



**TENDER DOCUMENT**

**For Works Contract**

**For Tender Enquiry No : FCX/TW/09/04**

**For**

**Foundation and allied work under debottlenecking scheme for Power Transformer manufacturing.**

**Contact Person :**

Name : Anshuman Sharma  
Designation : Dy. Mgr (MM)  
Email : anshuman.sharma@bhel.in  
PH : 0510 – 241 – 2784

**Tender Due Date                    24/09/2019 at 13 :15 Hrs**

**Tender Opening Date :    24/09/2019 at 14 :00 Hrs**

**Material Management Department  
BHEL, PO : BHEL, Jhansi 284120 (UP)**

**Factory Civil Department****TENDER DOCUMENT****TENDER ENQUIRY NO. FCX/TW/09/04****DATE:- 31-08-2019****Detail of Bidder and Documents to be submitted along with Technical Bid**

Please number your documents in continuation with tender documents at bottom (footer) of page.

<b>S.No.</b>	<b>Particular</b>	<b>Detail</b>	
<b>1.</b>	Name of the firm		
<b>2.</b>	Name of the Proprietor/Partners		
<b>3.</b>	Address		
<b>4.</b>	Mobile No.		
<b>5.</b>	E-mail ID		
<b>Essential Documents</b>			
	<b>Particular</b>	<b>Detail</b>	<b>Page No</b>
<b>6.</b>	Acceptance of Terms & conditions Signature on all pages without conditions of contractor	Submitted/ Not submitted	
<b>7.</b>	Blank price bid format duly signed by the contractor.	Submitted/ Not submitted	
<b>8.</b>	Copy of ESI Registration	ESI No-	
<b>9.</b>	Copy of PAN card	PAN No-	
<b>10.</b>	Copy of GST registration	GST No-	
<b>11.</b>	Self declaration as per as per annexure V on Rs 100 stamp paper .	Submitted/ Not submitted	
<b>12.</b>	Copy of ownership of firm	Submitted/ Not submitted	
<b>13.</b>	Reciept of tender fees deposition	Amount	
<b>14.</b>	Reciept of EMD deposition	Amount	
<b>15.</b>	Copy of turn over for last three year i. <b>2016-17</b> ii. <b>2017-18</b> iii. <b>2018-19</b>	Submitted/ Not submitted	

**We hereby accepted above (Signature & seal of bidder)**

**BHARAT HEAVY ELECTRICALS LIMITED, JHANSI**

**Factory Civil Department**

**TENDER DOCUMENT**

**TENDER ENQUIRY NO. FCX/TW/09/04**

**DATE:- 31-08-2019**

<b>16.</b>	Work Experience i. Work order ii. Completion Certificate iii. Bill of Quantity <b>Relevant TDS/TRACES (in case of Experience in private sector)</b>	Submitted/ Not submitted	
<b>17.</b>	Copy of IncomTax return i. 2016-17 ii. 2017-18 iii. 2018-19	Submitted/ Not submitted	
<b>18.</b>	Copy of PF registration	PF No-	

We will fulfill all the obligations of the contractor and abide by the terms & Conditions mentioned in the enquiry.

Date :-

Signature With Name & Seal

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We hereby accepted above (Signature & seal of bidder)

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**PART II: PRICE BID**

**(Separate envelope)**

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## NOTICE INVITING TENDER



**BHARAT HEAVY ELECTRICALS LIMITED, JHANSI****Factory Civil Department****TENDER DOCUMENT****TENDER ENQUIRY NO. FCX/TW/09/04****DATE:- 31-08-2019****1- NOTICE INVITING TENDER**

S. No.	Particulars	Details
1	Name of work	<b>Foundation and allied work under debottlenecking scheme for Power Transformer manufacturing.</b>
3	Tender Evaluation Criteria	(As per GTC issued by "Central Contracting Cell" and Special condition of contract for Civil Work of BHEL Jhansi.
4	Duration of the Contract	<b>One Year</b>
5	Last date of receipt of the Tender	(As on page # 1)
6	Date of opening Tender	(As on page # 1)
7	Address for submitting the tender	(As on page # 7)
8	Earnest Money Deposit (EMD)	<b>Rs. 48084/- (Rupees Forty Eight Thousand Eighty Four only)</b>
9	Cost of tender (Non refundable)	<b>Rs. 500.00</b> plus (18% GST as payable at BHEL cash office through POS machine or RTGS/NEFT/IMPS/EFT/ECS in BHEL account mentioned below)
10	Validity of Offer	120 days
11	Defect liability period	<b>One year from actual date of completion</b>

**Note:** The EMD may be accepted only in the following forms:

(i) Electronic Fund Transfer credited in BHEL account (before tender opening)

**BHEL account details: Bank Name: - SBI; A/c No.:- 10670828866 ; IFSC Code:- SBIN0003807 A/c Holder Name:- BHARAT HEAVY ELECTRICALS LIMITED**

(ii) At BHEL cash office through POS machine **No Demand Drafts shall be accepted.**

The contractors may physically visit the work place before quoting their rates. For relevant details, please visit our website "www.bhel.com" & "www.bheljhs.co.in"

**Note: BHEL takes no responsibility for any delay / loss of documents or correspondence sent by courier or post. Late tenders shall be rejected outright.**

The techno-commercial bid comprising (i) all its sections, (ii) all enclosures in support of various clauses and requirements and (iii) EMD, shall be duly signed and sent in a sealed envelope boldly super-scribing "**PART-I TECHNO COMMERCIAL BID FOR Foundation and allied work under debottlenecking scheme for Power Transformer manufacturing**". Similarly, the Price-bid must be duly signed and sent in a sealed envelope boldly super-scribing "**PART-II PRICE BID FOR Foundation and allied work under debottlenecking scheme for Power Transformer manufacturing**". Both these envelopes shall be placed inside 3<sup>rd</sup> sealed envelope super-scribing" duly signed and sent in a sealed envelope boldly super-scribing "**Foundation and allied work under debottlenecking scheme for Power Transformer manufacturing**".

**The tender shall be addressed to as follows:**

We hereby accepted above (Signature & seal of bidder)

**BHARAT HEAVY ELECTRICALS LIMITED, JHANSI**

**Factory Civil Department**

**TENDER DOCUMENT**

**TENDER ENQUIRY NO. FCX/TW/09/04**

**DATE:- 31-08-2019**

Anshuman Sharma

Sr. Purchase Officer (MM)

Email : anshuman.sharma@bhel.in

PH : 0510 – 241 – 2784

Sealed Tenders can be submitted (i) personally, (ii) by Courier, or (iii) by post.

If submitted personally

Tender Box

CISF Control Room/Office

Administrative Building

Bharat Heavy Electricals Limited

Jhansi-284120 (U P)

Or if sent through Courier / Post

Office of

Anshuman Sharma

Dy. Manager (MM)

Material Management Department

Email : [anshuman.sharma@bhel.in](mailto:anshuman.sharma@bhel.in)

BHEL, JHANSI - 284120

PH : 0510 – 241 – 2784

**Part-I Techno Commercial bid:**

Part I of the sealed tenders alone will be opened by BHEL in the presence of tenderers who are present at the time & place of opening. A signed blank price-bid copy should be enclosed with this bid. The spaces for prices should be crossed (x).

**Part-II Price bid:**

The price bid should contain prices only. Price bid will be opened only for the parties who qualify in techno commercial bid.

**TO BE SIGNED BY THE TENDERER**

Certified that all Sections of the Tender have been read / complied & agreed to, and each page of the tender offer has been signed & stamped.

(Signature of Authorized person(s))

**Brief Description of Work / Scope of work**

We hereby accepted above (Signature & seal of bidder)

The project/ work site is located inside BHEL Jhansi factory. BHEL Jhansi approximately 15 km from Jhansi railway station at Jhansi Lalitpur Highway. The bidder are advised to take into account all factors and any fluctuation in the market rates etc. having effect in the prices. It is advised to contractor before submission of tender proper assessment of site and working conditions may be done. The work shall be carried out in and around production shops, and the site will be available for working as per time schedule mentioned in contract / final time schedule as decided by BHEL before start of work without disturbing the ongoing production activities. The work will be carried out at Bay 9 (Main Transformer assembly shop) and nearby area.

The scope of work shall be including but not be limited to the following:

1. Demolishing of RCC structure.
2. Dismantling of structural steel in railings, partitions, doors, windows, base plates, barricades, roofing, walls etc.
3. Brickwork upto plinth and in wall as required.
4. Plastering of wall, painting of wall with approved color and shade including putty wherever required.
5. Foundation work for VPD plant, Oil Silos, Oil Filtration plant, static inverter and capacitor bank as per the issued drawings. This work shall include excavation of good earth, ordinary rock or hard rock as per the site conditions. Laying of PCC and further RCC as per the drawings.
6. Sheet piling work along with fixing of ridges, flashing, cappings etc. is to be carried out as per the drawing.

The above list is indicative and not exhaustive and shall include any other work not mentioned above but becomes important for successful completion of the entire work.

**Note :-** It is also advised that the bidder shall visit the Jhansi plant and physically see the work area/areas in order to have visualization of the work content involved for the above works.

### **Qualifying Requirements**

1. Copy of PAN Card to be submitted.
2. Copy of GST Registration to be submitted.
3. Self Declaration undertaking duly signed with stamp of the bidder on Stamp Paper of Rs 100 /- to be submitted.
4. Copy of independent ESI Registration.
5. Signed copy of Blank Price Bid.
6. (A) The bidder should have the experience of having successfully completed similar work against completed work order during the last seven years ending on **31.07.2019** amounting to values mentioned as under:
  - (1) One Work valuing not less than **Rs 19.23 Lakhs.**  
Or
  - (2) Two works each valuing not less than **Rs 12.02 Lakhs.**  
Or
  - (3) Three works each valuing not less than **Rs 9.62 Lakhs.**

Definition of Similar Work: **All type of civil construction/renovation/maintenance works.**

(Note: For verification by the department, work order copy and work completion certificate mentioning successful completion by the client shall be submitted by the vendor. If the work is done for a private customer, relevant TDS Certificate (TRACES Only) must be submitted as evidence in addition to above work completion certificate & work order copy by the vendor.

(B) Turnover criteria: Average annual financial turnover during the last three years, ending **31st March, 2019 (i.e. FY-2016-17, FY-2017-18 and FY-2018-19)** applicable as per norm shall be at least **Rs 7.21 Lakh**. Duly audited financial statement/balance sheet by CA to be submitted as supporting documents. If all balance sheet/ financial statement are not available for three years than the average shall be calculated by dividing the sum of turnover of submitted Balance sheet /Financial statement by three.

**Note: Provisional turnover for the FY 2018-19 duly certified by C.A. shall also be acceptable for evaluation purpose.**

7. Taxes & Duries, Payment Terms, Bonus & LD Clause will be as per GTC issued by “Central Contracting Cell” and “Special Conditions of Contract for Civil Works” of BHEL Jhansi.
8. Documentary proof in support of above eligibility criteria along with EMD shall be submitted along with Techno Commercial Bid.
9. The documents required for legal entities under whose name and style contractor has participated in the tender are as follows:
  - (i) Partnership Firm: Partnership Deed & registration certificate issued by office of registrar of Firms.
  - (ii) Company: Certified copy Memorandum of Association, Article of Association and Incorporation Certificate.
  - (iii) Society: Registration certificate issued by Registrar of societies.
  - (iv) Sole Proprietor-ship: Undertaking on oath (Rs. 100 stamp paper) that Proprietor is solely responsible for all rights and liabilities while working under the name and style of Sole Proprietorship firm namely (\_\_\_\_\_)

**GENERAL TERMS AND CONDITIONS OF ENQUIRY FOR WORKS  
CONTRACTS (JHS2055C R00)**

**UPLOADED IN SEPERATE FILE - PAGE NO 01 TO 14  
(To be signed by contractor and submitted along with bid)**

**FREE ISSUE MATERIAL TO THE CONTRACTOR**

**SCHEDULE "A"**

<b>S No.</b>	<b>Particulars</b>	<b>Rs.</b>	<b>Quantity</b>
1	Cement	Free of cost	As required
2	TMT	Free of cost	As required
3	Structural Steel	Free of cost	As required
4	Tool and Plant	Chargeable Basis	As required

Note: Tools and Plants if issued to contractor on chargeable basis than the amount shall be deducted as per rates decided by BHEL prior to issue.

**SPECIAL CONDITIONS OF CONTRACT FOR CIVIL WORK**

**1. Special Conditions of Contract for Civil Work**

- a) These special conditions supplement the conditions enumerated in the tender and contract and the other general conditions of contract and form part of the contract documents. Where these special conditions are at variance with the general conditions of contract these special conditions shall prevail.
- b) The rate quoted for reinforced cement concrete items shall include smooth finishing of exposed faces. The top surfaces of roof slab shall be laid to specified slope and mortar that comes to surface due to vibrations shall be trowel led so as to obtain smooth and even surface.
- c) The BHEL reserves the right to deviate either by additions or by deductions from the schedule of items of work given in the tender document after awarding work.
- d) In case of any difference between agreement, wording and detailed drawings the interpretation of the BHEL shall be final and binding on the contractor.
- e) The final acceptance of work in all items are subject to proper performance after testing regardless of whether the items are paid for or not.
- f) If discrepancy in specifications observed between schedule of quantities and general / technical conditions, the specifications in schedule of quantities will have precedence over the general / technical conditions.
- g) Water will be supplied free of cost at one point for drinking and construction.
- h) Quantity records shall be prepared, maintained and submitted by contractor on regular basis during the course of execution. Test records shall be prepared, maintained and submitted by contractor during the course of execution and as demanded by Engineer-In-Charge. Contractor shall strictly adhere to quality requirements and shall follow the norms mentioned in Field Quality Plan (if applicable).
- i) In case of defective work BHEL will have full right to reject the work or part thereof. Such defective work if any, will have to be rectified by the contractor at his own cost. The opinion of Engineer in charge shall be final in this matter. If the defective work is allowed to stand BHEL shall have the absolute right to reduce the rates for such items and the contractor shall have no claims over such defective work allowed on reduced rates.
- j) The contractor shall have to make his own storage sheds for materials to be issued by BHEL. If deemed necessary by engineer in charge, the contractor shall make separate store for cement with double lock system. The empty cement bags shall be stocked at one place and at least 90% of them shall be returned to BHEL at BHEL stores in good condition without any additional payment. Therefore, if the total quantity of 90% empty cement bags is not returned by the contractor, the same will be recovered at the rate of Rs 3/- per bag from the bills.
- k) For all natural minerals used in the work like sand, aggregate, bricks, etc royalty certificate (MM-11) must be submitted along with bills. If royalty certificate is not submitted the cost of royalty shall be deducted from contractors bill as per prevailing Govt. order including penalty as applicable.
- l) Any electric power required for contractors' lighting/machinery for the purpose of work including fabrication work shall be supplied FREE OF COST at one point by the company on the written request of the contractor, subject to the observance of rules and regulations of Electric board / company. If it is observed that power is being wasted, BHEL shall have the right to recover cost of such consumption including arrears. Power will not be allowed for cooking and room (air) heating in winter season: For

this purpose, on written application chargeable power can be allowed. The rates shall be the rates applicable for industrial consumption in U.P.

**2. TAXES AND DUTIES**

- a) Price quoted shall include all taxes/Duties/Royalties applicable as on date of submission of tender except GST.
- b) GST (as applicable) shall be payable additionally to the contractor at actuals at the rate prevailing at the time of execution against submission of GST registration no and production of documentary proof of payment of GST to the concerned Govt. Deptt. (as applicable).
- c) No claim shall be admissible on account of upward or downward revision in rate of existing taxes & duties (except GST as applicable) subsequent to bid submission. However, if any new taxes & duties are introduced subsequent to bid submission and during the currency of the contract including its extension if any for the reasons not attributable to the contractor, the same shall be reimbursed at actual against documentary evidence of remittance by the contractor. In case the contract period is extended for the reasons attributable to the contractor, no such reimbursement shall be made during extended period.
- d) Income Tax & other deductible tax (if any) shall be deducted at source (TDS) as per prevailing rules and certificate to this effect shall be provided to the contractor.
- e) Contractor to ensure timely remittance of SGST, CGST, IGST as applicable in time as per law.
- f) Contractor to ensure compliance to filing of monthly GST sales return including BHELs supplies by 10th of next calendar month in the online GST portal wherever applicable.
- g) Contractor to declare filing of timely returns and GST remittance/likely remittance /ITC adjustment along with invoice.
- h) Contractor to submit invoices compliant with GST invoice rules.
- i) Contractor to comply with all statutory provisions as may be applicable at the time of dispatch/sale. Any additional financial liability to BHEL on account of non-compliance by contractors shall be borne by them and shall be adjusted/ recovered from the contractor. BHEL reserves the right to review the existing offers/contracts for any revision in terms, which may arise due to change in any statutory provision to ensure that the benefit accrues to BHEL.
- j) Contractor to ensure TAX INVOICE submission to BHEL.
- k) In respect of cases where the liability to discharge GST in on BHEL under reverse charge mechanism, contractors have to ensure timely submission of invoices and delivery of material/services to BHEL, so that there is no mismatch on both activities. In case there is any additional financial liability on BHEL on account of default on the part of the contractor on submission or delivery of material/services the same shall be passed on to them.
- l) In respect of free issue material by BHEL, contractors have to return the processed material within the time line as per the provisions of GST. In case of any additional tax liability on BHEL on account of non- compliance by the contractor, the additional financial implications on BHEL shall be passed on to the contractor.
- m) Contractors to provide the applicable HSN/SAC codes as called for in the enquiry.
- n) As per provisions of section 171 of the CGST ACT 2017, bidders to pass on the anti - profiteering benefits accruing to them under GST regime to BHEL.
- o) In case of input credit is not available as denied by GST Portal due to in proper documentation or wrong uploading of data by bidder, the same will be recovered from bidder along with interest, if any.

**3. PROVISION OF BONUS**

Early completion of work is acceptable by BHEL. However no reward/bonus on any early closure shall be admissible.

**4. OVER RUN COMPENSATION (ORC)**

Not applicable in this contract.

**5. PRICE VARIATION COMPENSATION (PVC)**

Not applicable in this contract.

**6. MATERIAL HANDLING AND STORAGE**

Adequate arrangement be made for material handling & storage taking due care against damages.

**7. ACCOUNTING**

- a) Proper method of accounting of steel, tore steel, cement & scrap material be followed. The books of such accounting be offered for auditing by BHEL at pre-decided regular interval.
- b) All debris and surplus materials shall be cleared from the site as and when directed by the Engineer-in-charge. Any temporary structure / stores made by the contractor for the work shall be demolished and site cleared before payment of final bill.
- c) Structural steel wastage /scrap shall be permissible upto 2% of total quantity of issued quantity. The wastage /scrap steel must be return by contract for reconciliation of steel. Wastage scrap beyond 2% will deducted @ Rs.75 per kg.

**8. OVERPAYMENTS AND UNDERPAYMENTS**

- a) Where-ever any claim for the payment of a sum of money to the company/ corporation arises out of or under this contract against the contractor the same may be deducted by the company/ corporation from any sum then due or which at any time thereafter may become due to the contractor under this contract and failing that under any other contract with the company/ corporation or from any other sum due to the contractor from the company/ contractor (which may be available with the company/ corporation) or from his security deposit, or he shall pay to claim on demand.
- b) The company/ corporation reserves the right to carry out post-payment audit and technical examination of the final bill including all supporting vouchers, abstracts, etc. the company/ corporation further reserves the right to enforce recovery of any overpayment when detected, notwithstanding the fact that the amount of the final bill may be included by one of the parties as an item of dispute before an arbitrator appointed under this contract and notwithstanding the fact that the amount of the final bill figures in the arbitration award.
- c) If a result of such audit and technical examination any overpayment is discovered in respect of any work done by the contractor or alleged to have been done by him under the contract, it shall be recovered by the company/ corporation from the contractor by any or all of the methods prescribed above or if any under payment is discovered, the amount shall be duly paid to the contractor by the company/ corporation.
- d) Provided that the aforesaid right of the company/ corporation to adjust over payments against amounts due to the contractors under any other contract with the company/ corporation shall not extend beyond the periods of two years from the date of payment of the final bill or in case the

final bill is a MINUS bill, from the date the amount payable by the contractor under the MINUS final bill is communicated to the contractor.

- e) Any amount due to the contractor under this contract for under payment may be adjusted against any amount then due or which may at any time thereafter become due before payment is made to the contractor, from him to the company/ corporation on any other contract or account whatsoever.

## **9. METHODS OF MEASUREMENTS**

Except where any general or detailed description of the work in quantities expressly shows the contrary, schedule of quantities shall be deemed to have been prepared and measurements shall be taken in accordance with the procedure set forth in the schedule of rates – specification notwithstanding any provision in the relevant standard method of measurement or any general or local custom. In the case of items which are not covered by the CPWD schedule of rates – specification, measurement shall be taken in accordance with the relevant standard method of measurement issued by the Indian standards institution.

## **10. TIME LIMIT FOR PAYMENT OF FINAL BILL**

The final bill shall be submitted by the contractor within three months of physical completion of the works. No further claim shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payment of those items of the bill in respect of which there is no dispute and of items in disputes of quantities and at rates as approved by Engineer-in-charge, shall be made six months, the period being reckoned from the date of receipt of the bill by the Engineer-in-charge. After payment of the amount of the final bill payable as aforesaid has been made, the contractor may if he so desires, reconsider his position in respect of the disputed portion of the final bill and if he fails to do so within 90 days, his disputed claim shall be dealt with as provided in the contract.

**11.TOTAL SCOPE AT A GLANCE**

S.No.	Description	Scope of	
		BHEL	Bidder
1	<b>Open space</b>		
1.1	Open space for storage of material required.	Yes	
1.2	For fabrication.	Yes	
1.3	Covered/ready to use office rooms for projects.		Yes
1.4	Space for lodging for workers (Outside factory premises)		Yes
2	<b>For living purpose of bidder staff</b>		
2.1	Lodging & Boarding for Executives.		Yes
2.2	Lodging & Boarding for Workers.		Yes
3	<b>Electricity</b>		
3.1	Provision of electricity at single point.	Yes	
3.2	Further distribution of Electricity including required material and execution.		Yes
4	<b>Water Supply</b>		
4.1	Making the water available at single point	Yes	
4.2	Further distribution as per the requirement of work including supply of material and execution.		Yes
5	<b>Transportation</b>		
5.1	For project purposes		Yes
5.2	For the site personnel of the bidder		Yes
5.3	For the bidder equipment and consumables (T & P, Consumables etc.)		Yes
6	<b>Lighting</b>		
6.1	For Construction work (Supply of all the necessary materials & Execution)		
A	At office storage area		Yes
B	At the preassembly area		Yes
C	At the construction site /area		Yes
7	<b>Communication Facility for site operation</b>		
7.1	Telephone, internet, e-mail etc.		Yes
8	Shop Crane, if available (Free of Cost)	Yes	

We hereby accepted above (Signature & seal of bidder)

**TECHNICAL SPECIFICATION**

1. The works shall be executed with the directions, instructions, which shall be given to the contractor by BHEL from time to time and as per technical specifications in price schedule and drawings available in the office to give a general idea of the work to be executed and is liable for modifications during the actual execution based on the designs prepared and approved by the Competent authority.
2. If the specifications found wanting relevant technical specifications along with the tender shall be followed. Further missing details relevant CPWD and IS specifications shall be followed. Wherever, there is difference in between CPWD and IS specifications latter shall prevail.
3. For execution of all scheduled items cpwd specifications and relevant is codes are to be followed. for execution of non-scheduled items specifications enclosed with this tender are to be followed.
4. Specialized works are to be executed by specialized agency with the approval of BHEL.
5. The materials in the scope of contractor shall have to be got approved by the contractor from the Engineer-in-charge before supplying inside the factory area. These materials should be accompanied by certificate. Testing of these materials shall be carried out at any BHEL or Govt approved/NABL apporved lab whose cost will be borne by the contractor.
6. Contractor shall ensure that quality is maintained in all works connected with this contract all stages as per requirement of BHEL. Contractor shall ensure all inspection, measuring and testing equipment are calibrated by authorized agency and valid calibration must be available with them for verification by BHEL.
7. Test Certificates are to be supplied for all bought-out items as required by the Engineer-in-charge.
8. Daily Log book should be maintained for the job in duplicate (1 for BHEL and 1 for Contractor) for detailing incorporating alignment/clearness/centering/labeling/Reading and inspection details and FQP (field quality plan).
9. The contractor shall be fully and finally responsible for correctness and quality of his work to the entire satisfaction of the BHEL/Customer.
10. If in the opinion of the contractor any work is insufficiently specified or required modifications, the contractor shall refer the same in writing to the Engineer and obtain his instruction/approval in writing before proceeding with the work. If contractor fails to refer such instance, any excuse for faulty erection, for poor workmanship or delay in completion shall not be entertained.
11. Material reconciliation statement has to be submitted by the contractor as & when required by BHEL.

**Laying and Fixing of Galvalume sheet**

- i) The sheets shall be laid and fixed in the manner described below, unless otherwise shown in the working drawings or directed by the Engineer-in-Charge.
- ii) The sheets shall be laid on the purlins to a true plane, with the lines of corrugations parallel or normal to the sides of the area to be covered unless otherwise required as in special shaped roofs.
- iii) The sheets shall be laid with a minimum lap of 15 cm at the ends and 1 ridge of corrugations at each side. The above minimum end lap of 15 cm shall apply to slopes of 1 vertical to 2 horizontal and steeper slopes. For flatter slopes the minimum permissible end lap shall be 20 cm. The minimum lap of sheets with ridge, hip and valley shall be 20 cm measured at right angles to the line of the ridge, hip and valley respectively. These sheets shall be cut to suit the dimensions or shapes of the roof, either along their length or their width or in a slant across their lines of

- corrugations at hips and valleys. They shall be cut carefully with a straight edge chisel to give a smooth and straight finish.
- iv)** Sheets shall not generally be fixed into gables and parapets. They shall be bent up along their side edges close to the wall and the junction shall be protected by suitable flashing or by a projecting drip course, the later to cover the junction by at least 7.5 cm.
- v)** The laying operation shall include all scaffolding work involved.
- vi)** Sheets shall be fixed to the runner, purlins or other roof members such as hip or valley rafters etc. with Self Tapping Screw/self-drilling screw with EPDM washer.
- vii)** Finishing: The roof when completed shall be true to lines, and slopes and shall be leak proof.
- viii) Measurement**
- The length and breadth shall be measured correct to a cm. Area shall be worked out in sqm correct to two places of decimal.
- The superficial area of roof covering shall be measured on the flat without allowance for laps and corrugations. Portion of roof covering overlapping the ridge or hip etc. shall be included in the measurements of the roof.
- Roof with curved sheets shall be measured and paid for separately. Measurements shall be taken on the flat and not girthed.
- No deduction in measurement shall be made for opening upto 0.4 sqm and nothing extra shall be allowed for forming such openings. For any opening exceeding 0.4 sqm in area, deduction in measurements for the full opening shall be made and in such cases the labour involved in making these openings shall be paid for separately. Cutting across corrugation shall be measured on the flat and not girthed. No additions shall be made for laps cut through.

**Ridges, Hips, flashing, corner pieces**

- i)** Ridges Hips, flashing, corner pieces of galvalume sheet roof shall be covered with ridge Hips, flashing, corner pieces sections of plain galvalume sheet with a minimum lap of 20 cm on either side over the galvalume sheets. The end laps of the ridges Hips, flashing, corner pieces and between ridges Hips, flashing, corner pieces shall also be not less than 20 cm. The ridges Hips, flashing, corner pieces shall be of 60 cm overall width plain Galvalume sheet, 0.5 mm thick as given in the description of the item and shall be properly bent in shape.
- ii) Finish:** The edges of the ridges and hips shall be straight from end to end and their surfaces should be plane and parallel to the general plane of the roof. The ridges and hips shall fit in squarely on the sheets.
- iii) Measurement:** The measurements shall be taken for the finished work in length along the centre line of Ridges Hips, flashing, corner pieces, as the case may be, correct to a cm. The laps in Ridges Hips, flashing, corner pieces and between ridges and hips shall not be measured.