



M/s DEEPAK FERTILISERS AND PETROCHEMICALS CORPORATION LTD. (DFPCL/ Company)

Registered Office: Sai Hira, Survey no. 93, Mundhwa, Pune – 411036, Maharashtra

Works at: PLOT K1, MIDC INDUSTRIAL AREA, TALOJA DIST : RAIGAD

Tender for Annual Rate Contract for Hot & cold insulation jobs at DFPCL plants, K1 aloja.

Tender Ref. 157/ 2019 Date: 09.07.2019

Technical bids are invited in Sealed Envelope with EMD. The sealed envelope shall be super scribed with Tender Reference Number, Name of Work & content in it and addressed to Mr. Rajesh Shankaratti , Deepak Fertilisers And Petrochemicals Corporation Ltd. at Plot K – 1 MIDC Industrial Area, Talaja, 410 208, Dist. : Raigad, Maharashtra.

Stage I Bidding

- Sealed Envelop –I: General Terms and Conditions, Commercial Terms and Conditions Special Conditions and Scope of work (Excluding Price Bid).

Exceptions and deviations, which tendered may desire to stipulate. (Tenderers are advised to submit the Tender strictly on the terms and conditions of the contract and specifications contained in the Tender documents and not to stipulate any deviations. However, if deviations become unavoidable, then it may be stipulated. The Company/ DFPCL reserve the right to reject such deviations or evaluate the Tenderers containing deviations having financial implication, by adding the cost for such deviations as may be determined by the Company/ DFPCL).

Stage II Bidding

Tenderer will submit the price bid online through the platform provided by our Ariba system, DFPCL Service Provider for online platform

Submission & opening of the Bid: The Bidders shall submit the duly filled in all the bid documents (Stage I) signing on each page along with requisite document as mentioned in pre-qualification criteria and EMD & every component by the authorized signatory & send the documents in Purchase Department latest by 17.07.2019

Coordinator- Mr Rajesh M Shankaratti (Sr. Manager Purchase) Phone: 022-50684116 representative of DFPCL.

E reverse Auction:

After submission of Stage I bid documents and online price bid E auction will be conducted. The E auction will be governed by the Business Rules for Reverse Auction as per enclosed pages in Stage I bidding.

Technically acceptable Tenderers against the tender can only participate in further process.

The Tenderers who do not fulfill all or any of the conditions laid down in the tender document are liable to be ignored at the sole discretion of DFPCL. DFPCL also reserves the right to reject any/all the offers without assigning any reason thereof.

In case of any Technical queries you may contact our Job Controller Shri Mahesh Kalghatgi Phone No. : 022-50684383. For commercial queries you may contact Mr Rajesh Shankaratti Tel No 022 50684116

Thanking you,

Yours faithfully,

For Deepak Fertilisers And Petrochemicals Corporation Limited

Srikanta Behera
General Manager (Commercial)

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ANNEXURE I

1.0 GENERAL TERMS AND CONDITIONS:-

1. Earnest Money Deposit of Rs.50000/- in the form of Bank demand draft (drawn on Public sector bank or reputed private bank) will have to be submitted in favour of Deepak Fertilisers And Petrochemicals Corporation Ltd payable at Mumbai along with tender document.. Tenders received without EMD will be disqualified.
2. All pages of the tender form and questionnaire must be signed and sealed by Tenderers.
3. Tenderers have to submit details along with documentary evidences for the following:
 - 1] Registration certificate as Proprietary/partnership firm/private ltd or Public ltd Company/ LLP.
 - 2] Registration certificate with PF organization for allotment of PF code number.
 - 3] Registration certificate with GST.
 - 4] Allotment letter under ESIC Act
 - 5] Registration certificate under Maharashtra Labor Welfare Board.
 - 6] Registration certificate for professional Tax.
 - 7] Registration certificate under Maharashtra Labor Welfare Board.
 - 8] Registration certificate with Income Tax Dept for allotment of permanent income tax code number.
 - 9] Tenderers are advised to submit their bids strictly on the terms and conditions of the bid document and not to stipulate any deviation.
 - 10] ISO Certification holder: Name of certification: -----Validity : -----
(Attested Copy to be enclosed)
 - 11] Organization Chart: Executive -----, Technical Staff-----
(Attested Copy to be Enclosed giving the details)
 - 12] List of requisite machinery, tools & tackles, equipment. (Attested Copy to be enclosed)
 - 13] Audited annual Turnover: for last three Financial Years.
 - 14] List of similar jobs carried out in other company.
 - 15] Client List:

Special Note: The contractors who are registered with DFPCL need not to submit the documents mentioned above.

4. DFPCL reserves the right to accept or reject any or all tenders at its sole discretion without assigning any reason.

5. Late tender will not be accepted / received.

6. Canvassing in any connection with the tender in any form is strictly prohibited. Tenders submitted by party who resort to canvassing will be liable for rejection and forfeiture of EMD

7. In case of any unscheduled holiday falling on the prescribed closing or opening day of the tender, the next working day will be treated as scheduled for opening or closing day of the tender as the case may be. The Final concluding bid shall be valid for 6 months from date of auction and if any new requirement received shall be catered at same auction price.

8. The bidders are advised to read carefully all the terms and conditions of the tender document which will form part of the contract. Tenderer are advised to submit their bids strictly on the terms and conditions of the bid document and not to stipulate any deviation.

9. If the Tenderers give wrong information deliberately to create conditions for acceptance of the tender, the DFPCL reserves the right to reject such tenders without assigning any reason.

10. Not more than one tender will be submitted by one Tenderer for the same work.

2.0. INSTRUCTIONS FOR SUBMISSION OF TENDER:

(i) The Tenderers are advised to visit the site of work to acquaint themselves as to the nature and location of the work, access to the site, the general & local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labour, water, electric power, physical conditions etc. and shall be included on such account while quoting for the tender.

(ii) Tenderers shall quote the tender in the prescribed format of the tender document. Tenders should be free from overwriting. All corrections should be duly attested by the Tenderer. Tenders should be signed by person/s that are legally authorized to sign on behalf of the person or firm or company tendering and in case of firm / company tender should bear its seal or stamp.

(iii) Tender format should contain columns for amount in Rupees (if any),

(iv) The Tenderers shall not stipulate any additional conditions. Any tender containing such conditions will be summarily rejected. Canvassing in connection with tenders is strictly prohibited. Tenders submitted by the Tenderers, who resort to canvassing, will be rejected outright.

(v) The work may be split up between two or more Contractors or accepted in part and not in entirety, if considered expedient at the sole discretion of DFPCL Management.

(vi) Submission of a tender will be conclusive evidence to the fact that the Tenderer has fully satisfied himself as to the nature and scope of work to be done, procedures for issue or materials, conditions of contract,, local precautions to be ensured, security rules to be followed and all other factors affecting the performance of the contract and the cost thereof.

(vii) It will be obligatory on the part of Tenderer to sign the documents for all the component part on each and every page.

(viii) No Bidder is allowed to bid below the current minimum wages applicable.

3.0 AMENDMENT TO NIT (Notice Inviting Tender)

At any time prior to the deadline for submission of bids, DFPCL or its nominee or its consultants may for any reason, whether at its own initiative or otherwise or in response to any clarification requested by a prospective Bidder, modify the NIT by amendment. The amendment will be notified in writing to all prospective Bidders who have received the NIT and the amendment will be binding on them. In order to afford prospective Bidders reasonable time to take the amendment into account in preparing their tenders, extension of time as may be reasonable, will be given for submission of tenders.

4.0 SUBMISSION OF TENDERS:

The Bidder shall bear all costs associated with the preparation and submission of Bid and neither the company nor its nominee nor its consultants will be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process. Any clarification required by prospective bidder shall be furnished in writing soon after its receipt so as to ensure submission of bid on or before bid closing date. Metric measurement system shall be applied, wherever it is applicable.

5.0 EARNEST MONEY DEOSIT (EMD)

The amount of earnest Money shall be deposited in the form of draft (drawn on Public sector bank or reputed private bank). The EMD should be in the name of M/s. Deepak Fertilisers And Petrochemicals Corpn. Ltd. The EMD will be forfeited in the event of the Contractor failing to commence the work within a 30 days period. The Earnest money deposited [E.M.D.] by the successful Tenderer's shall be Returned to the bidder after the commencement of the work and receipt of bank guarantee towards security deposit if applicable. The tenders without E.M.D. shall be liable for rejection. If for any reason the bidder withdraws his bid at any time prior to expiry of the validity period or refuses to execute the work after issue of the letter of intent/Work Order, the amount of Earnest Money is liable to be forfeited. Earnest Money Deposit will not carry interest. E.M.D. of the unsuccessful participated bidders will be refunded with-in one month.

6.0 RIGHT OF ACCEPTANCE & REJECTION OF TENDER:

DFPCL reserves the right to accept at their sole discretion any tender in whole or part or split the work among two or more Contractors or reject any or all Bids without assigning any reason thereof. No claim for compensation etc. whatsoever will be entertained by DFPCL. If a Contractor whose past performance has not been found satisfactory in the opinion of DFPCL, then DFPCL reserves the right to refuse the tender documents or reject the tender while opening or evaluating the tenders. The decision of DFPCL regarding performance evaluation shall be final & binding on the Contractors.

7.0 VALIDITY OF BIDS:

Bids shall be valid for at least 60 days after the date of price bid opening prescribed by the DFPCL. A bid valid for a shorter period may be rejected at the discretion of DFPCL. In exceptional circumstances, DFPCL may solicit the bidder's consent to an extension of the period of validity. The request and responses thereto shall be made in writing. The bids shall be suitably extended where it is necessary at the request of DFPCL. Where bidder is unwillingly to extend the validity period, his bid shall be deemed to be invalid and the EMD would be returned to the bidder. No bidder shall be permitted to modify his bid, after commercial bids have been opened unless asked by DFPCL due to change in specifications / scope or otherwise. . The Final concluding bid shall be valid for 6 months from date of auction and if any new requirement received shall be catered at same auction price.

8.0 Procedure for Auctioning

8.1 [a] Auction: DFPCL will declare its **Opening Price (OP)**, which shall be displayed to all Tenderers during the start of the Auction. The Tenderer will be required to start bidding after announcement of Opening Price and decrement amount. Opening Price displayed on screen is evaluated price to DFPCL for all the items mentioned in price bid. The first online bid and the subsequent bids, received in the system during the event shall be less than the Auction's opening bid price by one decrement or multiples of decrement.

[b] Reverse Auction shall be for a period of 30 minutes or as per DFPCL requirement. If a Tenderer places a bid in the last **3 minutes** of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another **3 minutes**, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. The auto-extension will take place only if a bid is received & accepted in those last **3 minutes**. If the bid does not get accepted, the auto-extension will not take place. In case, there is no bid in the last **3 minutes** of closing of Reverse Auction, the auction shall get closed automatically without any extension. **However, Tenderers are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.**

[c] After the completion of Auction, the **Closing / Final Price (CP)** shall be available on auction screen.

8.2. During Auction, if no bid is received within the specified time, DFPCL, at its sole discretion, may decide to reschedule / scrap the Reverse Auction process / proceed with conventional mode of tendering / or finalize the tender based on Prices Bid submitted in the envelope

8.3. Placement of order on the conclusion of Reverse Auction shall be at the discretion of DFPCL. Bids once made by Tenderer, cannot be cancelled or withdrawn. If bidder withdraws the bid then the EMD of the bidder will be forfeited.

8.4. It shall be the prerogative of DFPCL to offer the Final / Closing Price of Reverse Auction to the other bidders for matching in case DFPCL decides to have more than one supplier.

8.5. The Tenderer shall be assigned a **Unique User Name & Password** by DFPCL'S Service provider. The Tenderer are advised to change the Password and edit the

information in the Registration Page after the receipt of initial Password from DFPCL Service provider. To ensure confidentiality. All bids made from the Login ID given to Tenderer will be deemed to have been made by them.

8.6. The Tenderer will be able to view the following on screen along with the necessary fields in the Reverse Auction:

_ Leading Bid in the Auction (Current Lowest Rate)

_ Opening Price & Decrement Value.

9. DFPCL'S decision for award of Contract shall be final and binding on all the Tenderers.

10. DFPCL shall not have any liability to Tenderers for any interruption or delay in access to the site irrespective of the cause.

9.0. SUBMISSION OF TENDERS:

The Bidder shall bear all costs associated with the preparation and submission of Bid and neither the company nor its nominee nor its consultants will be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process. Any clarification required by prospective bidder shall be furnished in writing soon after its receipt so as to ensure submission of bid on or before bid closing date. Metric measurement system shall be applied, wherever it is applicable

10.0. RIGHT OF ACCEPTANCE & REJECTION OF TENDER:

DFPCL reserves the right to accept at their sole discretion any tender in whole or part or split the work among two or more Contractors or reject any or all Bids without assigning any reason thereof. No claim for compensation etc. whatsoever will be entertained by DFPCL. If a Tenderer/ Contractor whose past performance has not been found satisfactory in the opinion of DFPCL, then DFPCL reserves the right to refuse the tender documents or reject the tender while opening or evaluating the tenders. The decision of DFPCL regarding performance evaluation shall be final & binding on the Tenderer/ Contractors.

The following are Pre-qualification criteria to be submitted along with stage 1 Tender document.

- [a] Annual Turnover of minimum Rs 1 crore including group companies.
- [b] Compliances of statutory requirement like registration under ESIC Act, PF Act, Service Tax, VAT, GST and other statutory compliance to operate/ do business in India.
- [c] Similar work completed during last five (5) years and details of similar ongoing works with value above 10 lacs including group companies.
- [d] List of clients of the Company/Firms.
- [e] Details of manpower owned technical and staff submitted along with the tender.
- [f] List of requisite tools & tackles, equipment. (Attested Copy to be enclosed)

The tendered have to provide the supporting documents for above mentioned prequalification criteria.

Special Terms and Conditions:

SAFETY ASPECTS:

1.01 Contractor to provide safety appliances like dust masks, ear plugs, Full body harness, ladder, safety shoes, helmet, hand gloves, safety goggles, PPE, rain gears, Boiler suit/overall made up from cotton cloths etc. to their personnel working inside the Complex at his cost and should adhere to safety codes as given in General Conditions of the contract.

Penalty for violation of Safety norms: Rs 500 for first instance per person, in multiple for next similar violations.

1. The manpower shall be confirmed physically fit by Factory Medical Officer to carry out assigned job at DFPCL work site. Contractor has to report with manpower to factory medical officer on very first day of his contract or his worker's first day of duty.
2. No young and Minor Child labour shall be allowed to enter and work at site of DFPCL.
3. The Contractor shall ensure the safety training of their workman prior to start of the assignment/ job with the help of DFPCL Supervisor and Safety Officer.
4. Electrical hand tools, welding machines deployed for the job shall be confirmed for the provision of ELCB proper earthing. The same shall be inspected by DFPCL Safety Officer and Electrical department
5. Contractor shall deploy Safety Supervisor for the contracts valuing more than Rs. 1 Crore Per annum.
6. Contractor shall prepare Job Safety Analysis for daily activities and will get endorsed from DFPCL Safety Manager. Hazard Identification and Risk assessment shall be done for each activity and accordingly Risk control measures shall be taken to control every risk. Every contract workman at site will be using Safety Helmet, Boiler suit and safety shoes compulsorily. Ear, Eye, Nose and Hand as well as body protection equipment will be used time to time to protect body from each activity.
7. Safety Work Permit will be issued by Contract Safety Officer, who will be inspecting all jobs for safety procedures to be followed.
8. Safety Training, First Aid Training, shall be imparted to all workers on first day and for five minutes every day at the start of the day.
9. No person shall work under the control of liquor, Chewing of Tobacco or smoking is strictly prohibited on site.
10. Housekeeping at site is essence of the contract. Site will be cleaned at start and end of the work every day by the Contractor.
11. Every electrical supply shall be taken through closed socket and ELCB, every electrical hand tool will be having proper earthing arrangement.

- 12 Contractor shall prepare Job Safety Analysis for daily activities and will get endorsed from DFPCL Safety Manager. Hazard Identification and Risk assessment shall be done for each activity and accordingly Risk control measures shall be taken to control every risk. Every contract workman at site will be using Safety Helmet, Boiler suit and safety shoes compulsorily. Ear, Eye, Nose and Hand as well as body protection equipment will be used time to time to protect body from each activity.
- a) Safety Work Permit will be issued by Contract Safety Officer, who will be inspecting all jobs for safety procedures to be followed.
 - b) Safety Training, First Aid Training, shall be imparted to all workers on first day and for five minutes every day at the start of the day.
 - c) No person shall work under the control of liquor. Tobacco chewing or smoking is strictly prohibited at site.
 - d) Housekeeping at site is essence of the contract. Site will be done clean at start and end of the work everyday.
 - e) Every electrical supply shall be taken through closed socket and ELCB, every electrical handtool will be having proper earthing arrangement.

1.02. Safety Training

- 1) Contractor has to deploy experienced trained and skilled manpower for the job assigned.
- 2) Safety training will be given by DFPCL Safety officer to all manpower reported on duty. Contractor's Safety Supervisor shall prepare job safety analysis with the help of the Maintenance Officer for the job to be carried out and the procedure which is going to be used for the job. On the basis of agreed procedure safety training will be given and adequacy of safety PPE's will be checked by Safety Officer.
- 3) Safety training certificate will be issued to all contractors' workers. Every contractor's workers will maintain safety certificate copy with him for the period of work inside the factory/ work site of DFPCL. The certificate will be valid for a period of six months from date of issue. After the validity, contractor and contract worker has to revalidate the certificate by acquiring additional certificate training from the Company.
- 4) Worker shall be aware of First Aid and using First Aid equipment and emergency procedures and assembly point at site.

1.03. Accidental Reporting

- 1) Safety of the worker/s is essence of the contract.
- 2) Any unsafe condition noticed by the Contractor/Contract worker shall be notified to the DFPCL Supervisor and Safety Officer on duty.
- 3) Any near miss, minor injury, First Aid or major injury shall be reported to OHC & Safety Officer in writing by the Contractor within 4 hours, with cause of the incident.
- 4) First Aid treatment shall be made available at OHC. Any more treatment advised by OHC /Factory medical officer shall be made available by Contractor at ESIC recognized hospital/specialized hospital. It is sole responsibility of Contractor to make available in

time the best treatment to its worker at his cost/insurance. DFPCL shall not be responsible for the same.

1.04 Safety performance

- 1) Every contract shall be vetted for safety performance of previous contract and experience
- 2) Safety training to workers, proactive performance, availability of safety appliances, Attitude towards safety implementation, rewards to the worker/s will be evaluation parameters.

2. Labor law and Safety codes:

All the matters concerned with labour management shall be as per the prevailing Labor laws. Contractor will obtain labour license/s on arrival at site before commencement of the job. The first RA bill shall be released only on submission of the copy of labour license duly attested by DFPCL Administration in the prescribed format. If labour license is not applicable, the Contractor shall obtain a confirmation to this effect from DFPCL Administration.

Contractor will comply with all labour and other statutory laws applicable from time to time. All labour laws, such as Contract Labour (Regulation and Abolition) Act 1970 with Maharashtra and Central Rules, Employees State Insurance Act with Rules & Regulations, The Maharashtra Workmen's Minimum House Rent Allowance Act, 1983 with Rules 1990, The Payment of Bonus Act, 1965 with Rules 1975, Factories Act with Mah. Rules, The Employees Provident Funds and Miscellaneous Provisions Act, 1952, Minimum Wages Act 1948, Payment of Wages Act 1936, Maharashtra Labor Welfare Act, etc. and such other acts which are in force or which may come in force during the subsisting of the contract, should be adhered to by the Tenderer/ Contractor and such other rules/ regulations/ laws made applicable from time to time.

The Contractor shall be solely responsible for its employees. And always keep the DFPCL Indemnified from all losses, actions, penalties etc arising out of this Tender/ Contract.

2.01 Deployment of Medically Fit Manpower:

For the due execution of this Contract, the Contractor shall deploy workers/supervisors who are at all times physically and mentally fit and are not disabled/handicapped and do not suffer from any chronic or contagious disease. It shall be the responsibility of the contractor to ensure that its Workers/Supervisors employed are medically fit. The Contractor shall give a written declaration as regards the fitness of the Workers/Supervisors employed at the time of applying for the Gate Pass. If any employee employed by the Contractor becomes or is declared medically unfit after the issuance of the Gate Pass, the DFPCL shall revoke the Gate Pass.

Failure to comply with this stipulation shall entail penalty as may be decided by the management apart from refusing entry to such Workers/Supervisors of the contractor. The decision of the DFPCL's Medical Officer in this regard shall be final.

2.02 MEDICAL EXAMINATION:

Contractor should ensure that all its Workers/Supervisors deployed at DFPCL sites undergo pre employment fitness examination. The form No.33 (Prescribed under Rule 68T & 102) should be filled up for all its Workers/Supervisors deployed and should be submitted by Him/her to user department.

Contract Workers/Supervisors completing 12 months shall undergo annual medical examination. Such examination must include the following tests:-

- 1) Complete Physical Examination.
- 2) X-Ray chest PA view (Once in Pre-employment then once every three years)
- 3) Complete haemogram (T&D, Hb at minimum)
- 4) One urine examination using .Multistix.

All entries pertaining to the periodical examination must be made and maintained in form 32 (Bounded register) prescribed under Rule 68 T & 102.

Form No.32 must be maintained in bounded register & should be submitted to the OCCUPATIONAL HEALTH CENTER for records annually.

2.03 UNIFORM:

The contractor staff shall wear uniform, Boiler suite, Rainy wear (During monsoon) while working inside plant premises. They shall also wear badge/name plate while they are working at site. All labour laws/ regulations shall be strictly followed by contractor as per central/state govt. directives. Before executing the contract agreement, Contractor will ensure with DFPCL P&A dept. that they are maintaining necessary records as required under labour laws.

Penalty for violation for Not wearing uniform/Boiler suit/Rainy Wear : Rs 500 for first instance per person, in multiple for next similar violations.

(A) Documents required at the time of issuance of gate passes :

Whenever the Contractor applies for gate passes to his worker/s to enter into DFPCL premises, they have to apply on its letter head (Format with HR Department) along-with following documents. The application should be recommended by authorised User Dept.

1. Copy of Work Order issued by DFPCL
2. Copy of Temporary or Regular ESIC Card of each worker (under ESIC Act) **or** Employees Compensation Policy (If contract worker drawing wages more than Rs.21000/-, required authentic proof i.e. appointment letter or last month payslip) **or** Group Personal Accident Policy along-with list of employees who is covered under the said GPA.
3. In case more than 49 persons are to be engaged, contractor has to apply and obtain Labour License under Contract Labour (R&A) Act from the State Labour authorities.
4. Copy of Allotment letter under ESIC Act

5. Copy of Registration certificate with PF organization for allotment of PF code number along with PF annual return submitted with the concern PF Commissioner.
6. Copy of Registration certificate under Maharashtra Labor Welfare Board.
7. Copy of Registration certificate for professional Tax.
8. Copy of Register of workmen employed by contractor (Form XIII) – Rule 74
9. Copy of Employment Card (Form XIV) - Rule 76
10. Copy of Application for employment, appointment letter issued by contractor to his workers.
11. Copy of Insurance coverage covering DFPCL, as work place, and for the number of persons to be deployed. The nature of work in the policy should be the same as per the work order issued by DFPCL.
12. Medical Examination and fitness reports in respect of all the contract labours from the designated/specified medical officers.
13. If the job is subcontracted then no objection certificate from DFPCL regarding subcontracting the work, work order issued to subcontractor by the main contractor and all the documents mentioned at Sr. No.1 to 12 are also required in respect of the subcontractor. However contractor has to take prior written permission before subcontracting the said work.

(B) Procedure to be followed by the contractors during the work period.

Documents / Registers / Challans to be maintaining & photo copies of the same should be submitted to HR Department for verification on monthly basis on or before 28th of every month.

- 1) Wage disbursement: Minimum wages as notified by State Govt. from time to time are required to be paid to the workers.
- 2) Monthly wage to all contract labours as per their actual attendance to be paid on or before 7th Day of every month in presence of authorized person from DFPCL. Wage slip will be issued to all Contract Labours while disbursement of wages.
- 3) PF is required to be deducted in respect of all the contract labors and deposited with PF authorities by 15th Day of the month and receipt of the same to be submitted with DFPCL.
- 4) ESIC is required to be deducted in respect of all the contract labours and deposited with concern authorities by 15th day of the month and receipt of the same to be submitted with DFPCL.
- 5) Labour Welfare Fund is required to be deducted in respect of all the contract labours and deposited with concern authorities for the wages of June & December of every year within stipulated time and receipt of the same to be submitted with DFPCL.

6) Professional Tax is required to be deducted in respect of all the contract labours and deposited with concern authorities as per act and receipt of the same to be submitted with DFPCL.

7) Following records under Contract Labour (R&A) Act & other acts will also be verified by Contract Labour Cell:

1. Wage Register in form XVII. (Under the C.L Act)
2. Muster Roll in Form XVI (under the C.L Act)
3. Register of deductions (under the C.L Act)
4. Register of Overtime (under the C.L Act)
5. Register of Fines (under the C.L Act)
6. Register of advances (under the C.L Act)
7. Bonus Register in Form C (under the Payment of Bonus Act)
8. Leave register in Form 20 (under the Factories Act)

8) Copy of all the work orders (first two pages only -applicable only if not submitted earlier) for which clearance certificate is sought for.

9) Copy of Monthly Wage Register.

10) Copy of monthly PF challan along with receipted copy of monthly PF returns i.e. Form 12A, Form 5 and Form 10.

11) Site wise breakup of PF: If contractor is working for various other companies then the site wise breakup of Monthly PF challan/returns.

12) Copy of Labour License (if not submitted earlier).

Contractor should ensure that, he has complied all statutory compliances as per above said acts for that particular Month before raising wage bill. DFPCL has right to hold the bill for any particular month if the Contractor has not complied with the mandatory statutory compliances. The Tenderer/ Contractor shall always keep DFPCL indemnified from any risk/ liability/ penalty/ cases arising from non-compliance of the same.

(C) Housekeeping:-

Contractor shall do housekeeping and shall remove all unwanted materials from the work site immediately after completion of work. Housekeeping shall also be done in between the work to keep the work area clean & tidy. 25% of bill value will be deducted if housekeeping is not done properly.

(D) ASSIGNMENT OR SUB-LETTING OF CONTRACT:

The Contractor shall not assign or sub-let the Contract or any part thereof or allow any person to become interested therein in any manner whatsoever without the previous consent in writing of DFPCL. Any breach of this condition shall entitle DFPCL to take such steps as may be necessary and also terminate Contract. Such termination shall also

render the Contractor liable for payment to DFPCL in respect of any loss or damage arising or ensuing from such cancellation. The permitted subletting or work by the Contractor shall not establish any contractual relationship between the sub-contractor and DFPCL and shall not release the Contractor of any responsibility under the Contract.

(E) CONTRACTOR TO BE LIABLE FOR ALL THE TAXES ETC.-

The Contractor shall be liable to pay all the taxes payable as per the prevailing laws made applicable or might come in force from time to time by the concerned authority. DFPCL shall not be responsible for the same.

(F) INDEMNITY -

Without prejudice to any other provisions in these conditions, the Contractor shall be bound to keep DFPCL or any representative or employee of DFPCL fully indemnified against any action, claim or proceedings under the provisions of any rules, regulations, bye-laws, notifications, directions or order having the force of law.

The Contractor in contravention of such provisions etc., for the infringement or violation thereof in the course of the execution or completion of the work under the Contract and if, as a result of any such action, claim or proceedings, the Contractor or such representative of the Contractor, as the case may be, adjudged to be liable to any penalties or to pay any penalties or to pay any compensation, such liability, the Contractor and if, DFPCL has to take-over the liability, DFPCL shall deduct all amounts arising out of such liabilities from the Security Deposit of the Contractor or from any other amount due and payable by DFPCL to the Contractor under this Contract or any other Contract and without prejudice to any other legal remedy available to DFPCL

(G) CONTRACTOR TO COMPLY WITH ALL LAWS ETC. -

The vendor shall be responsible to ensure compliance with all Central and State Laws as well as the Rules, Regulations, Bye-laws and Orders of the Local Authorities and Statutory Bodies as may be in force from time to time. The Tenderer/ Vendor shall give to the statutory bodies, local authorities, police and other relevant authorities all such notices etc. as may be required by law and obtain all requisite Licenses and pay all fees, Duties, Taxes, charges etc. in connection therewith as may be livable on account of his operations involved under this Contract.

The Tenderer/ Vendor shall make good at his own cost any damage to the property of the Company or any other body, persons, local authorities etc due to or arising from operations involved under this Contract and the Company shall have the right to recover the cost of damage from dues payable from the Bank Guarantee or Security Deposit of the Tenderer/ Vendor.

(H) CONFIDENTIALITY -

Both during the continuance of this Agreement and 1 (one) year after termination of this Agreement, Vendor and/or his employees/ personnel shall keep all information, such as specifications, technical information, business data and other confidential information under this Agreement strictly confidential and shall not. Disclose it to any third party or Use it for other purpose than to perform its obligations under this Agreement. Tenderer/ Vendor and/or personnel may

disclose the information to an employee of Vendor, or a government agency or other regulating authority

But only insofar as this is necessary either to carry out its duties under this Agreement or comply with any existing law, and under intimation to "Company". Where sub clause (b) applies Vendor and/or personnel shall ensure that the person who receives the information keeps it confidential and does not use it for any unauthorized purpose.

(I) RELATIONSHIP -

Each party understands that they are independent entities and this Agreement does not make it, its/ his employees, associates or agents, the legal representatives of the other party for any purpose whatsoever. Either party has express or implied right or authority to assume or to undertake any obligation in respect of and on behalf of or in the name of the other party or to bind the other party in any manner in respect of any transaction, except the present agreement.

(J) WAIVER -

The failure of either party to enforce at any time any of the provisions of this agreement shall not be considered to be a waiver of the right of such a party thereafter to enforce each and every provision.

(K) ENTIRE AGREEMENT -

This Agreement supersedes all oral and written representations and agreements between the parties, including, but not limited to any earlier agreement relating to the subject matter thereof and/or any other agreement between the parties in relation to the subject matter thereof.

(L) AMENDMENT -

The parties to this Agreement may add, delete, amend or alter all or any of the terms & conditions of this Agreement as mutually agreed from time to time and such modifications and changes shall not be effective until the same are in writing and duly signed by the authorized representatives of both the parties.

(M) Declaration of Tenderers/ Contractors Relation with DFPCL Employee(s):

Should a Tenderers/ Contractors have a relation or in the case of a firm, one or more of its partners a relation or relations employed in DFPCL or in case of company any of its official or relations employed in DFPCL, the authority inviting tenders shall be informed in writing of the fact at the time of submission of the tender. If so, the name, designation, department and Employee Number of such employees be indicated failing which DFPCL may in its sole discretion reject the tender or rescind the contract. If any ex- employee(s) of DFPCL is/ are employed, with the Tenderers/ Contractors, name, designation, department and employee number of such employee(s) be indicated and if any ex-employee(s) of DFPCL is/are employed after acceptance of tender, the said particulars shall also be intimated immediately in writing to DFPCL from time to time. If the Tenderer/ Supplier fails to inform the same, DFPCL shall at sole discretion may reject the tender.

(N) The Tenderer/ Contractor shall not be entitled to any claim including any cost, charges, TA/DA expenses or incidentals for the preparation and submission of this tender even if the Management may decide to withdraw the “NITT”.

(O) Dispute not to hold up works:

The successful Tenderer(s) shall not stop the work in case of any dispute(s) unless further progress of work has been rendered impossible due to non-fulfillment of any reciprocal promise. Unilateral stoppage of work by the Tenderer shall be considered as a breach of contract and DFPCL reserves the right to take such action as it may deem fit keeping its interest as paramount.

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- 1 INTRODUCTION

Execution of various Thermal insulation works described here under is an occasional service required at various plants at Taloja. The specification covers the technical requirement for the material procurement, supply, storage, and application of all types of external, above ground insulation of piping and equipments for the maintenance of operating temperatures process stabilization, against of influx of heat, personnel protection and for anti-condensation

2. ABBREVIATIONS AND DEFINITIONS:

DFPCL: Deepak Fertilisers & Petrochemicals Corporation Ltd.

EIC : Engineer - in - Charge as defined in the General Conditions of Contract.

GCC : General Conditions of Contract annexed as part of this contract documents.

FIM : Free Issue Materials - This refers to materials issued by the company free of cost to the contractor for performance of work under the contract and as per the conditions of the contract.

ISBL : Inside Battery Limit - The areas designated at individual sites by the company as forming part of inside battery limit.

OSBL : Outside battery limit - The areas designated at individual sites by the company as forming part of outside battery limit.

PPE : This refers to Personal Protective Equipment and covers all necessary personnel protective equipment to be used by contractor staff and workmen for executing the works under the contract.

DOR : Division Of Responsibility - This refers to the division of responsibility for providing the items specifically mentioned under the heading DOR in this document. The DOR is only for providing the item and it is the contractor's the responsibility to execute and operate safely the company provided items.

UOM : Unit of Measurement

SOR : Schedule Of Rates

SOP : Standard Operating Procedure in use at respective site

S.H.E. : Safety, Health & Environment Department

TDS : Tax deducted at source.

PSV : Pressure safety valve.

3 DETAILED SCOPE OF WORK

3.1 CONTRACTORS SCOPE OF WORK

3.1.1. This specification covers minimum technical requirements for the design, material procurement, supply, storage & application of all types of external, above ground insulation of piping and equipment's operating between ambient temperatures and 550 °C for the purpose of heat conservation ,maintenance of operating temperatures, process stabilization and personnel protection.

3.1.2. Contractor shall arrange for transportation of its personnel within the site. If contractor deploys vehicles for movement of its personnel, the vehicle shall meet the fitness requirements specified by the company and shall not be more than four years old.

3.1.3. Contractor shall ensure that the site is maintained clean at all times. All material shall be stacked neatly and useful and scrap material shall be segregated based on the type of material. Spillage of grease, lubrication, etc shall be avoided and if happens, the same shall be cleaned immediately as per approved procedures.

3.1.4. All Insulation application, removal, box up and other associated activities shall be performed by the contractor as per drawings, specifications and instructions of the EIC.

3.1.5. Collection of all raw materials, consumables, and all other company supplied materials from designated storage locations, performing all handling activities including loading, unloading, intermediate storage, handling all surplus and scrap material, returning the same at designated locations including performing salvaging operations wherever required.

3.2 DFPCL Scope of supply
DFPCL scope of supply is limited to the following:

Provision of required drawings and specifications.

Provision of water, electricity, compressed air at one point in the site.

Provision of mobile material handling equipment like cranes, trailers, trucks, etc with operators.

Provision of open space for contractor office and material storage.

Space for contractor office inside company premises subject to availability.

Telephone facility on chargeable basis (if available)

Issue of all FIM.

4 SCOPE OF WORK FOR CARRYING HOT INSULATION

4.1 This specification covers minimum technical requirements for the design, material procurement,

4.2 This specification does not cover insulation for boilers, fired heaters, furnaces and cold services.

4.3 Design Basis

4.3.1 Heat conservation insulation is designed to limit the cold face temperatures below 55°C if economically justified with 35°C ambient temperature in still air condition limiting the heat loss at 150 kcal/hr m² on insulation outside surface basis. Emissivity for aluminium cladding shall be 0.3.

4.3.2 The design temperature used for calculation of insulation thickness shall be the normal operating temperature of the contained fluid. However, the insulation material shall be suitable for the design temperature of piping and equipment for which it is used.

4.3.3 Insulation shall be applied for the following purpose:

Heat Conservation
Process stabilization
Steam, hot water, hot oil or liquid jacketing

Steam, hot oil or electric tracing.

Personnel protection

4.4 Extent of Insulation

4.4.1 ON PIPING :

Insulated nozzles, flanges, valves, fitting and piping specialty items shall be considered a part of the piping & shall have the same insulation requirements as the attached piping.

4.4.1.1 Insulated piping systems shall have straight pipe, bends, tees and pipe fitting completely insulated.

4.4.1.2 All valves and flanged joints shall be completely insulated only in steam condensate services, hot oil lines and in lines which are trace heated or jacketed to maintain temperatures.

4.4.1.3 For bucket and float type traps the inlet piping and trap shall be insulated.

4.4.1.4 Insulation on inlet piping to thermostatic and thermodynamic steam traps shall terminate at approximately 500 mm before the trap.

4.4.1.5 Steam trap outlet piping other than closed condensate recovery system shall not be insulated except for personnel protection reasons.

4.4.1.6 Instrumentation to be insulated, such as level gauges, level controllers, level switches, DP cells, shall have fluid containing sections and the associated piping completely insulated, including pipes, valves and fitting.

4.4.1.7 Insulation shall be designed to provide an absolute minimum clearance of 25 mm between the outside surface of any insulation finishing material and adjacent surfaces.

4.4.1.8 Where insulated horizontal piping is supported on steel shoes, the height of the shoe shall be such that the underside of the insulation finishing material is clear of the supporting structures upon which the shoe rests by 25 mm minimum.

4.4.1.9 Insulation shall not be applied to the following unless otherwise specified.

1. Piping which becomes hot intermittently, such as relief valves, vents, steam-out and snuffing steam systems, flare and blow down systems.
2. Supports for piping, excluding pipe hangers to the extent covered by insulation.
3. Steam Traps (Except as noted in paragraph 3.1.3)
4. Valves including control valves and flanges in process piping systems (except as noted in 3.1.2 and 3.1.7). However, personnel protection insulation for these items shall be applied as required.
5. Pipe Union fittings.
6. Thermowell bosses and pressure tapping.
7. Expansion joints, hinged joints and hose assemblies

4.4.1.10 Valves and flanges in services below 300°C are Usually not insulated unless other requirements are overruling.

4.4.1.11 Flanges for hydrogen service shall never be insulated.

4.4.1.12 Flanges in services of 300°C and above which are not insulated, e.g. hydrogen service and equipment nozzles. shall be provided with a weather protection cover.

4.4.1.13 Steam traps and the downstream lines of them shall not be insulated, except when heat of the drain is to be recovered.

4.4.2 ON EQUIPMENT:

4.4.2.1 Support skirts of insulated vertical vessel greater than 1200 mm diameter shall be insulated both internally and externally for a minimum distance of 600 mm below the bottom tangent line. The insulation shall terminate not less than 300 mm above the support concrete or steelwork.

4.4.2.2 Support skirts of insulated vertical vessels of 1200 mm and less shall be insulated externally only, as described in para 3.2.1 above. The insulation thickness shall be 50% of that provided for the main equipment.

4.4.2.3 Bottom heads of insulated vertical vessels enclosed by a support skirt shall be insulated without finishing material and shall be insulated only when the vessel outside diameter is greater than 1200 mm. The insulation thickness shall be same as that provided for main equipment.

4.4.2.4 Turbine and steam ends of reciprocating pump shall be insulated for heat conservation

4.4.2.5 Liquid ends of pumps shall be insulated when heat traced or jacketed.

4.4.2.6 Items and equipment for which heat loss is essential or those which are refractory lined from inside shall not be insulated.

4.4. 2. 7 Rotating equipment

Pumps and compressors are normally not insulated. Protective fencing may be considered. If insulation is necessary, e.g. for steam and gas turbines, boiler feed water pumps, it shall be done by one of the following methods:

Insulating blankets shall be applied over the housing. stitched together with binding wire and covered with aluminium cladding.

A metal box, reinforced with insulation material, shall not be applied when pumping flammable liquids at high temperature. since if these liquids are absorbed by the insulation it can catch fire.

4.4.2.8 Nameplates, stampings, thermowell bosses and pressure tapping shall be left clear of insulation.

4.4.2.9 Flare line for hydrocarbon gas and liquid shall not be insulated.

4.5.0 Materials

4.5.1 General

4.5.1.1 All insulation, fixing, sealing & weatherproofing materials shall be new undamaged and of good quality and appearance. They shall be of a normally available commercial grade.

4.5.1.2 Insulation material shall be chemically inert of low chloride content, non sulfurous. Non hygroscopic, impervious to hot water and steam, rot.

Fungus and vermin proof. It shall be non-injurious to health and shall not exert a corrosive effect on the surfaces to be insulated and on the finishing materials even if soaked in water at ambient temperatures for extended periods. It shall be unaffected by acidic & saline atmospheric conditions.

4.5.1.3 Insulation and finishing materials shall not contain ASBESTOS in any form.

4.5.1.4 All insulation materials and accessories shall conform to local health and safety regulations. Contractor shall determine applicability of regulatory requirements prior to use.

4.5.1.5 Insulation support lugs or other support attachments shall not be field welded without written authorization.

4.5.1.6 Insulation material for austenitic stainless steel piping and equipment shall comply with ASTM C795. Leachable chloride content shall be less than 50ppm.

4.5.1.7 Insulation or jacketing material used shall not be backed with any flammable material.

4.5.2 Insulation Materials

4.5.2.1 Rock Wool / Mineral Wool

(Warning: This specification shall not be used below - 30°C and above 550°C)

4.5.2.1.1 The material shall be lightly resin bonded; processed into long fibers from molten state and suitable for the intended operational temperature range from 60°C to 550°C. Fibers shall be of high tensile strength, tough, non hygroscopic & of diameter varying between 3 & 5 microns. There shall be no settling of fibers over an extended period of use or under vibration.

4.5.2.1.2 Glass wool/ slag wool shall not be used.

4.5.2.1.3 The lightly bonded mineral wool & slabs shall generally meet all the requirement of IS:8183. Only machine made & machine stitched mattresses having uniform density thickness shall be used.

4.5.2.1.4 Preformed Snap-On rigid pipe sections conforming to IS 9842 shall be used for sd/cs up to 50 NB. The density of these pipe sections shall be 140 kg/m³ minimum.

4.5.2. 1.5 Properties & specifications

Unless specifically mentioned otherwise all properties shall be tested per IS-3144.

1) Bulk Density(Δ) - 120 kg/m³ up to 300°C for LRB mattresses.

140 kg/m³ above 300°C & for all preformed pipe sections

2) Thermal Conductivity, k (IS- 3346)

Mean Temperature	K (MW / cm deg C)
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	Delta = 120 kg/cu m	Delta = 140 kg/cu m
50	0.43	0.43
100	0.52	0.52
150	0.62	0.62
222	0.73	0.7
250	0.84	0.85
300	0.95	1

- 3) Sulphur content <0.6%
- 4) Moisture content & Moisture Absorption - <2.0%
- 5) Shot Content :
 - 500 microns size - 5% maximum
 - 250 microns size - 5% maximum
- 6) Resin content - <3.0%
- 7) Chloride content <20 ppm
- 8) In combustibility - Incombustible with weight loss of s . 5%
- 9) Linear Shrinkage - < 2%.
- 10) Recovery after Compression Recovery shall be ~ 90% after
compression of the material upto 75% .
- Performed pipe sections - <200 NB
- Curved Segments - >200 NB

4.6. Weather Proofing

4.6.1 FOR FIBROUS MATERIAL (MINERAL WOOL)

Minimum Cladding thickness (mm)					
Aluminium		Galvanized Steel		Stainless Steel	
Flat	Corrugated	Flat		Flat	Corrugated
-	0.71	0.8		0.6	0.4
1.22	-	0.8		0.6	0.4

0.71	-	0.8		0.6	0.4
0.71	-	0.8	-	0.5	0.4
-	-	0.56	-	-	-

4.6.2 Unless otherwise specifically mentioned aluminium jacketing shall be used as weatherproofing material. Aluminium material shall be with low copper content and shall conform to ASTM B209 ALLOY 3003 h16 OR IS:737 designation 31000 H3 for flat sheets and H4 for corrugated sheets. Finishing material shall be coated on the inside surface (i.e. the surface in contact with insulation material) with bitumen anti corrosive paint.

4.6.3 Stainless steel material (if required to be applied) shall be of SS-304 grade.

4.7.0 Ancillary Materials

4.7.1 Aluminium foil for protection of stainless steel surfaces

A layer of 0.19 mm (36 SWG) thick aluminium foil shall be applied first on stainless surfaces to avoid direct contact of insulation material with hot surface. Aluminium foil shall be as per ASTM B 209 alloy 3003 H16 or IS:737 designation 31000 H3

4.7.2 Securement Bands

4.7.2.1 For securing fibrous insulation

Equip. Type	Band Size width x thickness		
	Aluminium	Stainless Steel	Galvanized Steel
Piping	12 x 22 SWG	-	-
Equipment	20 X 24 SWG	-	-
Vertical Storage	-	-	40 X 3 MM
Tanks	-	-	-
Horton spheres	-	25 X 0.8 MM	-

4.7.2.3 For securing cladding on fibrous insulation

Equip. Type	Band size width x thickness		
	Aluminium	Stainless Steel	Galvanized Steel
Piping	12 wide x 24 SWG	-	-
Equipment	20 Wide x 24 SWG	-	-
Vertical Storage Tank	-	25 Wide x 24 SWG	-
Spheres	-	25 Wide x 24 SWG	-

4.7.3 Self tapping screws

Self tapping screws with aluminium sheeting shall be No. 8 12mm long cadmium flat

4.7.4 Clips

Valves, strainers & naged joints requiring frequent removal shall be provided with removable box type insulation adding with snap ori type quick release dips.

4.7.5 Hardware

All steel nuts, bolts, screws, washers etc. shall be of commercial quality, hot dip or electrogalvanized.

4.7.6 Wire netting, lacina & stitchino wire

Wire netting shall be. 20 mm mesh x 20 SWG galvanism,steel wire.

Lacing & stitching wire shall be.20 SWG galvanized steel per IS-3150 or equivalent.

4.7.7 Overlap & Sealer

Metal cladding overlap shall be 50mm on longitudinal & circumferential joints conforming to IS:14164 Sealer is to be applied for scaling the overlapped joints. Sealing strips should be of bituminous felt conforming to !S: 1322 grade 1 of minimum 25 nrn width.

4.7.8 Spacer Ring

Spacer rings as per following specifications shall be supplied by the insulation contractor.

4.7.8.1 Spacers are used for providing framework on which metal sheeting used for protecting the insulation is cl added. These rings shall.be fabricated from 25 x 3mm MS flats. The outside diameter of these rings shall be equivalent to the diameter of the pipes measured over the insulation.

4.7.8.2 Spacer rings shall not be used for pipe sizes 80NB & below except where the insulation thickness exceeds 50mm

4.7.8.3 Spacers shall be provided with 'L' shaped stays fabricated from same size of MS flats at an interval of not more than 300mm along the circumference with a minimum of 3nos. & at a pitch of not more than 1200mm along the length .

4.7.8.4 Spacers shall be painted with one coat of red oxide zinc chromate primer or heat resistant aluminium paint.

4.7.8.5 To minimize direct conduction of heat packing of 5mm thick asbestos mill board shall be provided at the joints of stays & pipes and between stays & outer MS rings.

4.8.0 Application

The application methods given in the standard are general in nature. The contractor is responsible for applying an insulation system that will give or satisfactory operational performance & the requirements given herein shall be regarded as the acceptable of insulation application, with minimum of waste & debris and the final job shall have a minimum. The contractor shall carryout the work in accordance with the best practice neat & workmanlike appearance .

4.8.1 For fibrous material (Mineral wool)

Surface preparing

Prior to installing insulation/heal transfer putty. the contractor must remove all oil and dirt from the surfaces to be insulated. Any occurrence of rust must be removed through wire brushing.

4.8. 1.1 Single layer Insulation

4.8.1.1.1 Single layer Insulation shall be used up to 75mm thickness. For insulation. thickness over 75 mm. the insulation shall be applied in multiple layers.

4.8. 1.1.2 Lightly resin banded mineral wool mattresses shall be machine made. Machine stitched at shop (to a suitable size) and shall have galvanized wire netting on one side .

4.8. 1. 1.3 The stitched mattresses shall be wrapped over the surface to be insulated and ends knitted with GI wire or wire hooks. The successive mattresses shall be applied over the surface such that the joints are staggered and also the gap between the joints is kept as small as possible.

4.8.1.1.4 The mounted mattresses shall be held in position by metal bands.

4.8. 1. 1.5 Finally the insulation shall be covered by metal weather- proofing of aluminium sheets. The type and thickness of aluminium sheets shall be as per 4.5.2 ..

4.8. 1. 1.6 Metal weatherproofing shall be provided over the insulation with an overlap of 50mm {minimum) at all lap joints.

4.8. 1.1. 7 All the over1ap joints shall be sealed and secured with self tapping screws.

4.8. 1. 1.8 Metal weatherproofing applied to irregular surfaces shall be shaped to fit the contour of insulation.

4.8. 1.2 Double or Multilayer Insulation

4.8.1.2.1 The first layer shall be applied in the same manner as for single layer insulation.

4.8 .1.2.2 After the installation oi first layer. the second layer of stitched mattresses with joints staggered shall be placed and ends knitted together. Care has to be taken that arc minimum gaps. The second layer shall be held in position on the previous layer by metal bands. This has to be continued (application of successive layers) till required thickness is achieved.

4.8.1.2.3. Over the final layer of insulation weather protection of aluminium sheet shall be provided.

4.8 .1.3 Pipes Bends, Elbows. Fittings, Flanges

4.8. 1.3.1 Elbows, Bends and fitting

The insulation to be build: up on elbows and all other fittings shall be the same as for adjoining pipe. Machine stitched mattresses from resin bonded mineral wool in suitable sizes shall be fatted properly round the pipe fittings. These then will be held in position by tie wire and steel bands. one at the center and one at each end. Finally weather protection of aluminium sheets shall be provided as described in 4.6.

4.8 .1.3.2 Flanges

At flanges in pipelines. the normal run insulation shall be terminated such that the gap between tile flanges and insulation is equal to length of bolt plus 20mm. So that the flange can be disconnected without damaging the insulation. The gap shall be packed w:with loose mineral wool and then the flange shall be insulated with resin bonded machine stitched mattresses of same thickness as the adjoining pipe and held in position by tie wire and metal bands. Finally, weather protection of aluminium sheets shall be provided. The insulation of flange shall form a box structure (removable type).

4.8 .1.4 Mineral Wool. Pipe Sections Insulation.

4.8 .1.4. 1 Performed pipe sections shall be installed in the same manner as the blanket insulation except as follows:

Sectional pipe insulation shall be applied with all the joints butted together and shall be secured with the bands.

4.8. 1.5 Pumps and Compressors:

In general. pumps and compressors that require insulation shall be insulated with removable metal boxes lined with flexible mineral wool mattresses, soundly adhered to the metal body by an approved method. The thickness of insulation shall be as specified for the connecting pipework. The metal box shall be made in at least two pieces, no piece weighing more than 30 kg. Secured by quick release toggle clips.

4.8.1.6 Man way etc.

4.8.1 .6. 1 Man way covers shall generally be insulated with removable metal boxes lined with flexible mattress soundly adhered to the metal box by an approved method. The thickness of insulation shall be as required for the vessel. The metal box shall be made in at least two pieces. no piece weighing more than 30 ~g. secured by quick release toggle clips.

4.8.1.6.2 Where tell-tale holes are provided in branch reinforcement rings, a small 'weep pipe should be fitted projecting clear of the insulation.

4.8. 1. 7 HOT PIPE INSULATION

4.8 .1. 7.1 Piping which is heat traced and insulated shall be covered with oversized pipe insulation to include the tracer.

4.9.0 Inspection. Testing & Measurement Of work

4.9. 1 Test certificates

Along with quotation contractor shall submit recent test certificates from recognized laboratories for all the insulation material proposed to be used by him. The test certificates shall cover all the properties given in the relevant IS Specifications or applicable international standards, including the properties given below. Any quotation without test certificates shall be liable for rejection.

- a) 'k' value at different temperatures up to 500 °C. for hot insulation material.
- b) Max. temp. up to which the material can be used.
- c) Sintering temperature:
- d) Sulphur content.
- e) Chloride content.
- f) Shot content.
- g) Fiber diameter
- h) Water absorption & tendency to corrode metals.
- I) Density of material
- j) Resin properties (chemical)

4.9.2 Inspection and Testing

4.9.2.1 The contractor shall carry out various tests as listed in technical specifications mentioned herein but shall not be limited to this. All the tests either on the field or at outside laboratories concerning the execution of work and supply of materials by the contractor shall be carried by the contractor at his own cost. The owner / consultant shall have free access to the manufacturing facility of the contractor for inspection I testing of material as and when required.

4.9.2.2. The work is subject to inspection at all times by the Engineer-in-charge. The contractor shall carry out all instruction given during inspection and shall ensure that the work is being carried out according to the technical specification of this specification.

4.9.2.3 The contractor shall provide for purpose of inspection access ladders, lighting and necessary instruments at his own cost.

4.9.2.4 Every batch of material supplied should be backed by test certificates for any or all of the requirements specified . Results of inspection and tests shall be recorded by the Contractor in the inspection. reports. proforma of which shall be approved by the Engineer.:in-Charge. These reports as well as test certificates shall be submitted as part of completion certificates. Every batch of material supplied should be backed by test certificates for any or all of the requirements specified . Results of inspection and tests shall be recorded by the Contractor in the inspection. reports. proforma of which shall be approved by the Engineer.:in-Charge. These reports as well as test certificates shall be submitted as part of completion certificates.

4.9.2.5. Inspection and acceptance of the work shall not relieve the Contractor from any of his responsibilities under this contract.

4.9.3 Measurement of work:

4.9.3.1. The Measurement of Insulation work shall be in general as per IS: 14164 - 2008 , except otherwise specified.

4.9.3.2. Insulation over Tanks/Columns/heat Exchangers and Equipments.

4.9.3.2.1 Measurements shall be taken in m2 over finished insulation surfaces in all cases .

4.9.3.2.2 No deduction shall be made for any area required to be left uninsulated the area of which is equivalent to a circle of 600 mm in diameter or less.

4.9.3.2.3 Dished ends of vessels shall be considered as twice the projected circular area of the dished end for the purpose of measurement.

4.9.4 Insulation over Piping

4.9.4.1 All measurements for piping shall be taken over the finished insulated surface in meters (except for providing aluminium for over SS/alloy steel piping), corrected to nearest centimeters along the center line of piping, through all fittings, insulated or otherwise such as valves, flanges, elbows, tees and reducers.

4.9.4.2 If the valves, flanges or other fittings are also insulated then, in addition to the lengths being already covered under piping and dueling insulation as stipulated in 4.9.4.1, extra measurement as prescribed below shall be allowed in linear meter of the connected piping or ducting.

Insulated Fitting

Insulated Fitting

	For Sheet metal finish	For other finishes
Valve/venturi/steam traps/strainers including flanges and body (up to 300 mm size)	1.50 m	1.40 m
Valve/venturi/steam traps/strainers including flanges and body (for sizes larger than 300 mm)	2.00 m	1.90 m
Pair of flanges including orifice plate and flanges Bends and elbows	0.80 m	0.60 m
Bends and elbows	Twice the actual length, as measured along the center line of the piping or ducting.	
Reducer	Actual length of larger size (along) the center line of piping)	
Tees	2 (D1 + D2) where D1 & D2 are insulated diameters of the two pipelines forming the tee	

NOTE :

Measurements of all valves, flanges and other fittings shall be based on actual count and then converted into equivalent lengths of connected piping, to arrive at the total equivalent lengths of piping or ducting of various diameter. Fittings that connect two or more different sizes of piping/ducting shall be counted as part of the larger size.

4.9.4.3 Steam traced and non-steam traced pipelines shall be normally specified and measured separately. Steam traced pipelines with single or multiple traces shall also be

normally specified and measured separately, according to the number of tracers.

4.9.4.4 For steam traced pipe lines, which are specified and measured separately, only the dia of the main pipeline(s) shall be reckoned for measurement of insulation. No separate measurement shall be made for insulation of the steam-traced line(s) which shall be deemed to have been covered under the insulation or main pipe line.

4.9.4.5 In case of any special treatment to steam traced pipe lines. Other than wrapping with wire netting and/or lacing with Gllblack annealed wire, to be carried out, such as application of special heat conducting compounds or wrapping with aluminium foil, such special treatment shall be measured separately.

4.9.4.6 For application of aluminium foil over SS piping and equipment prior to application of Insulation. the measurement shall be taken over finished aluminium foiled surface on overall area-basis.

4.9.5 Insulation of instruments shall be measured separately and the length covered by such instruments which are not axial with the pipeline shall not be considered in the measurement or the concerned piping insulation.

4.9.6 Inspection plugs, if any provided. in the insulated on of pipeline or any equipment shall be measured separately on number basis and no deduction shall be made on this account from the overall measurement of insulation of concerned equipment or pipeline. Measurement for removal of hot/cold insulation shall be on actual area basis without any addition.

4.9.8 The mode of measurement for insulation work for piping above 20" dia shall be on overall area basis based on actual measurement on finished insulated surface, without addition of extra measurement in lieu of any fittings such as valves.gauges. tees, etc. This shall also be applicable to all sizes and shapes of insulated ducts.

4.9.9 Guarantee

Contractor shall guarantee for the quality of Insulation material and other ancillary and weather protection material. Contractor shall also guarantee for the service and workmanship of application of insulation.

4.10.0 Contractor's Obligations

Definition

For the purpose of this specification the contractor shall refer to the insulation specification selected by the Client/Consultant to supply and fix the Plant insulation.

4.10.1 The Contractor shall work in accordance with this specification, the Consultant's Insulation Purchase Specification (inquiry and/or order) and the Consultant's site regulations (sent with the insulation contract order) and any client's site rules as may be applicable.

4.10.2 The contractor shall provide all materials. tools. site accommodation, transport service and supervision necessary for the satisfactory completion of the insulation contract.

4.10.3 The contractor shall provide storage sheds to protect material!s from the weather.

4.10.4 Special treatment coatings etc. shall be applied strictly in accordance with the procedure laid . down herein, and with the manufacturer's (supplier's) instructions. Where manufacturer's instructions conflict with this specification, the customer shall take precedence .

4.10.5 The contractor shall remove all oil grease, loose scales and dirt from surfaces to be insulated and shall ensure that all surfaces requiring insulation are clean and thoroughly dry before applying any insulation.

4.10.6 The contractor shall cover all openings in vessels, towers and any other equipment to prevent the entry of insulating materials and shall daily remove from job site all cartons, wrappers and other debris.

4.10.7 Each day's application of insulation is to be weather-proofed over night by either the final protective coating or some form of temporary weather-proof covering.

4.10.8 Before starting site work the contractor and the Consultant's site supervisor shall agree to a detailed programme of work. Before the application of insulation. The contractor shall check with the consultant's site supervisor that the equipment or pipeline to be insulated is available. i.e. all testing is completed.

4.10.9 Insulation of all flanges, valves etc where required shall be left off until authorization is given by the Consultant's site supervisor to carry out this work. In general this will be done after lines or equipment have reached operating conditions and all joints have been proven tight.

4.10.10 The contractor shall provide facilities to ensure that the materials can also be fitted under bad weather conditions. Prior to fitting the finishing material, the contractor shall remove and replace any wet insulation material.

4.10.11 Contractor shall specify make and type of all insulation sealing and coating materials to be used.

4.10.12 No insulating or ancillary material shall be used beyond its recommended temperature usage range.

5 SCOPE OF WORK FOR CARRYING COLD INSULATION

5.1.1 Scope:

This specification describes the materials to be applied and the method of application for the external insulation of cold pipework end fittings, vessels, tanks, exchanges and other equipment for the maintenance of operating temperature against influx of heat and for anti-condensation.

In case of conflict between the specification and the equipment data sheet/pipe list, the latter shall govern.

5.1.2 Limits:

- Low temperature insulation shall be applied to all surfaces operating below 23°C (73°F), unless for process reasons it is undesirable to do so. Such cases shall be specified separately.

- Skirts, legs or support of insulated vessels shall be insulated internally and externally, for a distance equal to four times the main shell insulation thickness or 12" (300mm) from the vessel tangent line, whichever is the greater.

- Temperature used for the selection of insulation thickness shall be the lowest operating temperature.

- All tests on pipes, vessels and other equipment shall be completed before insulation is installed. If insulation is applied before tests have been completed, all welds and threads shall be left exposed until completion of testing.

Vertical vessels which have a marked decrease in temperature from bottom to top shall be insulated as follows;

The lower half of the vessels shall be insulated for the bottom service temperature, and the upper half shall be insulated for the vessels overall average temperature.

The word "fittings" as used in this specification shall refer to Bends, Tees, Caps, Reducers, Level gauges, Level Controllers, and Level Alarm Bodies etc....

5.1.3 Contractors Obligations:

The Contractor shall work in accordance with this specification, site regulations (sent with the insulation Contract or order), and any client's site rules as may be applicable.

The Contractor shall provide all materials, tools, site accommodation, transport services and supervision necessary for the satisfactory completion of the Insulation contract.

The contractor shall provide storage sheds to protect materials from the weather.

Pre-treatment coatings to metal surfaces, adhesives and outer vapour sealings etc. shall be applied strictly in accordance with the procedure laid herein and with the manufacturer's (suppliers) instructions. Where the Manufacturer's instructions conflict with this Specifications the former shall take precedence.

The Contractor shall remove all oil, grease, loose scale and dirt from surfaces to be insulated and shall ensure that all surfaces requiring insulation are thoroughly dry before application.

The Contractor shall cover all openings in vessels, towers and any other equipment to prevent the entry of insulating material, and shall daily remove from the site all cartons, wrappers and other debris.

Each day's application of insulation is to be weatherproofed over-night by either the final protective coating or some form of temporary weather-proof covering.

Before starting site work the Contractor shall agree to a detailed programme of work. Before the application of insulation the Contractor shall check that the equipment, pipeline to be insulated is available, i.e. all testing, painting etc.... is completed.

Insulation of all flanges, valves etc..., where required, shall be left off until authorisation is given by the EIC to carry out this work. In general this will be done after testing and all joints have been proved tight.

5.2 Materials

5.2.1 Basic Insulating Materials

The following basic insulating material shall be used,

5.2.1.1 Glass Wool (or Mineral Wool) shall consist of long fibres of high tensile strength that will not settle under vibration and shall be chemically inert, non-hygroscopic and also rot, fungus and vermin proof. It shall not promote corrosion when in contact with iron steel or non-ferrous metals and shall not be affected by acidic and sea atmospheric conditions. Glass wool or mineral wool shall be resin bonded.

5.2.1.2 The thermal conductivity of Glass wool (or Mineral wool) shall not exceed 0.23 Btu In./ft²hr at a mean temperature of 32°F (0.0285 KCal/m.hr. °C at 0°C).

B.2.1.3. The density of resin bonded glass wool shall be not less than 2lb/ft³ (32 kg/M³) and that of resin bonded mineral wool shall not be less than 4lb/ft.³ (64 kg/M³).

B.2.1.4. Thermocole/Polystyrene shall be made of foamed polystyrene with smooth surface. It shall be of uniform section, rot and fungus proof and self extinguishing in the event of fire. The thermocole shall not be effected by sudden changes in temperature. The thicknees of preformed sections shall be accurate within + 1/8" (3mm)- 1/16" (1.6 mm) and the edges shall be square, and the whole properly formed to fit snug without the necessity of filling joints. The alkalinity shall be neutral.

B.2.1.5 . The thermal conductivity of "Thermocole" shall not exoeed 0.24 Btu in/ft² hr.°F at a mean temperature of 32°F (0.03 Kcal/m.hr. °C at 0°C).

B.2.1.6. The density shall be in the range of 1.25lb/ft³ (15 Kg/M³) and 2 lb/ft³ (16 Kg/M³).

B.2.1.7 The compresslve strength shall be in the range of 0.7 kg/cm² and 1.0 Kg/cm²,

B.2.1.8 The water absorption shall not exoeed 2% by volume after 24 hours.

B.5.2 Finishing Materials:

B.5.2.1 Metal Cladding where required for mechanical protection shall consist of following Aluminium sheets to IS737 Grade NS3-1/2H in the following range:

Type 1 - Shall be 24 SWG. (0.56mm) thick

Type 2 - Shall be 22 SWG. (0.71mm) thick

Type 3 - Shall be 20 S.W.G. (0.91mm) thick

B5.2.2 Vapour Sealing Compound - depending on the job requirements shall be of Fire Resistant Grade or normal grade of trowelling consistency. A selection of suitable please refer Appendix 1 of this specification.

B.5.2.3 Fixing Materials

B.5.2.3.1 Adhesives used for bonding insulation sections together or to metal surfaces shall NOT contain Ketone or Methylated Hydrocarbon Solvents and shall be suitable for use at the specified service temperatures, and shall be selected from the list given in Appendix 2 of this specification.

B.,.2.3.2. 'Fixing Bands for insulation (where specified and metal cladding shall be as follows:(As per IS 737 Grade SIB and secured by the appropriate aluminium seals.

a) 3/8" (9.5mm) wide x 24 swg , or equal Aluminium strip.,

b)1/2" (12.7mm) wide x 24 swg or equal Aluminium strip

c) 3/4" (19mm) wide x 24 swg or equal Aluminium strip

d)1" (25.4mm) wide x24swg or equal Aluminium strip

B5.2.3.3 Tie wire shall be galvanised, annealed iron, 16swg(1.63mm)and 12swg(2.64mm)as specified.

B.5.2.3.4 Self Tapping Screws shall NOT be used.

B.5.2.3.5 Adhesive Tape shall be 3" (75mm) wide "DENSO Tape" or equal. ·

B.5.2.3.6 Scrim Cloth shall be used between each layer of Vapour sealing compound and shall be evenly woven glass cloth with an open mesh pattern. The specification shall be as follows;

- Warp : 20 per inch
- Waft : 20 per inch
- Yarn count : 22 ½ warp, ½ waft

B.5.2.3.7 Contraction joint compound shall be Foster's Foamseal 30-45 or equal.

B.5.2.3.8 Cushioning Blanket- When specified for certain vessels shall be 1"(25mm) thick 7 .5lb/ft³ (120 kg/cm²) density mineral wool blanket on one side by 20SWG x1" mesh GI wire netting. Cushioning material should not be considered as part of the specified insulation thickness. Where used, the blanket shall be draped to the vessel surface and held loosely in place with a minimum amount of 12 SWG "Tie wires".

5.3 Classification- General Piping:

5.3.1 Basic Types

The following Basic type of insulation shall be used.

TYPE "D" - Preformed pipe sections or radiused and bevelled lags and slabs of resin bonded glass wool coated with two layers of vapour sealing compound and finished with metal cladding.

TYPE "E" - Preformed pipe section or radiused and bevelled lags and slabs of Thermocole / Polystyrene coated with two layers of vapour sealing compound and finished with metal cladding.

5.3.2 Insulation Form

5.3.2.1 Preformed pipe sections shall be used as far as possible for insulation layers less than 3" (75mm) having nominal inside diameter 23" (575mm) and below. •

5.3.2.2 Where pipe sections of a specified thickness are not available, the nearest available pipe section shall be used for outer layer. •

5.3.2.3 Radiused and bevelled lags shall be used for all circular sections where 5.6.2.1 does not apply.

5.3.2.4 Flat slab insulation shall be used for all rectangular or square section ducting.

5.3.2.5 No insulation piece shall exceed 36" (1M) in length

5.4 APPLICATION AND FINISH -PIPE WORK

· Wire brush the surface to remove rust and thoroughly clean the surface to remove all oil, loose scale and dirt and dry the surface thoroughly before application.'

· On the clean and dry surface apply one coat of Shalimar Tankmastic primer or equivalent.

· Apply one coat of hot bitumen R85/25 or equivalent

· The thickness of insulation given in Table I & II are for guidance only. The number of layers of insulation applied shall be as tabulated in Table III.

· Fix the insulation (preformed pipe sections) of required thickness against each dia. of pipe. In case the sections with required thickness are not available, sections to the nearest thickness will be fixed and further thickness built up by radiused and bevelled slabs.

The adhesive specified shall be applied on longitudinal and circumferential edges of the section.

· Where insulation is applied in multilayers, the first layer shall be treated as above. Subsequent layers shall have the inner surface circumferential and longitudinal edges coated with Adhesive before application.

· Insulation sections shall be fitted close avoiding gaps and joints staggered as far as practicable so that complete breaks are reduced to a minimum.

· Contraction joints shall be provided on long straight runs of piping at approximately 40 feet (12M) intervals. Joint shall be packed with Fibre glass and adequately sealed with contraction joint compound.

· Insulation support rings shall be provided by the Contractor at 12 feet (:3.66M) intervals on long vertical lines, or on lines inclined more than 45° from the horizontal axis and more than 12 feet (3.66m) in length.

· Insulation shall be carefully fitted at bends to conform as far as practicable to profile, care being taken to ensure tightly jointed work. All voids shall be filled with fibre glass and joints pointed with jointing compound.

· Where 'Fixing Bands' are used to fix the insulation to pipework the following shall apply;

· (a) No.1 Band and seals at 18"(450mm) pitch upto 12"(300mm) OD insulation layer.

· (b) No.2 Band and seals at 18" (450mm) pitch over 12"(300mm) and upto 18" (450mm) OD insulation.

· (c) No.3 Band and seals at 12"(300mm) pitch over 18"(450mm) and upto 30"(750mm) OD insulation.

· (d) No.4 Band and seals at 12" (300mm) pitch over 30"(750mm) OD insulation layer.

· The entire outer surface of the insulation shall receive one coat -of 'Vapour Sealing Compound' to a thickness of 1/16 in.(1.6mm) and while the surface is still wet, 'scrim cloth' shall be embedded into the surface, care to be taken to avoid wrinkles. 'Scrim Cloth' shall be overlapped to a minimum of 2inch (50mm). A final coat of 'Vapour sealing Compound' shall be applied to a thickness of 1/8 in. (3mm)

Mechanical Protection (pipe work)

Where it is required to protect the outer 'Vapour Seal'on pipework from damage, Metal Cladding shall be used in accordance with the following procedure .

a) Type 1 metal cladding shall be used for pipes having a diameter over insulation of less than 12 in. (300mm).

b) Type 2 metal cladding shall be used for pipes having a diameter over insulation equal to or greater than 12 in (300mm).

The metal cladding shall be applied over the 'vapour Seal' such that all points are lapped not than 1"(25mm), on piping upto and including 1 1/2" (38mm) nominal bore, and 3"(75mm) on all other piping. Laps shall be arranged to shed rainwater. Metal cladding shall be banded as mentioned above. NO SCREWS SHALL BE USED.

On bends, the metal cladding shall be of interlocking, self-supporting sections. NO SCREWS SHALL BE USED.

Metal cladding shall be secured as follows;

- (a) No.2 Band and seals at 18"(450mm) pitch upto 12"(300mm) OD insulation layer.
- (b) No.3 Band and seals at 18" (450mm) pitch over 12"(300mm) and upto 18" (450mm) OD insulation.
- (c) No.3 Band and seals at 12"(300mm) pitch over 18"(450mm) and upto 30"(750mm) OD insulation.
- (d) No.4 Band and seals at 12" (300mm) pitch over 30"(750mm) OD insulation layer.

One band shall coincide with each circumferential lap.

Pipe fittings and Special pipework:

Flanges and Valves.

All valves, flanges and pipe fittings shall be insulated. Valves shall be insulated to the packing gland.

Insulation at flanges, valves etc. shall be built up, as far as possible, with flat slabs leaving sufficient space for the removal of bolts, studs or other fixtures. Voids or gaps are to be filled with chopped insulation to the same specification of the basic insulating material.

Where insulation is to be removable. Adjoining layers of insulation shall be coated with grease where breaks are to occur.

The whole of the insulation outer surface shall receive the surface finish specified insuring that valve stems etc... are adequately sealed against rain water.

Pipe Hangers and Supports:

Insulation shall be continuous at all points of support. In general, pipe hangers and supports shall be attached to the outside of the insulation which shall be reinforced with metal cradles to prevent crushing of the insulating material. Where insulating material come in contact with the pipe, insulation shall be applied around the support for a distance equal to four times the pipe insulation thickness. Where pipe supports cannot be carried on the outside of the insulation, a cold break in the form of wooden blocks coated with hot bitumen shall be used and insulation shall be applied to the support for a distance equal to four times the pipe insulation thickness.

5.5 CLASSIFICATION OF EQUIPMENT

The following basic type of insulation will be used;

- TYPE "E" - Radiused and bevelled lags, bevelled lags or flat slabs of Resin bonded glasswool coated with two layers of vapour sealing compound and finished with metal cladding.

- TYPE "F" - Radiused and bevelled lags, bevelled lags or flat slabs of Thermocole/ polystyrene coated with two layers of vapour sealing compound and finished with metal cladding.

Standard pipe sections may be used where diameter permits.

Insulation Form

- Radiused and bevelled lags shall be used on cylindrical items upto 6'-0"(1.83M)diameter where the insulation thickness exceeds 1 1/2 inch (38mm).
- Bevelled lags shall be used on cylindrical items upto 6'-0" (1.83M) diameter with insulation thickness upto 1 1/2"(38mm) and on all thicknesses on items over 6'-0" and upto 16'-0"(4.88M) diameter.
- Flat slabs shall only be used where specified and for flat surfaces and cylindrical items over 16'-0"(4.88M) diameter, unless special permission to the contrary is obtained in writing.
- No piece of insulation shall exceed 36"(1.0M) in length.

5.6 APPLICATION AND FINISH- EQUIPMENTS

Columns, Vessels, Tanks & Exchangers:

Wire brush the surface to remove rust and thoroughly clean the surface to remove all oil, loose scale and dirt and dry the surface thoroughly before application.'

On the clean and dry surface apply one coat of Shalimar Tankmastic primer or equivalent.

Apply one coat of hot bitumen R85/25 or equivalent.

The thickness of insulation given in Table I & II are for guidance only. The number of layers of insulation applied shall be as tabulated in Table III.

The thickness or insulation tabulated in tables 1 & II are for guidance only. The number of layers of insulation applied shall be as tabulated in table III .

For single layer insulation, the ends and butt edges of sections shall have a trowel coat of Adhesive. Insulation shall be securely banded with No.2 fixing bands and seals at approximately 12" (300mm) centres atleast 1"(25mm) back from the butted joints.

For multi-layer insulation the first layer shall be erected as mentioned above. The subsequent layers of insulation shall have a trowel coat of Adhesive applied to the erection surface and to the ends and butting sides. Each layer of insulation shall be banded with No.3 fixing bands and seals at approximately 12" (300 mm) centres atleast 1 in (25mm) back from the butted joints. All joints shall be staggered and shall be cut and squared so that all voids are eliminated .

Vessel and exchanger flanges, manhole covers, and all appurtenances shall be insulated. All attachments to the vessel or exchangers such as skirts, supports, ladder and platform clips etc., shall be covered with insulation for a distance of four times the basic insulation thickness, with the outer vapour seal continuing and sealing to the metal. •Insulation shall be installed around manholes, exchangers, channels and shall covers so as to allow. Removal & re-use without to the insulation or the adjacent insulation .

At irregular shapes where banding may be impracticable, "Tie wire", 12SWG as applicable may be used.

The entire outer surface of insulation shall receive one coat of 'Vapour Sealing Compound' to a thickness of 1/16"(1.6mm) and while the surface is still wet 'Scrim Cloth' shall be embedded into the surface, care to be taken to avoid wrinkles. The scrim cloth shall be overlapped to a minimum of 2" (50mm) A final coat of vapour Sealing shall be applied to a thickness of 1/8"(3mm).

Insulation shall be supported on lagging rings where provided.

Where equipment is supported by local steel work or on concrete, a cold break in the form of wooden blocks coated with hot bitumen shall be supplied between the equipment support and the supporting structure.

Where circumferential expansion of cold vessels in the event of steaming out or other similar processes is anticipated, a cushioning blanket of fibreglass shall be draped to the vessel surface and the basic insulating material applied over the blanket.

Mechanical Protection -Equipment

In general, unless otherwise specified herein, insulation shall be encased in Metal Cladding applied directly over the vapour seal and held in position by No.4 bands and seals spaced at 18"(450mm) centers.

The following types of Metal Cladding shall be used:

For Vertical Units Type 2

. For Horizontal units Type 3

All metal cladding laps shall be 3" (75mm) and arranged to shed rain water

Unexposed vessel heads i.e. bottom heads of vessel protected by skirts, shall be finished with a vapour seal only.

Spheres shall not be metal clad. Finish shall be Vapour seal only.

Projections from Vessel, Columns etc..

Projections from Vessels, Columns etc., such as for local platforms and walkways, shall be for general application, insulated along the projections to a distance to four times the applied thickness of insulation on the unit.

Where the applied thickness on the unit is such that it would be impractical to insulate the projection to a distance of four times the applied thickness, a cold break in the form of 1/4"(6mm) thick compressed asbestos or equal shall be provided between the supporting structure and the unit lugs and 1/8"(3mm) thick insulating washers between the bolts and unit lugs. The use of this procedure shall be clearly specified for individual items and shall be kept to a minimum because of the possibilities of localised icing occurring at the insulation break.

For condition where the heat gain may be considered critical, platforms or walkways on projecting structures shall be provided with a cold break in the form of wooden blocks coated with hot bitumen, the projection being insulated as mentioned above.

Pumps and Compressors:

In general, pumps and compressors or other irregularly shaped equipment shall be enclosed in block insulation, fabricated to suit the shape with voids filled with fibreglass

Insulation on pumps and compressors shall be finished with Vapour Sealing Compound and have sheet metal cover formed to suit.

TABLE I
ANTI-CONDENSATION
INSULATION THICKNESS (MM) Vs COLD FACE TEMPERATURE °C

C.F.Temp °C Pipe N.B.	+23 to +18	+17 to +11	+10 to +3	+2 to -3	-4 to -9	-10 to - 15	-16 to - 21	-22 to - 27	-28 to - 33
15	25	25	25	40	40	50	50	65	65
20	25	25	40	40	50	50	65	65	65
25	25	25	40	40	50	50	65	65	65
40	25	40	40	50	50	50	65	65	80
50	25	40	40	50	50	50	65	80	80
80	25	40	40	50	50	65	65	80	80
100	25	40	40	50	50	65	80	80	80
150	25	40	40	50	65	65	80	80	90
200	25	40	40	50	65	80	80	90	90
250	25	40	50	50	65	80	80	90	90
300	25	40	50	50	65	80	80	90	90
350	25	40	50	50	65	80	90	90	90
400	25	40	50	50	65	80	90	90	100
450	25	40	50	65	80	80	90	90	100
500	25	40	50	65	80	80	90	100	100
FLAT SURFACE	40	50	50	65	80	90	100	100	100

TABLE II
COLD CONSERVATION
INSULATION THICKNESS (MM) Vs COLD FACE TEMPERATURE °C

C.F.Temp °C Pipe N.B.	+23 to +18	+17 to +11	+10 to +3	+2 to -3	-4 to -9	-10 to - 15	-16 to - 21	-22 to - 27	-28 to - 33
15	25	25	40	40	50	65	65	65	80
20	25	25	40	40	50	65	65	65	80
25	25	25	40	40	50	65	65	65	80
40	25	40	50	50	50	65	65	80	90
50	25	40	50	50	65	65	80	80	90
80	40	40	50	50	65	65	80	80	90
100	40	40	50	65	80	80	90	90	90
150	40	40	50	65	80	80	90	90	100

200	40	40	50	65	80	80	90	100	100
250	40	50	65	65	80	90	90	100	115
300	50	50	65	65	80	90	100	115	115
350	50	50	65	65	80	90	100	115	125
400	50	50	65	80	90	100	115	125	125
450	50	50	65	80	90	100	115	125	140
500	50	65	80	80	90	100	115	125	140
FLAT SURFACE	65	65	80	80	90	100	125	140	150

NOTES:

1. Thickness is insulation only and excludes any finishing material.

2. The range of temperatures given shall not be taken as implying that such temperatures will prevail in the plant.

3. Thickness given is based on an ambient temperature of 31°C(88°F), RH 85%,and may be varied to suit conditions and /or process conditions , where necessary

TABLE III

THICKNESS SCHEDULE

Insulation to 65mm thickness shall be in single layer.

Insulation in excess of 65mm thickness shall be in multi layer construction in accordance with the following table.

Total Thickness (mm)	Nos of Layers	Inner Layer (mm)	Second layer (mm)	Outer layer (mm)
80	2	40	-	40
90	2	40	-	50
100	2	50	-	50
115	2	50	-	65
125	2	50	-	75
140	3	40	50	50
150	3	50	50	50
165	3	50	50	65
175	3	50	50	75
190	3	50	65	75
200	3	50	70	75

APPENDIX 1

VAPOUR SEALING COMPOUNDS

As specified by manufacturer.

APPENDIX 2

ADHESIVES

Supplier	Product reference	Type of Insulation to be used with	Type & Description of Product	Service Temperature Limits
AGROMORE LIMITED	Koldfas Adhesive 82-08	Glasswool;Expanded Polystyrene	Quick setting water based rubber bitumen	-46°C to -77°C
SHALIMAR TAR PRODUCTS	C.P.R.X Compound	Glasswool;Expanded Polystyrene	Rubberised bituminous adhesive	As specified by manufacturer.
BURMAH-SHELL BITUMEN DEPT	R 85/25	Glasswool;Expanded Polystyrene	Industrial Bitumen (Blown grade)	As specified by manufacturer.
LLOYD BITUMEN	Thermoband -741	Glasswool;Expanded Polystyrene	Rubberised bituminous adhesive	As specified by manufacturer.

The range of vapour sealing compounds and Adhesives given are for guidance and shall not be taken as implying that only the above named proprietary materials shall be used exclusively.

6 DIVISION OF RESPONSIBILITY

6.1 Under Contractors scope -

- a. Accommodation to workmen
- b. Accommodation to contractor staff
- c. Vehicle for transportation of workmen
- d. Vehicle for transportation of contractor material within site
- e. Vehicle for transportation of FIM within site
- f. Mobile lifting equipment for loading / unloading / shifting of contractor material within site
- g. Mobile lifting equipment for loading / unloading / shifting FIM material within site
- h. Contractor office
- i. Safety tapes
- j. Display boards

- k .Material lifting equipment like chain pulleys, etc
 - l. PPE for workmen and staff
- 6.2 Under DFPCL Scope
 - 1 Space for contractor office inside company premises subject to availability
 - 2 Erection equipments like cranes, hydras, etc for erection / dismantling activities at field
 - 3 Telephone facility on chargeable basis (if available).
 - 4 Issue of all FIM
- 6.3 As per SOR -
 - a .Scaffolding pipes
 - b. Scaffolding clamps
 - c. Scaffolding jallies, planks, toe guards, ladders, etc
- 7 SAFETY
 - 1. The contractor shall follow safety rules & regulations, safety procedures as per the safety standards and comply with the safety requirements.
 - 2. .The contractor shall deploy at site a full time safety in-charge and full time safety officers with requisite qualification, experience and training. The safety in-charge shall be a senior person.
 - 3. .The contractor shall submit an organization chart of its department to the EIC and shall obtain EIC' approval. The contractor shall mobilize and ensure availability of personnel as per approved site safety organization at all times during execution of work under this contract.
 - 4. The contractor is required to deploy persons for specific jobs who are trained and skilled in particular trade and well familiar with hazards and safety precautions.
 - 5. The site staff and workers of the contractors are required to undergo safety orientation before they are assigned work at site. No person shall be allowed at work site without safety orientation.
 - 6. The contractor shall plan and execute work in such a way to avoid accidents / injuries to its-own staff and workers, other workers, company employees, damage to company property and damage to environment.
 - 7. Adequate resources have to be made available by the contractor for safe execution of work at site. Short cut methods or make-shift arrangement will not be allowed.
 - 8. The contractor shall ensure that any time during the performance of the work his personnel are fit to execute the tasks assigned and are not under the influence of any alcoholic liquor, drug or other intoxicating substances.
 - 9. The contractor shall make himself and all staff/workers familiar with emergency procedure and response action to respond rightly in the event of any emergency due to fire/gas leak, etc. in the operating plants at site.
 - 10. Contractor shall ensure that all its staff and workmen are aware of the site specific safety guidelines wherever applicable and shall ensure that the same is followed.

11. It is the responsibility of the contractor to ensure good housekeeping at work site. The scrap debris, unwanted material etc. shall be removed frequently from the work place to avoid accident and work area shall be kept tidy. Gangways shall be kept clear of obstructions. Contractor shall deploy dedicated personnel for housekeeping.

8 .PERSONAL PROTECTIVE EQUIPMENT (PPE)

The contractor shall provide personal protective equipment as specified to it's staff and workmen such as, safety helmets, safety shoes, safety goggles, ear plugs, hand gloves, safety harness / belts, overalls, gum boots etc. and other work equipment as required for safe execution of work at his cost. Special PPEs/ safety appliances, if required for any job as mentioned below job may be provided by the company on chargeable / returnable basis (cost of repair or damage as a result of mishandling will be charged from the contractor). All the safety equipments should meet the specifications prescribed/approved by S.H.E. department of the respective sites.

8.1 Activity/Hazard and Recommended PPE

1)Non toxic dust nuisance---Dust mask,Panoramic goggles,Hand gloves PVC/Rubber

2)Toxic & Corrosive liquids/gases --Face shield,PVC Apron,PVC suit with hood,Positive Pressure suit,Panoramic Goggles,Gum Boots,SCBA sets,Air line mask set,Cartridge type Mask,

3)Working at height --Full body Safety Harness / Belt with two lifelines,Canvas hand gloves,Leather Palm canvas hand gloves,

4)Material Handling --Leather hand gloves,Aluminized hand gloves,Aluminized suit with hood,Asbestos/Leather apron,Spectacle type toughened glass,

5)Grinding/Chipping --Goggles,Panoramic goggles

8.2 Responsibility of provision of PPE -

8.2.1 Under Contractors Scope - Dust mask ,Panoramic goggles, Hand gloves PVC/Rubber ,Face shield, PVC Apron, Panoramic Goggles, Gum Boots, Full body Safety Harness / Belt with two lifelines, Canvas hand gloves, Leather Palm canvas hand gloves, Leather hand gloves, Asbestos/Leather apron,Spectacle type toughened glass,

8.2.2 Under DFPCL Scope on returnable basis- PVC suit with hood, Positive Pressure suit, SCBA sets,Air line mask set, Cartridge type Mask, Aluminized hand gloves, Aluminized suit with hood, In case returnable PPEs are not received back/received in damage condition beyond normal wear & tear, cost of PPE shall be deducted from the bills of contractor concerned.

8.3 Specifications for contractor provided PPE

The personal protective equipment shall be of standard make and preferably should have ISI mark or other certificate of approval from recognized institution/organization and ensure that are maintained in good condition and worn by workers as per the requirement.

Safety Helmet: Moulded out of high impact, heat & chemical resistant HDPE with brim for additional side protection with 6 point ergonomic adjustable head band & chin

strap and approved as per BIS specification no. IS: 2925-1984

Safety Goggles: Toughened/ Polycarbonate scratch resistant lens with side shield, Optically correct zero power, impact resistant and approved as per BIS specification no. IS: 7524 Part-I.

Safety Harness with double lifeline: Waist belt with shoulder strap, 6mm thick coated friction buckle & joint less D-ring, 44 mm wide nylon webbing, padded back, nylon stitched along with copper rivets for additional safety, " quick fit" spring loaded hook and approved as per BIS specification no. IS: 3521.

Safety Shoes: High ankle shoes, made from fine quality plain black leather, padded collar, D-rings, full below attached tongue, with steel toe cap as per IS 5852 with direct injection PVC Nitrile heel sole resistant to acid, alkali, oil.

8.4 Guidelines for Personal Protective Equipment

Safety Harness / Belt: Full body safety harness / safety belts with two life lines shall be provided for all jobs at heights. No persons will work at height without fall arrest device / safety belt with two life lines except where standard scaffolds/work platforms are erected with proper hand rails/ toe guards for fall protection.

Safety Goggles: Appropriate eye protection shall be used by the persons according to nature of hazard. The contractor has to ensure that safety goggles/face shields are provided to workers.

Ear Plugs: Persons engaged in jobs near high level of noise (85 db or more) shall be provided with ear plugs / ear muffs.

Hand Gloves: All workmen / supervisors shall be provided with and use work gloves (cotton hand gloves) to avoid minor hand injuries. Other types of hand gloves specific to hazards will be used by workmen / supervisors.

Scaffolding: The contractor is required to use standard scaffolding and temporary work platforms for jobs at elevations 2 meter or more. Unsafe work methods shall not be allowed. All temporary work platforms shall have guard rails/toe guards with proper means for access.

Electrical Equipment: All the electrical equipment shall be in good working condition. The electrical circuits shall be used with ELCB. Electrical circuits/ extensions boards used for hand tools shall have ELCB of 30 mA rating. Power supply cables with joints shall not be used at site.

Safety Guards: All moving parts like fly wheels, toothed gears, belt drives shall be provided with proper guards. No equipment/ machine with exposed moving parts shall be used at site.

Lifting Equipment: All lifting equipment, chain blocks, tools, tackles, cranes, etc shall have valid certification from a competent authority and shall be maintained in good working condition.

Fire Extinguishers: Contractor shall make adequate provision and provide fire extinguishers at certain locations e.g. stores containing combustible materials, solvents, paints, fuel storage, gas cylinder storage etc.

Gas Cylinders: Gas cylinders trolleys shall be used for safe handling gas cylinders at site. The contractor must have adequate trolleys to handle gas cylinders.

8.5 Safety Organization Of Vendor:

The contractor shall be fully responsible for supervision of its personnel to ensure that they strictly adhere to all applicable safety fire requirements.

The contractor shall appoint one of its personnel on the work site as a Safety officer with the approval from the plant . Contractor shall employ skilled, experienced, trained and dedicated safety personnel as per below details:

Those employing 20 to 100 employees - One Safety Officer

Those employing 101 & more employees - Additional safety officers/ 100 employees

Contract safety officer shall conduct training for all contract employees as per guideline given by DFPCL safety dept. The contractor's owner / line manager in charge on site shall be responsible for formation of the organization and coordination the contractor's Safety activities. This organization shall take the responsibility of all safety related activities with respect to their jobs.

Recruitment, Training of contractor's Personnel

The contractor shall at his own expense ensure that all its personnel and sub-contractor's personnel have been given the necessary safety, job-related training required by DFPCL regulations and will provide proof to the effect. The contractor's personnel shall participate in any additional training, which may be provided by DFPCL. Access to work site by the contractor's personnel shall be denied if not complying with the rules and regulations at site.

8.6 Minimum Entry qualification for contract Personnel

Contractor shall employ only those personnel who are trained in their trade or otherwise having sufficient working experience to ensure their and others safety while on the work.

Contractor shall employ only those personnel who at least can speak & read Marathi, Hindi or English . Contractor shall maintain up to date record of qualification and experience of his personnel and produce it to concerned DFPCL authorities in advance.

Safety meetings

The contractor shall be responsible for maintaining and enhancing the Safety awareness of the workmen working under him, including sub contractor. The contractor will inform the DFPCL safety manager of the time and place of safety meetings arranged by him. Copies of minutes / records of contractor's safety committee meetings shall be sent to the DFPCL Safety Department. The contractor and sub-contractor's personnel are to be encouraged to contribute actively to safety meetings and to identify S.H.E. topics for inclusion in the agenda for a safety meeting. Toolbox talk should be conducted before conducting of any maintenance activity. Safety committee meetings conducted by DFPCL should be attended by nominated representative of the contractor and he shall ensure the communication of same for his employees. This scheme is applicable to all contractors working in the complex.

First Aid and Industrial Injuries

Vendor shall maintain first aid facilities for his employees. All industrial injuries (minor & major) shall be reported promptly to Engineer-In-Charge, and a copy of Vendors report covering each personnel injury requiring the attention of a physician shall be furnished to Company.

8.7 Schedule of penalties for safety violations

Use of PPE is mandatory and non-compliance shall be viewed seriously. Punitive actions including financial penalty may be imposed for safety violations

- 1 Type of violation-Supervisor found at site without having undergone safety induction training
First Time-Rs.50/- per employee

Repetitions-Rs.100/- Per employee

Frequent Safety violations-Rs.100/- Per employee
- 2 Type of violation-Employee found without using required safety equipment

First Time-Rs.50/- per employee

Repetitions-Rs.100/- Per employee

Frequent Safety violations-Rs.100/- Per employee + warning letter
- 3 Type of violation-Employee found without safety belt or without anchoring the safety line at height
First Time-Rs.100/- per employee

Repetitions-Rs.200/- per employee

Frequent Safety violations-Rs.200/- Per employee + warning letter
- 4 Type of violation-Using defective equipment (Tools&Tackles) at site having potential for accident/fire
First Time-Rs.500/-each Observation

Repetitions-Rs.1000/-each Observation

Frequent Safety violations-Rs.2000/-each Observation + warning letter
- 5 Type of violation-Non-compliance of HSE&F procedures/standard practices

First Time-Up to Rs.500/- Repetitions-Up to Rs.1000/-

Frequent Safety violations-Review for DE-listing
- 6 Type of violation-Carrying out job in an unsafe manner having potential for serious consequences e.g. fall accident, damage to property electrocution etc.

First Time-Rs.1000/-each observation

Repetitions-Rs.2000/-each observation

Frequent Safety violations--Review for DE-listing
- 7 Type of violation-Medical treatment injury

First Time—Verbal warning
Repetitions-Warning letter
Frequent Safety violations--Review for delisting

8 Type of violation-Lost time accident

First Time-Warning letter
Repetitions-Review for DE-listing the contractor from approved list

9 Type of violation-Fatal Accident

First Time-Review for DE-listing the contractor from approved list.

9 WORKINGHOURS

Normal working time shall be same as the general shift timing of the respective sites. This will be 8 working hours excluding lunch time. However based on the job /unplanned shutdown/ emergencies or as per plant requirement and instructions of EIC, contractor shall work beyond normal working hours also. No separate / additional compensation shall be payable for the same. (In such cases the contractor has to work as and when required without any percentage increase on SOR.)requirement during the planned

10 MOBILIZATION

Contractor shall arrange for necessary materials, workmen and supervision to start the work within 48 hours of instruction from EIC. In case of emergency or shutdown, contractor shall mobilize all required resources and start the work within 24 hours of instruction of EIC.

To & fro transportation of the material shall be arranged by contractor. However mobile crane/tractor, EOT/ HOT facilities, if required for loading/unloading supply of slings and movement of the machine at site shall be provided by Company, free of charge. However actual activities of loading/ unloading, internal shifting of machines shall have to be done by contractor's manpower.

Contractor shall complete all formalities for its staff & workmen with company's P&A / IR/Contract Cell as required for gate pass and mobilize the manpower as per the requirement of EIC.

Contractor shall interact with S.H.E. department of company for scheduling training program for its total untrained personnel prior to entering into complex.

Contractor shall initiate gate pass request to EIC, get it counter signed by P&A/IR/Contract Cell and then submit to security in advance as required to mobilize manpower.

11 JOB COMPLETION TIME

The total contract duration is as specified in the contract. However for individual works from time to time as and when need arises, separate intimations shall be issued from individual plants/ EIC. Contractor shall ensure mobilization of all required resources and completion of the job including dismantling, etc. as per EIC instructions.

12. SCHEDULE OF RATES

12.1 As per Attached Annexure-1

PRICE BID FORMAT

Sr No	Sr Code	Description	Qty	Uom
10	100145	Hot Ins. on pipe size 1/2" x 40 MM	1	RM
20	100146	Hot Ins. on pipe size 1/2" x 50 MM	1	RM
30	100149	Hot Ins. on pipe size 1/2" x 100 MM	1	RM
40	100155	Hot Ins. on pipe size 3/4" x 40 MM	1	RM
50	100156	Hot Ins. on pipe size 3/4" x 50 MM	1	RM
60	100166	Hot Ins. on pipe size 1" x 50 MM	1	RM
70	100168	Hot Ins. on pipe size 1" x 75 MM	1	RM
80	100169	Hot Ins. on pipe size 1" x 100 MM	1	RM
90	100176	Hot Ins. on pipe size 1-1/2" x 50 MM	1	RM
100	100178	Hot Ins. on pipe size 1-1/2" x 75 MM	1	RM
110	100179	Hot Ins. on pipe size 1-1/2" x 100 MM	1	RM
120	100181	Hot Ins. on pipe size 1-1/2" x 150 MM	1	RM
130	100182	Hot Ins. on pipe size 1-1/2" x 180 MM	1	RM
140	100185	Hot Ins. on pipe size 2" x 40 MM	1	RM
150	100186	Hot Ins. on pipe size 2" x 50 MM	1	RM
160	100187	Hot Ins. on pipe size 2" x 65 MM	1	RM
170	100188	Hot Ins. on pipe size 2" x 75 MM	1	RM
180	100189	Hot Ins. on pipe size 2" x 100 MM	1	RM
190	100191	Hot Ins. on pipe size 2" x 150 MM	1	RM
200	100196	Hot Ins. on pipe size 2-1/2" x 50 MM	1	RM
210	100199	Hot Ins. on pipe size 2-1/2" x 100 MM	1	RM
220	100206	Hot Ins. on pipe size 3" x 50 MM	1	RM
230	100208	Hot Ins. on pipe size 3" x 75 MM	1	RM
240	100209	Hot Ins. on pipe size 3" x 100 MM	1	RM
250	100211	Hot Ins. on pipe size 3" x 150 MM	1	RM
260	100213	Hot Ins. on pipe size 3" x 200 MM	1	RM
270	100214	Hot Ins. on pipe size 4" x 25 MM	1	RM
280	100216	Hot Ins. on pipe size 4" x 50 MM	1	RM
290	100218	Hot Ins. on pipe size 4" x 75 MM	1	RM
300	100219	Hot Ins. on pipe size 4" x 100 MM	1	RM
310	100221	Hot Ins. on pipe size 4" x 150 MM	1	RM
320	100223	Hot Ins. on pipe size 4" x 200 MM	1	RM
330	100226	Hot Ins. on pipe size 6" x 50 MM	1	RM
340	100228	Hot Ins. on pipe size 6" x 75 MM	1	RM
350	100229	Hot Ins. on pipe size 6" x 100 MM	1	RM
360	100231	Hot Ins. on pipe size 6" x 150 MM	1	RM
370	100233	Hot Ins. on pipe size 6" x 200 MM	1	RM
380	100236	Hot Ins. on pipe size 8" x 50 MM	1	RM
390	100238	Hot Ins. on pipe size 8" x 75 MM	1	RM
400	100239	Hot Ins. on pipe size 8" x 100 MM	1	RM
410	100241	Hot Ins. on pipe size 8" x 150 MM	1	RM
420	100243	Hot Ins. on pipe size 8" x 200 MM	1	RM

430	100246	Hot Ins. on pipe size 10" x 50 MM	1	RM
440	100248	Hot Ins. on pipe size 10" x 75 MM	1	RM
450	100249	Hot Ins. on pipe size 10" x 100 MM	1	RM
460	100251	Hot Ins. on pipe size 10" x 150 MM	1	RM
470	100253	Hot Ins. on pipe size 10" x 200 MM	1	RM
480	100256	Hot Ins. on pipe size 12" x 50 MM	1	RM
490	100258	Hot Ins. on pipe size 12" x 75 MM	1	RM
500	100259	Hot Ins. on pipe size 12" x 100 MM	1	RM
510	100260	Hot Ins. on pipe size 12" x 125 MM	1	RM
520	100261	Hot Ins. on pipe size 12" x 150 MM	1	RM
530	100263	Hot Ins. on pipe size 12" x 200 MM	1	RM
540	100268	Hot Ins. on pipe size 14" x 75 MM	1	RM
550	100269	Hot Ins. on pipe size 14" x 100 MM	1	RM
560	100271	Hot Ins. on pipe size 14" x 150 MM	1	RM
570	100273	Hot Ins. on pipe size 14" x 200 MM	1	RM
580	100276	Hot Ins. on pipe size 16" x 50 MM	1	RM
590	100278	Hot Ins. on pipe size 16" x 75 MM	1	RM
600	100279	Hot Ins. on pipe size 16" x 100 MM	1	RM
610	100281	Hot Ins. on pipe size 16" x 150 MM	1	RM
620	100283	Hot Ins. on pipe size 16" x 200 MM	1	RM
630	100286	Hot Ins. on pipe size 18" x 50 MM	1	RM
640	100288	Hot Ins. on pipe size 18" x 75 MM	1	RM
650	100289	Hot Ins. on pipe size 18" x 100 MM	1	RM
660	100291	Hot Ins. on pipe size 18" x 150 MM	1	RM
670	100293	Hot Ins. on pipe size 18" x 200 MM	1	RM
680	100294	Hot Ins. Flt Sur 25 MM	1	M2
690	100296	Hot Ins. Flt Sur 50 MM	1	M2
700	100298	Hot Ins. Flt Sur 75 MM	1	M2
710	100299	Hot Ins. Flt Sur 100 MM	1	M2
720	100300	Hot Ins. Flt Sur 125 MM	1	M2
730	100301	Hot Ins. Flt Sur 150 MM	1	M2
740	100303	Hot Ins. Flt Sur 200 MM	1	M2
750	100306	Cold Ins. on pipe size 1/2" x 50 MM	1	RM
760	100326	Cold Ins. on pipe size 1" x 50 MM	1	RM
770	100336	Cold Ins. on pipe size 1-1/2" x 50 MM	1	RM
780	100338	Cold Ins. on pipe size 1-1/2" x 75 MM	1	RM
790	100346	Cold Ins. on pipe size 2" x 50 MM	1	RM
800	100348	Cold Ins. on pipe size 2" x 75 MM	1	RM
810	100349	Cold Ins. on pipe size 2" x 100 MM	1	RM
820	100366	Cold Ins. on pipe size 3" x 50 MM	1	RM
830	100367	Cold Ins. on pipe size 3" x 65 MM	1	RM
840	100368	Cold Ins. on pipe size 3" x 75 MM	1	RM
850	100376	Cold Ins. on pipe size 4" x 50 MM	1	RM
860	100378	Cold Ins. on pipe size 4" x 75 MM	1	RM
870	100386	Cold Ins. on pipe size 6" x 50 MM	1	RM
880	100388	Cold Ins. on pipe size 6" x 75 MM	1	RM

890	100389	Cold Ins. on pipe size 6" x 100 MM	1	RM
900	100396	Cold Ins. on pipe size 8" x 50 MM	1	RM
910	100398	Cold Ins. on pipe size 8" x 75 MM	1	RM
920	100399	Cold Ins. on pipe size 8" x 100 MM	1	RM
930	100406	Cold Ins. on pipe size 10" x 50 MM	1	RM
940	100408	Cold Ins. on pipe size 10" x 75 MM	1	RM
950	100409	Cold Ins. on pipe size 10" x 100 MM	1	RM
960	100426	Cold Ins. on pipe size 14" x 50 MM	1	RM
970	100456	Cold Ins. Flt Sur 50 MM	1	M2
980	100458	Cold Ins. Flt Sur 75 MM	1	M2
990	100459	Cold Ins. Flt Sur 100 MM	1	M2
1000	100464	Rem. Old Ins. (25-100mm)	1	M2
1010	100465	Rem. Old Ins. (101-200mm)	1	M2
1020	100466	Fix. old ins with old Al sh.(25-100mm)	1	M2
1030	100467	Fix. old ins with old Al sh.(101-200mm)	1	M2
1040	100468	Fix. old ins with new Al sh.(25-100mm)	1	M2
1050	100469	Fix. old ins with new Al sh.(101-200mm)	1	M2
1060	100470	Fix. New ins with old Al sh.(25-100mm)	1	M2
1070	100471	Fix. New ins with old Al sh.(101-200mm)	1	M2
1080	100475	Lagger on 8 Hr shift	1	PSH
1090	100476	Helper on 8 Hr shift	1	PSH
1100	101580	Wrapping of filter elemet on filter cage	1	AU
1110	103378	Removal & Refixing of Pillow	1	M2
1120		Removal & Refixing Pockets for Inspect	1	EA

Price to be quoted online and should include Uniform and PPE.

Sr No	Sr Code	Description	Long text	C
10	100145	Hot Ins. on pipe size 1/2" x 40 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.	
20	100146	Hot Ins. on pipe size 1/2" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.	
30	100149	Hot Ins. on pipe size 1/2" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.	
40	100155	Hot Ins. on pipe size 3/4" x 40 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.	
50	100156	Hot Ins. on pipe size 3/4" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.	

60	100166	Hot Ins. on pipe size 1" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
70	100168	Hot Ins. on pipe size 1" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
80	100169	Hot Ins. on pipe size 1" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
90	100176	Hot Ins. on pipe size 1-1/2" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
100	100178	Hot Ins. on pipe size 1-1/2" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

110	100179	Hot Ins. on pipe size 1-1/2" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
120	100181	Hot Ins. on pipe size 1-1/2" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
130	100182	Hot Ins. on pipe size 1-1/2" x 180 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
140	100185	Hot Ins. on pipe size 2" x 40 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
150	100186	Hot Ins. on pipe size 2" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

160	100187	Hot Ins. on pipe size 2" x 65 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
170	100188	Hot Ins. on pipe size 2" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
180	100189	Hot Ins. on pipe size 2" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
190	100191	Hot Ins. on pipe size 2" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
200	100196	Hot Ins.on pipe size 2-1/2" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

210	100199	Hot Ins. on pipe size 2-1/2" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
220	100206	Hot Ins. on pipe size 3" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
230	100208	Hot Ins. on pipe size 3" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
240	100209	Hot Ins. on pipe size 3" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
250	100211	Hot Ins. on pipe size 3" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

260	100213	Hot Ins. on pipe size 3" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
270	100214	Hot Ins. on pipe size 4" x 25 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
280	100216	Hot Ins. on pipe size 4" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
290	100218	Hot Ins. on pipe size 4" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
300	100219	Hot Ins. on pipe size 4" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

310	100221	Hot Ins. on pipe size 4" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
320	100223	Hot Ins. on pipe size 4" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
330	100226	Hot Ins. on pipe size 6" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
340	100228	Hot Ins. on pipe size 6" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
350	100229	Hot Ins. on pipe size 6" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

360	100231	Hot Ins. on pipe size 6" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
370	100233	Hot Ins. on pipe size 6" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
380	100236	Hot Ins. on pipe size 8" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
390	100238	Hot Ins. on pipe size 8" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
400	100239	Hot Ins. on pipe size 8" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

410	100241	Hot Ins. on pipe size 8" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
420	100243	Hot Ins. on pipe size 8" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
430	100246	Hot Ins. on pipe size 10" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
440	100248	Hot Ins. on pipe size 10" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
450	100249	Hot Ins. on pipe size 10" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

460	100251	Hot Ins. on pipe size 10" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
470	100253	Hot Ins. on pipe size 10" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
480	100256	Hot Ins. on pipe size 12" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
490	100258	Hot Ins. on pipe size 12" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
500	100259	Hot Ins. on pipe size 12" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

510	100260	Hot Ins. on pipe size 12" x 125 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
520	100261	Hot Ins. on pipe size 12" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
530	100263	Hot Ins. on pipe size 12" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
540	100268	Hot Ins. on pipe size 14" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
550	100269	Hot Ins. on pipe size 14" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

560	100271	Hot Ins. on pipe size 14" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
570	100273	Hot Ins. on pipe size 14" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
580	100276	Hot Ins. on pipe size 16" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
590	100278	Hot Ins. on pipe size 16" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
600	100279	Hot Ins. on pipe size 16" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

610	100281	Hot Ins. on pipe size 16" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
620	100283	Hot Ins. on pipe size 16" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
630	100286	Hot Ins. on pipe size 18" x 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
640	100288	Hot Ins. on pipe size 18" x 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
650	100289	Hot Ins. on pipe size 18" x 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

660	100291	Hot Ins. on pipe size 18" x 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
670	100293	Hot Ins. on pipe size 18" x 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
680	100294	Hot Ins. Flt Sur 25 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
690	100296	Hot Ins. Flt Sur 50 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
700	100298	Hot Ins. Flt Sur 75 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.

710	100299	Hot Ins. Flt Sur 100 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
720	100300	Hot Ins. Flt Sur 125 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
730	100301	Hot Ins. Flt Sur 150 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
740	100303	Hot Ins. Flt Sur 200 MM	To clean surface or rust, scale, greases, etc. by sand paper, wire brushes, etc. Providing and fixing LRB mattresses of required thickness and of 120 Kg/M3 density. Joints of mattress to be sealed with loose wool and lace it properly with galvanised wire.
750	100306	Cold Ins. on pipe size 1/2" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
760	100326	Cold Ins. on pipe size 1" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app

770	100336	Cold Ins. on pipe size 1-1/2" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
780	100338	Cold Ins. on pipe size 1-1/2" x 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
790	100346	Cold Ins. on pipe size 2" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
800	100348	Cold Ins. on pipe size 2" x 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
810	100349	Cold Ins. on pipe size 2" x 100 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
820	100366	Cold Ins. on pipe size 3" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app

830	100367	Cold Ins. on pipe size 3" x 65 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
840	100368	Cold Ins. on pipe size 3" x 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
850	100376	Cold Ins. on pipe size 4" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
860	100378	Cold Ins. on pipe size 4" x 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
870	100386	Cold Ins. on pipe size 6" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
880	100388	Cold Ins. on pipe size 6" x 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app

890	100389	Cold Ins. on pipe size 6" x 100 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
900	100396	Cold Ins. on pipe size 8" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
910	100398	Cold Ins. on pipe size 8" x 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
920	100399	Cold Ins. on pipe size 8" x 100 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
930	100406	Cold Ins. on pipe size 10" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
940	100408	Cold Ins. on pipe size 10" x 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app

950	100409	Cold Ins. on pipe size 10" x 100 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
960	100426	Cold Ins. on pipe size 14" x 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
970	100456	Cold Ins. Flt Sur 50 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
980	100458	Cold Ins. Flt Sur 75 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
990	100459	Cold Ins. Flt Sur 100 MM	Clean the surface to be insulated, apply thermocol joint seal tarfelt pipe section with CPR, wirenet, tiding by G.I. Wire and one small coat and final coating by 22 gauge aluminium cladding with fixing by 3/4" parker screws. The cold insulation before app
1000	100464	Rem. Old Ins. (25-100mm)	Removal of old insulation (thickness from 25mm to 100 mm)
1010	100465	Rem. Old Ins. (101-200mm)	Removal of old insulation (thickness from 101mm to 200 mm)
1020	100466	Fix. old ins with old Al sh.(25-100mm)	Refixing of Old insulation with old aluminium sheet including supply of wire and screw (thickness from 25 mm to 100 mm)

1030	100467	Fix. old ins with old Al sh.(101-200mm)	Refixing of Old insulation with old aluminium sheet including supply of wire and screw (thickness from 101 mm to 200 mm)
1040	100468	Fix. old ins with new Al sh.(25-100mm)	Refixing of Old insulation with new aluminium sheet including supply of wire and screw (thickness from 25 mm to 100 mm)
1050	100469	Fix. old ins with new Al sh.(101-200mm)	Refixing of Old insulation with new aluminium sheet including supply of wire and screw (thickness from 101 mm to 200 mm)
1060	100470	Fix. New ins with old Al sh.(25-100mm)	Fixing of New insulation material with old aluminium sheet including supply of wire and screw (thickness from 25 mm to 100 mm)
1070	100471	Fix. New ins with old Al sh.(101-200mm)	Fixing of New insulation material with old aluminium sheet including supply of wire and screw (thickness from 101 mm to 200 mm)
1080	100475	Lagger on 8 Hr shift	Supply of Lagger for insulation jobs
1090	100476	Helper on 8 Hr shift	Supply of Helper for insulation jobs
1100	101580	Wrapping of filter elemet on filter cage	Wrapping of filter element on spare platinum filter cage after cleanin and after completion of wrapping complete cage is to be covered with plastic paper in our plant at Taloja.
1110	103378	Removal & Refixing of Pillow	Pillow insulation FOR TURBINESS AT K-1 plant at Taloja. SCOPE OF WORK :- Removal of exisiting pillows. Fixing of new pillows made out of Glass cloth and Ceramic wool. Qty given is tentative and payment shall be done as per actual job carried out.
1120		Removal & Refixing Pockets for Inspect	

Commercial Terms and Conditions

1. Mobilization: Within 7 days from the date of receipt of PO/ email confirmation.
2. Payment Terms: Monthly one R.A (Running Bill) Bill within 45 days which is to be certified by our job coordinator.
3. The quantity may vary +/- on either side during the tenure of the contract, however the total value of the contract will not be changed. Contractor will be paid as per the actual execution of the job which is to be certified by our job coordinator.
4. Validity of the contract: 2 Year from the date of receipt of PO. The contract may be extended by another 6 months with the same rates if the quantities are not fully utilized. Even after extension of the contract if the quantities are still not fully utilized then the contract will be terminated by DFPCL.
5. Taxes and Duties: Taxes and duties will be paid by DFPCL as per government notifications
6. Security Deposit:: - 10% of basic order value will be retained by DFPCL or equal amount of Bank Guarantee to be submitted by the contractor or will be deducted from Tenderers First 3 Monthly Bills against this contract and NO INTEREST will be payable by DFPCL on the said amount and it will be refunded to you only after expiry of the contract subject to deduction of any.
7. Force Majeure condition:
The term force Majeure as employed herein shall mean acts of God, War, Revolt, Terrorist Act , Accident , Fire, Flood and Acts and Regulations of respective Governments of the two parties. Upon occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing within 72 hours, the full particulars and satisfactory evidence support of his claim. Time for purpose of the relative obligations suspended by the force majeure shall then stand extended by the period of delay, which is directly caused by force majeure event.
- 8) Jurisdiction:
The Court at Panvel, Maharashtra shall have exclusive Jurisdiction to deal with and decide any legal matter whatsoever arising out of this Tender/ Purchase order or any agreement entered between the Vendor/ Supplier and Company.
- 9) Arbitration:
Any dispute, difference, claim or question of interpretation of any nature arising between the parties with regard to this Tender/ Purchase Order/ Work Order/ Agreement regarding the meaning, respective rights, claims, liabilities and obligations under this Tender/ Purchase Order/ Work Order/ Agreement, including any question regarding its

existence, validity or termination which is not resolved by amicable settlement shall be settled by arbitration in accordance with the Rules of Arbitration of the Indian Council of Arbitration (ICA) or any enactment or amendment thereof. Award passed shall be final and binding on both the parties. The venue of such arbitration proceedings shall be at Mumbai (India) and for interim relief under the Act, courts at Panvel shall have the exclusive jurisdiction over this Agreement.

10) Termination: A. The Contract/ Tender can be terminated by either party i.e. DFPCL or the Contractor/ Tenderer, after giving three (3) month's notice to the other party. However, DFPCL reserves the right to terminate the contract without giving any notice in case of the Contractor commits breach of any of the terms of the contract. DFPCL's decision in such a situation shall be final and binding on the Contractor/ Tenderer without any objection or resistance.

B. On termination of the contract, the Contractor/ Tenderer will hand over all the equipment's/ furniture/ article etc. supplied by DFPCL (if any) in good working condition back to DFPCL except normal wear and tear.

C. If the successful bidder/ Contractor withdraws or the services provided by the successful bidder are not found satisfactory (say in a month or so) during the probationary period of three months from the date of taking over charge /Job contract, DFPCL reserves the right to terminate the contract without giving any notice and initiate appropriate necessary action in the matter for making alternate arrangements. The Contractor shall continue till such time DFPCL finds alternative arrangement.

In case it is found that any information furnished by the Tenderer/ Vendor/ Supplier is false or incorrect, the Company at its sole discretion may terminate the Contract/ Order without giving any notice. The Company shall reserve its right to seek appropriate damages from the Tenderer/ Vendor/ Supplier. Any loss incurred by the Company in this respect will be on Suppliers/ vendor's account.

11) Job Controller – Mr. Mahesh Kalghatgi of DFPCL shall be the job controller.

12) The rates quoted by the suppliers shall remain firm till the completion of contract period and also during extended period if any. No escalation on any other ground shall be allowed.

On Contractor's letterhead)

DETAILS OF BLACKLISTING / DISQUALIFICATION / FORFEITURE OF B.G. / S.D.

- 1) Whether your Firm/Company is blacklisted by DFPCL or any other Public Sector / Govt. / Quasi-Govt Organisation / any other client : **Yes / No**. If yes please mention details.
- 2) Whether your Contract was terminated before expiry of Contract period or Security Deposit / E.M.D forfeited by our Company or any other Public Sector/Govt./Quasi Govt Organization / Any other client : **Yes / No**. If yes please mention details.
- 3) Whether Proprietor/Partner/Director (as applicable) has been prosecuted by any judicial court for any criminal breach of trust : **Yes / No**. If yes please mention details.

(Signature of the Contractor & Seal)

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(On Contractor's letterhead)

INFRASTRUCTURE / RESOURCES :

1. Total number of resources employed : _____
2. No. of branch offices : _____ (details of address, Telephone No., Fax No. etc.)
3. No. of FMS Contracts engaged in Mumbai with Avg value of Contract:

(Signature of the Contractor & Seal)

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(On Contractor's letterhead)

GENERAL INFORMATION:

1. Name & address of the Tenderers Firm / Company : _____
2. Office Telephone No. : _____
3. Office Fax No. : _____
4. Year of Establishment : _____
5. Constitution of the Firm : Proprietorship/Partnership/Pvt. Ltd./ Pub Ltd. Co./Co-operative .
6. Name, Address of Partner / Directors : _____
7. Name of contact person : _____
8. Telephone no. of contact person: Office _____
Residence _____
Mobile _____
9. Name & Designation of Authorized Signatory : _____
10. Details of sister concerns
 - a) Name & Address:
 - b) Activities engaged in by Sister Concern:
 - c) Names, Addresses & Telephone Nos. of Proprietors/Directors/Partners of Sister concerns.

(Signature of the Contractor & Seal)