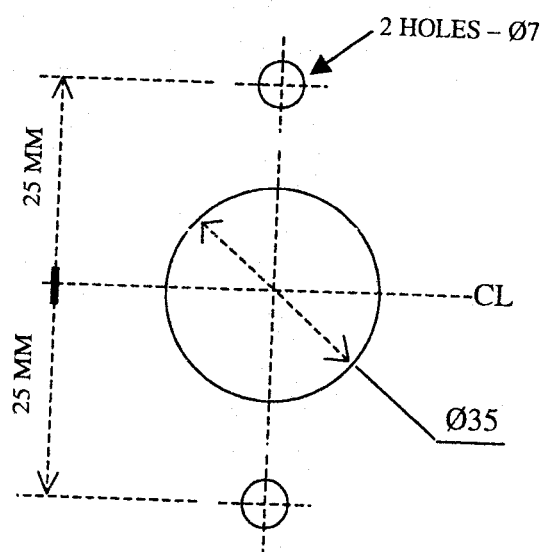
16.2.0 Each Electronic controller and High voltage transformer rectifier to be packed separately.

16.3.0 Each crate shall indicate the Purchaser order number, Name and address of the consignee, Approximate weigh, Name of equipment (Electronic controller / High voltage transformer rectifier) , Shipping marking etc.

16.4.0 For Export orders, only Sea worthy packing shall be provided



FIRING CARD DETAIL



DRILLING DATA ON PANEL (FOR FIXING INTERLOCK)

ANNEXURE TO R-INDENT NUMBER: R-7550467

ADDITIONAL REQUIREMENTS OF EC-HVR

01. The HVR shall deliver the rated secondary voltage and current with load connected, when the transformer primary voltage is 373.5V.
02. The HVR shall be designed for double voltage double frequency testing.
03. Only HRC fuses for power and MCB for control shall be provided. Glass fuses are not acceptable.
04. The scheme drawing shall be very clear indicating all the components. The drawing shall be prepared in such a manner that trouble shooting can be made easier. A single drawing explaining all circuit connection shall be furnished.
05. Draft O&M manual shall be furnished along with the drawing for Approval.
06. Only Auxiliary contactors and power contactors shall be provided. Relays are not permitted.
07. Magnetic Oil Level Guage to be linked to Alarm/warning/trip circuit.
08. Double compression type cable gland shall be provided as given below for each set:

For EC : 4 Nos. 2C-120 sq. mm. Armoured XLPE - FRLS AL. CABLE.
1 No 10C-2.5 sq. mm. Armoured PVC-FRLS CU.CABLE.
3 Nos. 4C-1.5 sq. mm. Armoured PVC-FRLS Screened CU.CABLE.
2 Nos. 3C-2.5 sq. mm. Armoured PVC-FRLS CU.CABLE.

For HVR : 2 Nos 2C-120 sq. mm. Armoured XLPE-FRLS AL.CABLE.
1 No 10C-2.5 sq. mm. Armoured PVC-FRLS CU.CABLE.
1 No 4C- 1.5 sq. mm. Armoured PVC-FRLS Screened CU.CABLE.
1 No. 3C-2.5 sq. mm. Armoured PVC-FRLS CU.CABLE.

09. The following connectors are to be mounted on suitable DIN rail for ARECA -II

Phoenix make &
Type reference

Cable No:1	MSTBVK 2.5/16-G-5.08 – 1 No.
Cable No:2	MSTBVK 2.5/12-G-5.08 – 1 No.
Cable No:3	MSTBVK 2.5/3 -G-5.08 – 1 No.

10. The following connectors are to be provided for firing card and shall be mounted on the rail of 220mm length. (Model No.NS 35 / 15)

phoenix make &
type reference

Connector - TB-1	-	MVSTBW 2.5/2-ST-5.08
Connector - TB-2	-	MVSTBW 2.5/4-ST-5.08
Connector - TB-3	-	MVSTBW 2.5/2-ST-5.08
Connector - TB-4	-	MVSTBW 2.5/2-ST-5.08

11. Height of panel shall be as per technical specification.

12. Potential free contacts for DCS communication shall be provided for the following signals.

- a) HT 'ON'
- b) HT 'OFF'
- c) Alarm Tripped
- d) Alarm warning

13. Provision to switch ON & OFF from Remote shall be provided.

14. HV Rectifier transformer shall be suitable for IP-65 Deg. of protection.

M. Vijay
PREPARED :

[Signature]
APPROVED :

TECHNICAL CONFIRMATION CHECKLIST

- | | | | |
|-----|--|---|---|
| 1.0 | Enquiry reference | : | |
| 2.0 | Bidder Name | : | |
| 3.0 | Bidder offer reference | : | |
| 4.0 | Item Description | : | High voltage Transformer Rectifier and Electronic control panel but without Microprocessor based TR set controller. |
| 5.0 | Technical confirmation (Page 3 of ECI: UKAI R&M:EC-HVR:REV00) | : | YES / NO |
| 5.1 | Compliance to enquiry Technical specification | : | YES / NO |
| 5.2 | Compliance to Additional Requirements of EC-HVR as Indicated in the enquiry Document Ref. ECI:UKAI R&M:EC-HVR REV 00 | : | YES / NO |
| 5.3 | Rating of EC-HVR as per enquiry | : | YES / NO |
| 5.4 | Commissioning of EC-HVR Included in the scope | : | YES / NO |
| 5.5 | Supply of O&M Manual Included in the scope | : | YES / NO |
| 5.6 | Compliance to Quality Plan/ Checklist indicated in the Enquiry | : | YES / NO |
| 5.7 | Compliance to the painting details Indicated in the enquiry Technical Specification | : | YES / NO |

SIGNATURE WITH OFFICIAL SEAL.

ADDITIONAL REQUIREMENTS OF EC-HVR

01. The HVR shall deliver the rated secondary voltage and current with load connected, when the transformer primary voltage is 373.5V.
02. The HVR shall be designed for double voltage double frequency testing.
03. Only HRC fuses for power and MCB for control shall be provided. Glass fuses are not acceptable.
04. The scheme drawing shall be very clear indicating all the components. The drawing shall be prepared in such a manner that trouble shooting can be made easier. A single drawing explaining all circuit connection shall be furnished.
05. Draft O&M manual shall be furnished along with the drawing for Approval.
06. Only Auxiliary contactors and power contactors shall be provided. Relays are not permitted.
07. Magnetic Oil Level Guage to be linked to Alarm/warning/trip circuit.
08. Double compression type cable gland shall be provided as given below for each set:

For EC : 4 Nos. 2C-120 sq. mm. Armoured XLPE - FRLS AL. CABLE.
1 No 10C-2.5 sq. mm. Armoured PVC-FRLS CU.CABLE.
3 Nos. 4C-1.5 sq. mm. Armoured PVC-FRLS screened CU.CABLE.
2 Nos. 3C-2.5 sq. mm. Armoured PVC-FRLS CU.CABLE.

For HVR : 2 Nos 2C-120 sq. mm. Armoured XLPE-FRLS AL.CABLE.
1 No 10C-1.5 sq. mm. Armoured PVC-FRLS CU.CABLE.
1 No 4C- 1.5 sq. mm. Armoured PVC-FRLS screened CU.CABLE.
1 No. 3C-2.5 sq. mm. Armoured PVC-FRLS CU.CABLE.

09. The following connectors are to be mounted on suitable DIN rail for ARECA-ii

Phoenix make &
Type reference

Cable No:1
Cable No:2

MSTBVK 2.5/16-G-5.08 – 1 No.
MSTBVK 2.5/12-G-5.08 – 1 No.

Page-2

10. The following connectors are to be provided for firing card and shall be mounted on the rail of 220mm length. (Model No.NS 35 / 15)

phoenix make &
type reference

Connector - TB-1	-	MVSTBW 2.5/2-ST-5.08
Connector - TB-2	-	MVSTBW 2.5/4-ST-5.08
Connector - TB-3	-	MVSTBW 2.5/2-ST-5.08
Connector - TB-4	-	MVSTBW 2.5/2-ST-5.08

11. Height of panel shall be as per technical specification.

12. Potential free contracts for DCS communication shall be provided for the following signals.

- a) HT 'ON'
- b) HT 'OFF'
- c) Alarm Tripped
- d) Alarm warning

13. Provision to switch ON & OFF from Remote shall be provided.

14. HV Rectifier transformer suitable for IP 65 deg. Of Protection.

PREPARED :



APPROVED :



TECHNICAL CONFIRMATION CHECKLIST

- 1.0 Enquiry reference :
- 2.0 Bidder Name :
- 3.0 Bidder offer reference :
- 4.0 Item Description : High voltage Transformer Rectifier and Electronic control panel suitable for Microprocessor based controller.
- 5.0 Technical confirmation :
- 5.1 Compliance to enquiry Technical specification : YES / NO
- 5.2 Compliance to Additional Requirements of EC-HVR as Indicated in the enquiry Document Ref. ECI:WANAKBORI R&M 3x210MW EC-HVR:REV 00 : YES / NO
- 5.3 Rating of EC-HVR as per enquiry : YES / NO
- 5.4 Commissioning of EC-HVR Included in the scope : YES / NO
- 5.5 Supply of O&M Manual Included in the scope : YES / NO
- 5.6 Compliance to Quality Plan/ Checklist indicated in the Enquiry : YES / NO
- 5.7 Compliance to the painting details Indicated in the enquiry Technical Specification : YES / NO

SIGNATURE WITH
OFFICIAL SEAL.