

Enquiry



Bharat Heavy Electricals Limited
Transmission Business Group
Materials Management

Project : BHEL TBG

Enquiry No	Enquiry Dt	Rev No	Rev Dt	PI No	Enquiry Type	Inspection by	Due Dt	Commercial Comments	Technical Comments	Signing Authority
274R056	23-Jun-14	0		342240003	Package		18-Jul-14			Sr.Engineer/TBMM

Document Enclosed

- Technical Specifications
- Terms & Conditions for Indigenous Enquiry
- Activity Schedule
- Schedule of Commercial Deviation
- Schedule of Technical Deviation

SN	Equipment	Phy Unit	Qty	Unit Exworks	Unit Packing	% ED	% CST	% VAT	% ST	Unit F&I	Plan Dt	Comments
1	AL TUBE 4" IPS (SCH 40)	MT	29.07									
2	AL TUBE 4" IPS (SCH 80)	MT	269.5									
3	AL TUBE 4.5" IPS (SCH 40)	MT	12.84									
4	AL TUBE 4.5" IPS (SCH 80)	MT	91.46									
5	TYPE TEST CHARGES (OPTIONAL)-CORONA INCEPTION/EXTINCTION TEST FOR 4 INCH ALUMINIUM TUBE.	LOT	1									
6	TYPE TEST CHARGES (OPTIONAL)-CORONA INCEPTION/EXTINCTION TEST FOR 4.5 INCH ALUMINIUM TUBE.	LOT	1									
7	TYPE TEST CHARGES (OPTIONAL)-RIV TEST FOR 4 INCH ALUMINIUM TUBE.	LOT	1									
8	TYPE TEST CHARGES (OPTIONAL)-RIV TEST FOR 4.5 INCH ALUMINIUM TUBE.	LOT	1									

You are requested to submit your most competitive offer so as to reach us positively by the tender opening date & time. THE TENDERS NOT RECEIVED WITHIN SCHEDULED DATE AND TIME ARE LIKELY TO BE IGNORED. BHEL shall not be responsible for any postal delay.

IN YOUR OWN INTEREST YOU ARE ADVISED TO CAREFULLY READ "THE INSTRUCTIONS TO BIDDERS". INCOMPLETE BIDS AND/OR BIDS NOT COMPLYING WITH TENDER CONDITIONS SHALL BE TREATED AS NON RESPONSIVE AND ARE LIKELY TO BE IGNORED.

In case Tender Documents are not received within 7 days of this E-mail message, intimate BHEL accordingly. If no intimation is received, it will be considered that you have received tender enquiry and delay in submission offer due to late receipt of tender documents will not be entertained.

YOU ARE REQUESTED TO SUBMIT YOUR MOST COMPETITIVE OFFER SO AS TO REACH US POSITIVELY BY 2 PM ON THE TENDER OPENING DATE AND TENDER WILL BE OPENED AT 2:30 PM WITH EFFECT FROM 15-SEP-09.

BHEL RESERVES THE RIGHT TO OPT FOR REVERSE AUCTION FOR OBTAINING BEST PRICES.

OFFERS THROUGH E-MAIL / FAX:

WHOSOEVER DESIRES TO SEND OFFERS ON THEIR OWN RISK (COMPLETE IN ALL RESPECTS) VIA E-MAIL or FAX HAVE TO SEND THE OFFERS TO THE COMMON E-MAIL ADDRESS tenderbox@bhel.in or 0120-6748581 FAX .

THE RECEIVED EMAIL OFFERS WILL BE PRINTED BY PURCHASE COORDINATOR AND PUT THEM INTO COVERS AS PER CONVENTIONAL METHOD FOR TENDER OPENING I.E., TECHNO COMMERCIAL & PRICE OFFER SHALL BE PUT INTO TWO SEPARATE COVERS AND BOTH THE COVERS ARE KEPT IN THIRD COVER DULY SUPER SCRIBING ENQY. NO. AND DUE DATE.

OFFERS SENT TO ANY OTHER E-MAIL ID or FAX NO AND INCOMPLETE OFFERS SHALL NOT BE CONSIDERED FOR EVALUATION PURPOSE.

It is suggested that the bidders are advised to send the files with 'password protection'. procedure for giving a password to a file has been given below:

For saving Excel file with password

Steps to be followed:

1. Click on the FILE option in XP system and Start sign in Vista system then go to SAVE AS option.
2. Select the location to save and Click on the TOOLS box and go to GENERAL OPTION.
3. It will ask for the password, type the password into open or modify box or both as required.
4. Then click on the OK button it will ask for reenter of the password.
5. After reentering the password click on the save box.

For saving Word file with password

Steps to be followed:

1. Click on the FILE option in XP and Start sign in Vista then go to SAVE AS option.
2. Select the location to save and Click on the TOOLS box and go to SECURITY OPTION in XP system and GENERAL OPTION in Vista system.
3. It will ask for the password, type the password into open or modify box or both as required.
4. Then click on the OK button it will ask for reenter of the password.
5. After reentering the password click on the save box.

The vendors who has sent offers with password,the passwords are to be forwarded to another email id:supplierinfo@bhelindustry.com

MSME STATUS

"THOSE INDUSTRIES WHO HAVE FILED A MEMORANDUM WITH THE CONCERNED AUTHORITIES AND REGISTERED AS MICRO & SMALL ENTERPRISE UNDER MICRO, SMALL AND MEDIUM ENTERPRISES DEVELOPMENT ACT 2006, HAVE TO SUBMIT A COPY OF SUCH REGISTRATION CERTIFICATE / MEMORANDUM TO BHEL FOR NECESSARY COMPLIANCES OF THE ABOVE ACT".

Please acknowledge the receipt of tender enquiry and fax back this letter by ticking the appropriate item below.

for BHARAT HEAVY ELECTRICALS LTD

We acknowledge the receipt of tender.

- (a) The offer against subject enquiry shall be submitted by the scheduled date and time.
- (b) We regret to quote. The item in reference is out of our manufacturing range.
- (c) We regret because of our prior commitments.
- (d) Any other reason.

To
S C Shivhare
Sr.Manager
BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP
TOWER-A,5th Floor,
Advant Navis IT Business Park,
Plot No-7,Sector-142,Expressway Noida
Noida-201305
Distt. Gautam BudhNagar,U.P

Ph: 0120-6748471
Fax: 0120-6748581

Signature and Seal of Tenderer

Enquiry No : 274R056 Enquiry Dt : 23-Jun-14



BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION PROJECTS ENGINEERING MANAGEMENT

DOCUMENT No.	TB-xxx-316-055	Rev no.-00	Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECIFICATION	NAME	MLK	SKS	SKS
TITLE		SIGN	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
RATE CONTRACT FOR ALUMINIUM TUBE		DATE	30.04.14		
		GROUP	TBEM	W.O. No	
		CUSTOMER/ CONSULTANT			
PROJECT					

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 This must not be used directly or indirectly in any way detrimental to the interest of the
 Company.

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Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS
Distribution			To		TBQM
			Copies		TBCM
					-
					-

SECTION – I

SCOPE, SPECIFIC TECHNICAL REQUIREMENT AND QUANTITIES

1.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and dispatch of ALUMINIUM TUBE.

The equipment is required for the following project.

Name of the customer :

Name of the Project :

1.1 (A) BILL OF QUANTITY

Sl. No.	Description	Quantity
1.	ALUMINUM TUBE 4" IPS (SCH 40)	29.07 MT
2.	ALUMINUM TUBE 4" IPS (SCH 80)	269.5 MT
3.	ALUMINUM TUBE 4.5" IPS (SCH 40)	12.84 MT
4.	ALUMINUM TUBE 4.5" IPS (SCH 80)	91.46 MT

1.1 (B) TYPE TEST CHARGES (OPTIONAL)

The bidder has to quote type test charges for the following type tests. Conduction of these type test is optional and solely on the discretion of BHEL, whether to be conducted or not. If desired by BHEL, then these should have been conducted in NABL accredited Laboratory.

- 1) RIV Test.
- 2) Corona Inception/Extinction Test.

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SECTION – II

EQUIPMENT SPECIFICATION

TECHNICAL SPECIFICATIONS FOR ALUMINIUM TUBE

1.0 TECHNICAL DATA OF ALUMINIUM TUBE

S. No.	PARTICULARS	DATA
1)	Applicable Grade & Standard	Grade 63401 WP as per IS 5082: 1981
2)	Manufacturing Process	a) Hot extrusion process through die and mandrel (hollow billet process). Heat treatment shall be done after hot extrusion of the tube; or b) Bridge extrusion process and then cold drawn. Heat treatment shall be done after hot extrusion of the tube.
3)	Chemical Composition	Copper- 0.04% max Magnesium- 0.4 to 0.9% Silicon- 0.3 to 0.7% Iron- 0.03 to 0.5% Aluminium - Balance
4)	Min. 0.2% proof Stress	17.34 kg/ mm ² (170 MPa)
5)	Min. UTS	20.5 kg/mm ² (200 MPa)
6)	Min. Elongation on 50 mm	10%
7)	Max. Electrical Resistivity at 20°C	3.133μΩ-cm
8)	Min. Electrical Conductivity	55% IACS
9)	Temp. Coefficient of resistance	0.00364/°C
10)	Temp. Coefficient of Linear Expansion over 20°C to 200°C	0.000023/°C
11)	Thermal Conductivity at 100°C	0.43 Cal/s/mm ² /cm/°C

12)	Nominal Size, IPS (EH type)	4 Inch		4.5 Inch	
	Schedule (SCH)	80	40	80	40
13)	Minimum Outside Diameter in mm (no negative tolerance permitted)	114.2 +2.28	114.3 +2.28	127 +2.54	127 +2.54
14)	Modulus of elasticity (kg/mm ²)	6700	6700	6700	6700
15)	Minimum Thickness in mm (no negative tolerance permitted)	8.51	6.35	9.02	6.27
16)	Nominal Cross Section Area, in Sqmm	2826	2153.5	3387.02	2378
17)	Nominal Weight, kg/m (Maximum positive tolerance allowed is 8%, no negative tolerance is allowed.)	7.7	5.814	9.146	6.420
18)	Packing	In wooden crates/Hessian covering			
19)	Required Length	As per Pl.			

No deviation on above-indicated parameters shall be accepted. The above-indicated length may vary by up to 25%. The tube shall be supplied in cut lengths as specified at the time of award of order. The negative tolerance on the length of the section shall not exceed 10 mm.

1.0 TESTS:

In addition to routine tests on the aluminium tubes as per IS 5082, Type Test Reports for following tests shall also be submitted:

- i) Measurement of the outside diameter, wall thickness and ovality of the tube.
0.2% proof tests both on the parent metal and aluminium tube after welding and International standards, as appropriate.
- ii) Tensile Strength Test.
- iii) Percentage Elongation Test.

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SECTION – 3

PROJECT DETAILS AND GENERAL SPECIFICATIONS

3.0 GENERAL

This section stipulates the General Technical Requirements under the contract and will form an integral part of the Technical Specification.

The provisions under this section are intended to supplement general requirements for the materials, equipment and services covered under other sections and is not exclusive. However in case of conflict between the requirements specified in this section and requirements specified under other sections, the requirements specified under respective sections shall hold good.

3.1 SITE INFORMATION

SL.NO.	DESCRIPTION	
3.1	PROJECT INFORMATION	
	a) Customer	
	b) Project	
	c) Project location	
	d) Transport facilities Nearest Railway Station/Gauge Distance from Railway Station	
	e) Access roads	
3.2	SITE CONDITIONS	
3.2.1	Ambient Temp.	
	a) Maximum Design Ambient air temp. (max.) °C	
	b) Minimum Design Ambient air temp. (max.) °C	
3.2.2	Relative humidity	
3.2.3	Height above mean sea level	
3.2.4	Pollution Severity	
3.2.5	Earth quake data	
	a) Seismic zone as per IS 1893:84	
	b) Seismic acceleration	
3.2.6	Wind data	
	a) Wind velocity m/sec.	
3.2.7	Average annual rainfall	

3.2 INSTRUCTION TO BIDDERS

The bidders shall submit the technical requirements, data and information as per the technical data sheets, provided in Section-4.

The bidders shall furnish catalogues, engineering data, technical information, design documents, drawings etc fully in conformity with the technical specification.

It is recognised that the Manufacturer may have standardised on the use of certain components, materials, processes or procedures different than those specified herein. Alternate proposals offering similar equipment based on the manufacturer's standard practice will also be considered provided such proposals meet the specified designs, standard and performance requirements and are acceptable to the Purchaser. Unless brought out clearly, the Bidder shall be deemed to conform to this specification scrupulously.

3.3 STANDARDS

The works covered by the specification shall be designed, engineered, manufactured, built, tested and commissioned in accordance with the Acts, Rules, Laws and Regulations of India.

The equipment to be furnished under this specification shall conform to latest issue (with all amendments) of specified standards.

In addition to meeting the specific requirement called for in Sections 1 and 2 of the Technical Specification, the equipment shall also conform to the general requirement of the applicable standards, which shall form an integral part of the specification.

The Bidder shall note that standards mentioned in the specification are not mutually exclusive or complete in themselves, but intended to complement each other.

When the specific requirements stipulated in the specifications exceed or differ from those required by the applicable standards, the stipulation of the specification shall take precedence.

Other internationally accepted standards, which ensure equivalent or better performance than that specified in the standards referred, shall also be accepted. The bidder shall submit copies of such standards.

In case governing standard for the equipment is different from IS or IEC, the salient points of difference shall be clearly brought out in the offer along with English language version of standard or relevant extract of the same. The equipment conforming to standards other than IS/IEC shall be subject to Purchaser's / owner's approval.

The bidder shall clearly indicate in his bid the specific standards in accordance with which the works will be carried out.

3.4 SERVICES TO BE PERFORMED BY THE EQUIPMENT BEING FURNISHED

All equipment shall also perform satisfactorily under various other electrical, electromechanical and meteorological conditions of the site of installation. All equipment shall be able to withstand all external and internal mechanical, thermal and electromechanical forces due to various factors like wind load, temperature variation, ice & snow, (wherever applicable) short circuit etc for the equipment.

3.5 ENGINEERING DATA

3.5.1 Drawings

The contactor shall necessarily submit all the drawings/ documents unless anything is waived. The contactor shall submit 6 (six) sets of drawings/ design documents/ data/ test reports as may be required for the approval of the purchaser. All drawings submitted by the Manufacturer including those submitted at the time of bid shall be in sufficient detail to indicate the type, size, arrangement, material description, Bill of Materials, weight of each component, break-up for packing and shipment, the external connections, fixing arrangement required, the dimensions required for installation and interconnections with other equipment and materials, clearances and spaces required for installation and interconnections between various portions of equipment and any other information specifically requested in the specifications.

Each drawing submitted by the Manufacturer shall be clearly marked with the name of the Purchaser, the unit designation, the specifications title, the specification number and the name of the Project. If standard catalogue pages are submitted, the applicable items shall be indicated therein. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.

Further work by the Manufacturer shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the Purchaser, if so required.

The review of these data by the Owner will cover only general conformance of the data to the specifications and documents, interfaces with the equipment provided under the specifications, external connections and of the dimensions which might affect substation layout. Owner may not indicate a thorough review of all dimensions, quantities and details of the equipment, material, any devices or items indicated or the accuracy of the information submitted. This review and /or approval by the Owner shall not be considered by the Manufacturer, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.

All manufacturing and fabrication work in connection with the equipment prior to the

approval of the drawings shall be at the Manufacturer's risk. The Manufacturer may make any changes in the design which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Purchaser. Approval of Manufacturer's drawing or work by the Purchaser shall not relieve the manufacturer of any of his responsibilities and liabilities under the Contract All engineering data submitted by the Manufacturer after final process including review and approval by the Owner shall form part of the Contract Document and the entire work performed under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the Owner in Writing.

The title block of drawings shall contain the following information incorporated in all contract drawings

Title block for _____ project:

1. Customer :
2. Consultant :
3. Project :
4. Contract No./LOA No. :
5. Main Contractor : Bharat Heavy Electricals Limited
6. BHEL Order No. & Date :

3.5.2 Approval Procedure

The scheduled dates for the submission of these as well as for, any data/information to be furnished by the Purchaser would be discussed and finalised at the time of award. The following schedule shall be followed generally for approval.

	Stage	No. of copies	Submission /Remarks	Schedule
i)	Initial Submission Drawings, Data sheets, Type test Reports	6	As per agreed schedule	
ii)	Resubmission, if required	6	Within 3 (three) weeks from date of comments including both ways posta time	
iii)	Approval or comments Within	3	(three) weeks of receipt of resubmission.	
iv)	Furnishing of distribution copies of drawings in bound volume	8	2 Weeks from the date of final approval Five (6) copies for each substation plus two (2) copies for corporate centre.	
v)	Furnishing of distribution copies of type test reports in bound volumes	3	2 Weeks from the date of final approval One (1) copies for each substation plus two (2)	

			copies for corporate centre.
vi)	Furnishing of distribution copies of Routine test reports	2	2 Weeks from the date of final approval One (2) copies for each substation
vii)	CD-ROM/ Optical Disc of all documents	3	One (1) set for each substation plus two (2) set for corporate centre.

NOTES:

a) The manufacturer may note that all re-submissions must incorporate all comments given in the prior submission by the Purchaser. Adequate justification for not incorporating the same must be submitted, failing which the submitted documents may be returned.

3.6 QUALITY ASSURANCE PROGRAMME

To ensure that the equipment and services under the scope of this Contract, whether manufactured or performed within the Manufacturer's Works or at his Sub-manufacturer's premises or at the Purchaser's site or at any other place of Work, are in accordance with the specifications, the Manufacturer shall adopt a suitable quality assurance programme to control such activities at all points, as necessary. Such programme shall be outlined by the Manufacturer and shall be finally accepted by the Purchaser after discussions before the award of Contract. A quality assurance programme of the manufacturer shall generally cover the following:

- (a) Manufacturer's organisation structure for the management and implementation of the proposed quality assurance programme;
- (b) Documentation control system;
- (c) Qualification data of bidder's key personnel;
- (d) The procedure for purchases of materials, parts components and selection of sub-Manufacturer's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.
- (e) System for shop manufacturing and site erection controls including process controls and fabrication and assembly control;
- (f) Control of non-conforming items and system for corrective actions;
- (g) Inspection and test procedure both for manufacture and field activities;
- (h) Control of calibration and testing of measuring instruments and field activities;
- (i) System for indication and appraisal of inspection status;
- (j) System for quality audits;
- (k) System for authorising release of manufactured product to the Purchaser
- (l) System for maintenance of records;
- (m) System for handling storage and delivery; and
- (n) A quality plan detailing out the specific quality control measures and Procedures adopted for controlling the quality characteristics relevant to each item of equipment furnished and/or services rendered.

The Purchaser or his duly authorised representative reserves the right to carry out quality audit and quality surveillance of the system and Procedure of the Manufacturer/his vendors quality management and control activities.

3.7 Quality Assurance Documents

The Manufacturer shall be required to submit the following all Quality Assurance Documents as stipulated in the quality plan at the time of purchasers inspection of equipment/ material.

3.8 TYPE TESTING, INSPECTION, TESTING & INSPECTION CERTIFICATE

All equipment being supplied shall conform to type tests and shall be subject to routine and acceptance tests in accordance with requirements stipulated under respective sections. Purchaser reserves the right to witness any or all the tests. The Manufacturer shall intimate the Purchaser the detailed programme about the tests at least three (3) weeks in advance in case of domestic supplies & six (6) weeks in advance in case of foreign supplies. Purchaser reserves the option for getting any or all the type tests repeated on the equipment. The Manufacturer shall also submit type test procedure for approval of the Purchaser.

In the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes (including substitution of components) or due to non-compliance with the requirement stipulated in the technical specification or any/all additional type tests not carried out without any additional cost implication to the Purchaser.

The price of conducting all tests and additional type tests is deemed to be included in Bid price. In case any bidder indicates that he shall not carry out a particular test, his offer shall be considered incomplete and shall be liable to be rejected.

The purchaser intends to repeat the type tests and additional type tests on cables for which test charges shall be payable as per provision of contract.

The Purchaser, his duly authorised representative and/or outside inspection agency acting on behalf of the Purchaser shall have at all reasonable times free access to the Contractors premises or Works and shall have the power, at all reasonable times to inspect and examine the materials and workmanship of the Works during its manufacture or erection if part of the Works is being manufactured or assembled at other premises or works, the Manufacturer shall obtain for the Engineer and for his duly authorized representative permission to inspect as if the works were manufactured or assembled on the Manufacturer's own premises or works. Inspection may be made at any stage of manufacture, dispatch or at site at the option of the Purchaser and the equipment if found unsatisfactory due to bad workmanship or quality, material is liable to be rejected.

The Manufacturer shall give the Purchaser/inspector thirty (30) days written notice of any material being ready for testing. Such tests shall be to the Manufacturer's account except for the expenses of the inspector. Unless witnessing of the tests is virtually waived, the Purchaser/ inspector will attend such tests within thirty (30) days of the date of which the equipment is notified as being ready for test/ inspection, failing which the Manufacturer may proceed with the test which shall be deemed to have been made in the Inspector's presence and the Manufacturer shall forthwith forward duly certified copies of test reports in triplicate to the Inspector.

The Purchaser or Inspector shall, within fifteen (15) days from the date of inspection as defined herein, give notice in writing to the Manufacturer, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the Contract. The Manufacturer shall give due consideration to such objections and shall either make the modifications that may be necessary to meet the said objections or shall confirm in writing to the Purchaser/ inspector giving reasons therein, that no modifications are necessary to comply with the Contract.

When the factory tests have been completed at the Manufacturer's works, the Purchaser/ inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the Purchaser/inspector, the certificate shall be issued within fifteen (15) days of receipt of the Manufacturer's Test certificate by the Engineer/ Inspector. Failure of the Purchaser/inspector to issue such a certificate shall not prevent the Manufacturer from proceeding with the Works. The completion of these tests or the issue of the certificate shall not bind the Purchaser to accept the equipment should it, on further tests/ after erection, be found not to comply with the Contract. The equipment shall be dispatched to site only after approval of test reports and issuance of MICC by the Purchaser.

In all cases where the Contract provides for tests whether at the premises or at the works of the Manufacturer or of any Sub-Contractor, the Manufacturer except where otherwise specified shall provide free of charge such items as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Purchaser /Inspector or his authorised representative to carry out effectively such tests of the equipment in accordance with the Contract and shall give facilities to the Purchaser Inspector or to his authorised representative to accomplish testing.

The inspection by Purchaser and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Manufacturer in respect of the agreed quality assurance programme forming a part of the Contract.

The Purchaser will have the right of having at his own expenses any other test(s) of reasonable nature carded out at Manufacturer's premises or at site or in any other place in addition of aforesaid type and routine tests, to satisfy that the material comply with the specification.

The Purchaser reserves the right for getting any field tests not specified in respective sections of the technical specification conducted on the completely assembled equipment at site. The testing equipment for these tests shall be provided by the Purchaser

3.9 MATERIALS AND WORKMANSHIP

Equipment materials and components shall be new, of high grade and good quality and be to the latest engineering practice. The material and workmanship throughout shall be in accordance with the purpose for which they are intended. Each component shall be designed to be consistent with its duty.

All the information concerning materials or components to be used in manufacturing, machinery, equipment, materials and components supplied, installed or used shall be submitted for approval. Without such approval the supplier shall run risk of subsequent rejection. The cost as well as time delay associated with such rejection shall be borne by the supplier.

3.10 PACKING AND STORAGE

All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. On request of the purchaser, the manufacturer shall also submit packing details/associated drawing for any equipment/ material at a later date, in case the need arises. While packing all the materials, the limitation from the point of view of availability of Railway wagon sizes in India should be taken into account. The manufacturer shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Any demurrage, wharf age and other such charges claimed by the transporters, railways etc shall be to the account of the manufacturer. Purchaser takes no responsibility of the availability of the wagons.

All coated surfaces shall be protected against abrasions, impact, discolouration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protecting device.

Supplier shall ensure that equipment shall be properly packed, blocked, padded, coated and protected so that it is not damaged due to possible mishandling. Storage requirements shall be clearly defined by the supplier. Packing shall be such that if required, long time storage at site should not deteriorate the performance of the equipment.

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SECTION – IV

**GUARANTEED AND TECHNICAL PARTICULARS OF STRANDED ALUMINIUM
TUBE (SEPARATE GTP TO BE FILLED FOR EACH TYPE
OF TUBE)**

S. No.	PARTICULARS	DATA			
1)	Applicable Grade & Standard				
2)	Manufacturing Process				
3)	Chemical Composition				
4)	Min. 0.2% proof Stress				
5)	Min. UTS				
6)	Min. Elongation on 50 mm				
7)	Max. Electrical Resistivity at 20°C				
8)	Min. Electrical Conductivity				
9)	Temp. Coefficient of resistance				
10)	Temp. Coefficient of Linear Expansion over 20°C to 200°C				
11)	Thermal Conductivity at 100°C				
12)	Modulus of Elasticity				
13)	Nominal Size, IPS (EH type)				
14)	Minimum Outside Diameter in mm <i>(no negative tolerance permitted)</i>				
15)	Minimum Thickness in mm <i>(no negative tolerance permitted)</i>				
16)	Nominal Cross Section Area, in Sqmm				
17)	Nominal Weight, kg/m				
18)	Packing				
19)	Required Length				

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SECTION - V

QUALITY PLAN

Bidder shall follow standard BHEL QAP doc. No. TBQM-STD-ALUMINIUM TUBE as enclosed with the specification.

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QUALITY PLAN

ITEM : ALUMINUM TUBE [RIGID CONDUCTOR]		QP NO. : TBQM-STD-ALT		PROJECT : RATE CONTRACT						
		REV:02		PACKAGE / CONTRACT :						
		DATE : 07.06.14		CONTRACTOR : BHEL						
		Page 1 of 2								
S.NO	COMPONENT / OPERATION	CHARACTERISTI C CHECKED	CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	ACCEPTANCE-NORM	REFERENCE DOCUMENT	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	8	7	9	D 10 11 12	13

I	CHEMICAL COMPOSITION	Chemical composition	Critical	Spectrometric test	One sample Per cast	IS: 5082	IS: 5082	Laboratory Test / JIR	V M C,N C,N	Review of Test record during final sample testing
II	Process of manufacture: it shall be produced by extruding hot billet in press through port hole die. The port hole die consists of a die aperture & mandrel & the tube is formed by squeezing the hot metal through annular space formed between mandrel & die aperture. Due to high pressure generated during the operation then tube has no weak joints. Heat treatment after extrusion shall be done.									
III	DIMENSIONS									
	a) Outer Diameter	Critical	Critical	Physical measurement	10%	Approved GTP & drg./ IS 5082/ IS 2673	Approved GTP & drg./ IS 5082/ IS 2673	JIR	V M C,N C,N	In case of rejection during sample testing sample size to increased to 20%. On subsequent rejection, 100% inspection to be carried out based on random check by inspector.
	b) Ovality	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	V M C,N C,N	
	c) Straightness	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	V M C,N C,N	
	d) Length	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	V M C,N C,N	
	e) Wall thickness	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	V M C,N C,N	
IV	MECHANICAL PROPERTIES									
	a) Ultimate Tensile Strength	Critical	Critical	Mech.	As per IS:5082-(Range 2)	As per IS:5082-(Range 2)	IS:5082 (Range 2)		V M C,N C,N	
	b) 0.2% Proof Stress	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	V M C,N C,N	
	c) % Elongation on 50.0 mm specimen	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	-Do-	V M C,N C,N	

Released for grade Contract

DiTaj
 विद्युत् संपूर्ण / DIPTOJIT SENGUPTA
 अभियंता (सहायता) / Engineer (Quality)
 परीक्षण व्यापार समूह / TBG3BHEL
 भारत हेवी इलेक्ट्रिकल्स लिमिटेड / BHEL
 5th Floor, Advant Navis IT Business Park
 Sector-142, Expressway Noida-201305

LEGEND :
 M – SUPPLIER / SUB SUPPLIER
 C – BHEL / NOMINATED INSPECTION AGENCY
 N – CUSTOMER / CUSTOMER NOMINATED AGENCY
 CHP- CUSTOMER HOLD POINT TC – TEST CERTIFICATE IR- INSPECTION REPORT
 JIR – JOINT INSPECTION REPORT


अनिल कुमार / ANIL KUMAR BHASKAR
 शक्ति प्रबंधक (सहायता) / Shakti Prbandhak (Quality)
 परीक्षण व्यापार समूह / TBG
 भारत हेवी इलेक्ट्रिकल्स लिमिटेड / BHEL
 5th Floor, Advant Navis IT Business Park
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QUALITY PLAN

ITEM : ALUMINUM TUBE [RIGID CONDUCTOR]

QP NO. : TBQM-STD-ALT
REV:02
DATE : 07.06.14
Page 2 of 2

PROJECT : RATE CONTRACT

PACKAGE /CONTRACT :

CONTRACTOR : BHEL

S.NO	COMPONENT / OPERATION	CHARACTERISTI C CHECKED	CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANC-E. NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	D	10	11	12	13

V	ELECTRICAL PROPERTIES	Conductivity	Critical	Electrical	-Do- 5 samples per lot per size	-Do- Approved Drg /GTP/ Tech spec.	-Do- Approved Drg /GTP/ Tech spec	-Do-	V	M	C,N	C,N	Applicable as specified in approved drg/GTP/ technical specification.	
VI	SURFACE FINISH & VERIFICATION OF CUTLENGTHS	Surface defects	Major	Visual Check	10%	-Do- IS-5082 Manufacturer standard	-Do- IS-5082 / Manufacturer standard /Material to be sound & free from harmful defects	-Do-	JIR	V	M	C,N	C,N	Review of test record during final inspection by BHEL

Note :

- Supplier shall directly submit & obtain SMQP approval from PGCIL, QA & I deptt. & the same shall be applicable for PGCIL projects.
- For NTPC, NPCIL & similar customers [where Supplier MQP is required], supplier shall submit to BHEL & approval of Customer shall be obtained.
- For all other projects where the item is classified under Inspection Cat-B of approved inspection category list, this QP shall be applicable.

(Signature)

विश्वजीत सेनगुप्ता / DIPLOMATT SENGUPTA
अभिजात (गुणवत्ता) / Engineer (Quality)
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LEGEND:
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CHP - CUSTOMER HOLD POINT TC - TEST CERTIFICATE
JIR - JOINT INSPECTION REPORT

P - PERFORMED BY
W - WITNESSED BY
V - VERIFICATION BY
IR - INSPECTION REPORT

(Signature)
अमित कुमार शर्मा / AMIT KUMAR BHASKAR
अभिजात (गुणवत्ता) / Manager (Quality)
परियोजना प्रबन्धक / TBG BHEL