TENDER DOCUMENT

SUPPLY, ERECTION & COMMISSIONING
OF PIPES/PIPE FITTINGS/VALVES
AS PER INDIAN BOILER REGULATIONS (IBR)
ON TURNKEY BASIS
TENDER DOCUMENT FOR SUPPLY, ERECTION & COMMISSIONING of PIPES/PIPE FITTING/VALVES (IBR) ON TURNKEY BASIS

Tender No. MS/PIPING/IBR/Advt. No. 92/2221 Dated: 16.11.2012

This Tender Document Contains 129 + 2 (Drawings) + 2 (Make List) Pages.

Tender Documents is sold to:

M/s

Address

Details of Contact person in SPM regarding this tender:

Name, Designation : Shri. Rajkumar R Officer Materials

Address : Security Paper Mill Hoshangabad M.P-461005

Phone : 07574-279847, 07574-279791

Fax : 07574-255170

Email : gm_spm@yahoo.co.in purchase_spm@yahoo.com
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1. Sealed tenders are invited from eligible and qualified tenderers for supply of following goods & services:

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<th>Schedule No.</th>
<th>Brief Description of Goods/ Services</th>
<th>Quantity (with unit)</th>
<th>Earnest Money (in Rs.)</th>
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<td>1.</td>
<td>Supply, Erection &amp; Commissioning on turnkey basis of Pipes/Pipe Fittings/Valves (IBR) as per List of Requirements (Section VI) of this tender</td>
<td>As per List of Requirements (Section VI)</td>
<td>Rs. 1,70,000/- (Rs. One Lakh Seventy thousand only)</td>
</tr>
</tbody>
</table>

2. Interested tenderers may obtain further information about this requirement from the Purchase section, Security Paper Mill, Hoshangabad. They may also visit our website mentioned above for further details.

3. Tender documents may be purchased on payment of non-refundable fee of Rs.1000/- per set in the form of account payee demand draft/ cashier’s cheque/ certified cheque, drawn on a scheduled commercial bank in India, in favour of Security Paper Mill payable at Hoshangabad.

4. If requested, the tender documents will be mailed by registered post/speed post to the domestic Tenderers, for which extra expenditure per set will be Rs. 100/- (Rupees Hundred) for domestic post. The tenderer is to add the applicable postage cost in the non-refundable fee mentioned in para 3 above.
5. Tenderers may also download the tender documents from the web site 
   http://spmhoshangabad.spmcil.com & http://eprocure.gov.in and submit its tender by utilizing the
   downloaded document along with the required non-refundable fee as mentioned in Para 3 above.

6. Tenderers shall ensure that their tenders, duly sealed and signed, complete in all respects as per
   instructions contained in the Tender Documents, are dropped in the tender box located at the
   address given below on or before the closing date and time indicated in the para 1 above, failing
   which the tenders will be treated as late and rejected.

   ADDRESS
   The General
   Manager, Security
   Paper Mill,
   Hoshangabad - 461 005 (M.P.) India.

7. In the event of any of the above mentioned dates being declared as a holiday/ closed day for the
   purchase organization, the tenders will be sold/ received/ opened on the next working day at the
   appointed time.

8. The tender documents are not transferable.

   (Rajkumar. R)
   Officer Materials
   For and on behalf of
   The General Manager
   Security Paper Mill, Hoshangabad, M.P-461 005
   Ph. No: 07574-279847, Fax No: 07574-255170
GENERAL INSTRUCTIONS TO TENDERERS (GIT)


(GIT contains 32 Pages)
SPECIAL INSTRUCTION TO TENDERER

The following Special Instructions to Tenderers will apply for this purchase. These special instructions will modify/ substitute/ supplement the corresponding General Instructions to Tenderers (GIT) incorporated in Section II. The corresponding GIT clause numbers have also been indicated in the text below. In case of any conflict between the provision in the GIT and that in the SIT, the provision contained in the SIT shall prevail.

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<thead>
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<th>GIT Clause No.</th>
<th>Topic</th>
<th>SIT Provision</th>
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<td>Pre Bid Conference</td>
<td>1.</td>
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<td>Earnest Money Deposit (EMD)</td>
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<td>Corrections in GIT Clauses</td>
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<td>8.</td>
<td></td>
<td>Coordination with Statuary Bodies &amp; outside Agencies</td>
<td>8.</td>
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</table>

1. **PRE-BID CONFERENCE**

   Pre-bid conference will be held on 08.12.2012 at 11 AM held for this tender at SPM Hoshangabad. Bidder should send their queries if any before one week of pre-bid conference.

2. **EARNEST MONEY DEPOSIT (EMD)**

   Tender should be accompanied with Earnest Money Deposit (Non-interest bearing) of Rs. 1,70,000/- (Rs. One Lakh Seventy thousand only) in the forms as given below.
   a) Account Payee Demand Draft or
   b) Fixed Deposit Receipt or
   c) Banker’s cheque

   The demand draft, fixed deposit receipt or banker’s cheque shall be drawn on any scheduled commercial bank in India, in favour of Account specified in the Clause 3 of NIT. The earnest money shall be valid for a period of forty five days beyond the validity period of the tender.

3. **TENDER VALIDITY**

   3.1 The tender shall remain valid for acceptance for a period of 165 days after the date of tender opening prescribed in the tender document. Any tender valid for a shorter period shall be treated as unresponsive & rejected.
3.2 In exceptional cases, the tenderers may be requested by SPM to extend the validity of their
tenders up to a specified period. Such request(s) and responses thereto shall be conveyed by
surface mail/E-mail/Telex/Cable followed by surface mail. The tenderers, who agree to extend the
tender validity, are to extend the same without any change or modification of their original
tender and they are also to extend the validity period of the EMD accordingly.

3.3 In case the day up to which the tenders are to remain valid falls on/subsequently declared a
holiday or closed day for SPM, the tender validity shall be extended up to the next working day.

3.4 **Compliance with the clauses of this Tender document:**
Tenderer must comply with all the clauses of this tender document. No deviations with any of
the clauses of this tender are permitted to the bidder.

4. **SUBMISSION OF TENDERS:**

4.1 Pre-Qualification bid, Technical bid and financial bid are to be submitted in three separate
doubled sealed envelopes on or before the due date of submission of tenders. It may be noted
that the price is not to be quoted either in the pre-qualification or in technical bid. It shall only be
quoted in price bid. Non-adherence to this shall be making tender liable for rejection. The
envelopes containing bids shall be super scribed “**Pre-qualification bid**, “**Technical bid**, “**Price
bid”**, as the case may be, for **“Supply, Erection & Commissioning of Pipes/Pipe fittings/valves
(IBR)”**. The sealed envelopes shall be again being put in another sealed cover and should be super
scribed **“TENDER FOR SUPPLY, ERECTION & COMMISSIONING OF PIPES/PIPE FITTINGS/VALVES
(IBR)”** due on **08.01.2013** up to **10.30 Hrs (IST)**. Late tenders shall not be accepted. Tenderers
shall submit their offers only on prescribed forms. Tender by Telegram/Fax/E-mail shall not be
accepted. Tender by Post/Hand/courier received on or before the due date and time shall be
accepted. Postal delay/ delay by courier service etc. shall not be condoned.

4.2 **Tenders shall be submitted in parts as below:**

**PART – I – PRE-QUALIFICATION BID**

i) Containing un-priced tender consisting of complete Qualification/Eligibility of the
tenderer as per the format specified under **Section IX** in this document.

ii) One original and one duplicate copy shall be submitted. It should not have any price
aspects.

iii) Earnest Money Deposit.

iv) Power of Attorney/authorization with the seal of the company of person signing the
tender documents.

v) Tender document fee Rs.1,000/-.

vi) Manufacturer’s authorization form if the bidder is not manufacturer.

vii) Valid authorization certificate from IBR authority to be enclosed.

**PART – II - TECHNO-COMMERCIAL BID**

I) The tenderer shall submit detailed technical offer as per Technical Specifications as per
**Section VII** of this tender document.

II) The tenderer has to submit acceptance of all sections of this tender document (GIT, SIT, SCC,
Quality control requirements, Tender form, Questionnaire, etc.)

III) One original and one duplicate copy shall be submitted.

IV) Containing un-priced tender consisting commercial package including all terms and
conditions. No price details to be given in this tender.

V) Containing Blank price Bid (No price details to be given in this tender.)
**PART- III - PRICE BID:**
The tenderers shall quote the prices strictly as per the proforma given in Section – XI of the tender document. No additional/extra item with prize should be included other than that of section XI. If any that particular item will not be considered for evaluation.

5 **PARALLEL CONTRACTS**

No parallel contracts shall be awarded for this tender.

6 **EVALUATION CRITERIA FOR L1 BIDDER**

The pre-qualification bids are to be opened in the first instance, at the prescribed time and date. These bids shall be scrutinized and evaluated by the competent committee/ authority with reference to the parameters prescribed in the eligibility criteria. Thereafter, in the second stage, the technical bids of only pre-qualified bidders (as decided in the first stage) shall be opened at a later date and time for further scrutiny and further evaluation. These bids shall be scrutinized and evaluated by the competent committee/ authority with reference to the parameters prescribed in the tender document. Subsequently, in the third stage the financial bids of only the technically acceptable offers (as decided in the second stage shall be opened for further scrutiny and evaluation. Intimation regarding to opening of technical and financial bids shall be given to acceptable Tenderers to enable them to attend the technical and financial bid opening, if they so desire.

The schedules of quantities of various items as covered under the scope of this Specification have been given in price schedule (Part A & Part B) of section XI. It may be noted that the quantities of item given is approximate and for evaluation purpose. Payment will be made of goods (Supply) and erection & commissioning (service) as per actual consumption, However it should not exceed 25% quantity, for each item.

The method of evaluation of L1 bidder for awarding the Contract shall be on consolidated grand total offer by the bidder and will be decided taking into consideration of the total offered price including (A+B) as per **Section-XI (Price schedule)** of this tender document.

7 **CORRECTIONS in GIT Clauses**

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<thead>
<tr>
<th>GIT CLAUSE</th>
<th>WRITTEN AS IN GIT</th>
<th>CORRECTED AS IN SIT</th>
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<tr>
<td>21.1</td>
<td>In 3rd line of procurement manual the words “Para 11 of NIT”</td>
<td>“Para 1 of NIT”</td>
</tr>
<tr>
<td>21.1</td>
<td>In 6th line of procurement manual the words “Clause 11 of NIT”</td>
<td>“Clause 1 of NIT”</td>
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<tr>
<td>24.1</td>
<td>In 2nd line of procurement manual the words “Clause 11 of NIT”</td>
<td>“Clause 1 of NIT”</td>
</tr>
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</table>
CO-ORDINATION WITH STATUTORY BODIES AND OUTSIDE AGENCIES

The Contractor shall be fully responsible for carrying out all co-ordination & liaison work as may be required with Boiler Inspector, IBR statutory bodies & other statutory bodies for implementation of the work. The application on behalf of the Owner for submission to the Boiler Inspector, IBR Statutory bodies & other statutory bodies along with copies of drawings, data, DBR ...etc complete in all respects shall be done by the Contractor & approval/certificates taken well ahead of time so that the actual commissioning of equipment is not delayed for want of inspection and approval by the Inspector & statutory bodies. The actual inspection work by the Boiler Inspector shall be arranged by the Contractor.

However, official fees paid to Boiler Inspector, IBR Statutory bodies / other statutory bodies, etc. in this regard shall be borne by the SPM.
GENERAL CONDITIONS OF CONTRACT (GCC)

(GCC contains 28 Pages)
SPECIAL CONDITIONS OF CONTRACT (SCC)

The following Special Conditions of Contract (SCC) will apply for this purchase. The corresponding clauses of General Conditions of Contract (GCC) relating to the SCC stipulations have also been incorporated below. These Special Conditions will modify/ substitute/ supplement the corresponding (GCC) clauses. Whenever there is any conflict between the provision in the GCC and that in the SCC, the provision contained in the SCC shall prevail.

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<th>GCC Clause No.</th>
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<td>Security Rules</td>
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1. **ABBREVIATIONS**


“SPMCIL” means Security Printing and Minting Corporation of India Limited

“DCPL” means Development Consultants Private Limited, Kolkata

“BIDDER”/“TENDERER”/“CONTRACTOR” means the individual/firm who quotes against this tender enquiry.

“MANUFACTURER” means the bidder have supplied & erected PIPES/PIPE FITTING/VALVES

“IBR” Indian Boiler Regulations

2. **INSPECTION AND QUALITY CONTROL**

2.1 SPM and/ DCPL or its nominated representative(s) will, without any extra cost to SPM, inspect and/ or test the ordered work and the related services to confirm their conformity to the contract specifications and other quality control details incorporated in the contract. SPM shall inform the contractor in advance, in writing, SPM’s programme for such inspection and, also the identity of the officials to be deputed for this purpose.

2.2 The Technical Specification and Quality Control Requirements incorporated in the contract shall specify what inspections and tests are to be carried out and, also, where and how they are to be conducted. If such inspections and tests are conducted in the premises of the contractor, all reasonable facilities and assistance, including access to relevant drawings, design details and production data, shall be furnished by the supplier to SPM’s inspector at no charge to SPM.
2.3 If during such inspections and tests the contracted work fail to conform to the required specifications and standards, the inspector may reject them and the contractor shall either replace the rejected work or make all alterations necessary to meet the specifications and standards, as required within the original delivery period and as specified in the contract free of cost to SPM and resubmit the same to the inspector for conducting the inspections and tests again.

2.4 In case the contract stipulates pre-despatch inspection of the ordered work at contractor’s premises, the contractor shall put up the work for such inspection to SPM’s or DCPL’s Inspector well ahead of the contractual delivery period, so that the inspector is able to complete the inspection within the contractual delivery period.

2.5 If the contractor tenders the goods to the inspector for inspection at the last moment without providing reasonable time to the inspector for completing the inspection within the contractual delivery period, the inspector may carry out the inspection and complete the formality beyond the contractual delivery period at the risk and expense of the contractor. The fact that the goods have been inspected after the contractual delivery period will not have the effect of keeping the contract alive and this will be without any prejudice to the legal rights and remedies available to SPM under the terms & conditions of the contract.

2.6 Work accepted by SPM and/or its inspector at initial inspection and in final inspection in terms of the contract shall in no way dilute SPM’s right to reject the same later, if found deficient in terms of the warranty clause of the contract, as incorporated under GCC Clause.

2.7 Travelling expenses, Lodging and boarding charges of SPM officer for pre-shipment inspection shall be borne by SPM.

3. **TRANSPORTATION OF DOMESTIC GOODS**

The supplier shall arrange transportation of the ordered goods up to the SPM and further transportation up to the Project site.

4. **INSURANCE**

4.1 The Supplier shall arrange for insuring the goods against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the following manner.

4.2 The supplier shall be responsible till the entire stores contracted for arrive in good condition at destination. The transit risk in this respect shall be covered by the Supplier by getting the stores duly insured till unloading of the stores at site. The insurance cover shall be obtained by the Supplier in its own name and not in the name of SPM or its Consignee.

4.3 Insurance in respect of damages to persons and property during equipment erection:

4.3.1 The Contractor shall be responsible for all injury or damage to persons, animals or things and for all damage to property which may arise from any factor omission on the part of the CONTRACTOR or any of their employees. The liability under this clause shall cover also inter-alia any damage to structures, whether immediately adjacent to the works or otherwise, any damage to roads, streets, footpaths, bridges as well as damage caused to the building and other structures and works forming the subject matter of this contract. The Contractor shall also be responsible for any damage caused to the buildings and other structures and works forming the subject matter of this contract due to rain, wind, frost or other inclemency of weather.
The Contractor shall indemnify and keep indemnified the SPM and hold him harmless in respect of all and any loss and expenses arising from any such injury or damage to persons or property as aforesaid and also against any claim made in respect of injury or damage, whether under any statute or otherwise and also in respect of any award or compensation or damage consequent upon such claims. The Contractor shall, at his own expense, effect and maintain till issue of the virtual completion certificate under this contract, with an insurance company approved by the SPM, an All Risks Policy for Insurance for the full amount of the contract including earth quake risk in the joint names of the SPM and the Contractor (the name of the former being placed first in the policy) against all risks as per the standard all risk policy for Contractor’s and deposit such policy or policies with SPM before commencing the works.

4.3.2 The Contractor shall reinstate all damage of every sort mentioned in this clause so as to do delivery of the whole of the works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to property or third parties.

4.3.3 The Contractor shall also indemnify and keep indemnified the SPM against all claims which may be made against the SPM by any person in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense, effect and maintain until the virtual completion of the contract, with an Insurance Company approved by the SPM a policy of Insurance in the joint names of the SPM and the Contractor (name of the former being placed first in the policy) against such risks and deposit such policy or policies before commencement of the works.

4.3.4 The minimum limit of the coverage under the policy shall be Rs.2 Lakhs per person for any one accident or occurrence and Rs.5 Lakhs in respect of damage to property for any one accident or occurrence. The Contractor shall also indemnify the SPM against all claims which may be made upon the SPM, whether under the Workmen’s Compensation Act or any other.

4.4 Statute in force, during the currency of this contract or at Common Law in respect of any employee of the Contractor and shall be at his own expense, effect and maintain until the Virtual Completion of the Contract with an Insurance Company approved by the SPM a policy of Insurance against such risks and deposit such policy or policies with the SPM from time to time during the currency of this contract.

4.4.1 In default of the Contractor insuring as provided above, the SPM may so insure and may deduct the premiums paid from any money due or which may become due to the Contractor.

4.4.2 The Contractor shall be responsible for any liability which may not be covered by the insurance policies referred to above and also for all other damages to any person, animal or defective carrying out of this contract, whatever, may be the reasons due to which the damage shall have been caused.

4.4.3 The Contractor shall also indemnify and keep indemnified the SPM against all and any costs, charges or expenses arising out of any claim or proceedings relating to the works and also in respect of any award of damage or compensation arising therefrom.

4.4.4 Without prejudice to the other rights of the SPM against Contractors in respect of such default, the SPM shall be entitled to deduct from any sums payable to the Contractor the amount of any damages, compensation costs, charges and other expenses paid by SPM and which are payable by the Contractor under this clause.
4.4.5 The Contractor shall upon settlement by the insurer of any claim made against the insurer pursuant to a policy taken under this clause, proceed with due diligence to rebuild or repair the works destroyed or damaged. In this event all the money received from the insurer in respect of such damage shall be paid to the Contractor and the Contractor shall not be entitled to any further payment in respect of the expenditure incurred for rebuilding or repairing of the materials or goods destroyed or damaged.

4.4.6 The Contractor, in case of re-building or reinstatement after damage shall be entitled to such extension of time for completion as SPM and/or DCPL may deem fit, but shall, however, not be entitled to reimbursement by SPM of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein.

5. INCIDENTAL SERVICES

5.1 Subject to the stipulation in the Technical Specification (Section - VII); the supplier shall be required to perform all of the following services.

   a) Providing required jigs and tools for assembly, start-up and maintenance of the goods.
   b) Supplying required number of operation & maintenance manual for the goods.
   c) Installation and commissioning of the goods.
   d) Training of SPM’s operators for operating and maintaining the goods.
   e) Providing after sales service during the tenure of the contract.
   f) Providing maintenance service after expiry of the warranty period of the goods if so incorporated in the contract.

6. WARRANTY

6.1 The supplier warrants that the goods supplied under the contract is new, unused and incorporate all recent improvements in design and materials unless prescribed otherwise by SPM in the contract. The supplier further warrants that the goods supplied under the contract shall have no defect arising from design, materials (except when the design adopted and / or the material used are as per SPM's specifications) or workmanship or from any act or omission of the supplier, that may develop under normal use of the supplied goods under the conditions prevailing in India.

6.2 This warranty shall remain valid for twelve months after the goods or any portion thereof as the case may be, have been delivered to the final destination and installed and commissioned at the final destination and accepted by SPM in terms of the contract or for eighteen months from the date of despatch from the supplier's premises whichever is later.

6.3 In case of any claim arising out of this warranty, SPM shall promptly notify the same in writing to the supplier.

6.4 Upon receipt of such notice, the supplier shall, with all reasonable speed and time, repair or replace the defective goods or parts thereof, free of cost, at the ultimate destination. The supplier shall take over the replaced parts/ goods after providing their replacements and no claim, whatsoever shall lie on SPM for such replaced parts/ goods thereafter.

6.5 In the event of any rectification of a defect or replacement of any defective goods during the warranty period, the warranty for the rectified/ replaced goods shall be extended to a further period of twelve months from the date such rectified / replaced goods starts functioning to the satisfaction of SPM.
6.6 If the supplier, having been notified, fails to rectify/replace the defect(s) within a reasonable period, SPM may proceed to take such remedial action(s) as deemed fit by SPM, at the risk and expense of the supplier and without prejudice to other contractual rights and remedies, which SPM may have against the supplier.

7. **TAXES AND DUTIES**

TDS or any other applicable taxes shall be deducted from the firm’s bill.

8. **TERMS AND MODE OF PAYMENT**

8.1 **TERMS OF PAYMENT**

a) 80% payment of the cost of goods as per Part –A of section-XI of this tender document shall be made on receipt and acceptance of goods by the SPM at destination and on production of all required documents by the supplier.

b) Balance payment of the cost of goods as per actual consumption, as indicated in part “A” of the price schedule, section XI of this tender document, shall be made on successful installation, commissioning and necessary clearance from statutory body if any and acceptance by the SPM. However actual consumption should not exceed 25% quantity, for each item.

c) Payment of the cost of erection and commissioning as per actual consumption, as indicated in part “B” of the price schedule, section XI of this tender document, shall be made on successful installation, commissioning and necessary clearance from statutory body if any and acceptance by the SPM. However actual consumption should not exceed 25% quantity, for each item.

8.2.1 **MODE OF PAYMENT**

Payment will be made through RTGS/NEFT; Firm should furnish all Bank detail including RTGS/NEFT code extra in their bill.

9. **SECURITY RULES**

9.1 The Contractor shall strictly abide by the security rules and regulations enforced by the SPM from time to time. The Contractor shall provide proper identity cards, badges etc., to his employees whenever directed by the DCPL/SPM.

9.2 The Contractor shall arrange for police verification certificates for all his employees/worker/supervisor and the contractor and submit it to CISF (SPM) before starting of the work to obtain the gate pass of the concerned person.

10. **COMPLIANCE WITH CONTRACT LABOUR ACT**

The contractor shall comply with all the provisions of the EPF rules, Workmen Compensation Act 1923, Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970 amended from time to time and rules framed there under. The provision of building and other Construction Worker’s Regulation of Employment & Condition of Service Act, 1996 amended from time to time and rules framed therein to be followed.
11. **REGISTRATION CERTIFICATE**

The contractor should be registered & established in the business of design, Engineering, Fabrication, Manufacture, testing, Supply, Erection and Commissioning of pipes/Pipe fittings/Valves System. Copy of the registration certificate / Incorporation to be furnished by the bidder.
## LIST OF REQUIREMENTS

<table>
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<tr>
<th>Schedule No.</th>
<th>Brief description of work and services (Related specifications etc. are in Section-VII)</th>
<th>Accounting unit</th>
<th>Quantity</th>
<th>Amount of Earnest Money</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Supply, transportation from stockyard, pre-assembly at site, consumable materials, complete erection, testing and successful commissioning of IBR Pipes and Pipe Fittings, Flanges, Valves, etc., including pipe supporting arrangements, as specified under Section – VII complete with all fittings</td>
<td>Refer Appendix-B of Section VII</td>
<td>Refer Appendix-B of Section VII</td>
<td>Rs.1,70,000/- (Rs. One Lakh Seventy thousand only)</td>
</tr>
</tbody>
</table>

**Required Completion Schedule** : Five (5) months from the date of issue of Notification of Award of contract or Purchase Order whichever is earlier. (including Supply, Erection & Commissioning)

**Required Terms of Delivery** : F.O.R SPM Hoshangabad (Duly Unloaded)

**Preferred Mode of Transportation** : Roadways

### 1. DETAIL SCOPE OF SUPPLY

The detail scope of supply of the Tenderer for this Tender shall include the following:

#### 1.1 SCOPE OF SUPPLY

The scope of supply of the Tenderer covered under this specification shall include the following:

1.1.1 All piping, valves, fittings, specialties, hangers and supports etc for steam services outside the battery limit of different package Vendors as per the details incorporated within following Appendices which form integral Part of this Specification :

- a) Appendix - A : Site and Mill Services Data
- b) Appendix - B : Schedule of Piping Materials.
- c) Appendix – C : Schedule of Valves
- d) Appendix - D : Mechanical Standards
- e) Appendix – G : Schedule of Work Item
1.1.2 All materials i.e. insulation, aluminium cladding, wires, plaster polythene sheets, insulation supports, etc. as specified herein to insulate the Piping/Fittings/Flanges/Valves, etc.

1.1.3 Insulation thickness shall be provided as per charts attached herein with.
   
   f) Appendix - E : Insulation Thickness Table
   
   g) Appendix – F : Insulation Schedule

1.2 **SCOPE OF SERVICES**

1.2.1 The successful Tenderer under this specification shall be responsible for the complete erection, supervision, testing, commissioning.

1.2.2 The Tenderer shall arrange for supply of all labour (supervisor, skilled, unskilled and administrative), transport vehicles, erection tools and tackles, radiography & stress relieving equipment as may be required for the efficient & timely execution of the contract. All consumable materials including welding electrode and gases, oils and greases, cleaning and anticorrosive fluids and all other necessary materials required during erection.

1.2.3 Opening of packing cases, inspection & checking of materials for their completeness and condition. No packing case shall however be opened except in presence of SPM/DCPL authorized representative.

1.2.4 Once the materials are inspected, the same shall be stored by the Contractor near the place of erection, as required or directed Purchaser’s representative, adequately protected from theft and deterioration or damage by rain, storm, dust water, tampering by casual visitors or workers. Any damage or loss through theft shall be to Contractor’s account free of cost.

1.2.5 SPM will make available the following items free of cost to the successful Tenderer: Power, Air & Water required for testing and commissioning. However, successful Tenderer shall send prior intimation to the SPM indicating the details of above utility requirement for testing and commissioning.

1.2.6 All required labour, tools, equipment and transportation thereof and to insulate piping, vessels and equipment as defined in insulation schedule.

1.2.7 To protect adjacent equipment, pavements and other properties from scrap insulation, dripped or sprayed paint, asphalt etc. and to clean up the area after completion of his work, removing all unused insulation material, scaffolding, etc. provided by him or supplied to him by the purchaser.

2. **SAFETY AND HEALTH INSTRUCTIONS**

During installation, the Contractor shall follow all the Safety Policy and Plant Safety rules of SPM and also the various provisions of M.P. Factories Rules, 1962 made under Factories Act, 1948. This instruction gives broad guidelines to be followed by the Contractor for ensuring safe working conditions in and around the site.
2.1 SAFETY ORGANISATION

Contractor at site shall organize a Safety Group headed by a Safety Officer who shall be responsible for providing, supervising and monitoring safe working conditions at all times for their workers. The Safety Officer shall be experienced in maintaining safe conditions for workers at site and shall be responsible for and shall have authority to enforce safe conditions for the workers.

Contractor shall have a declared Safety Policy and shall get the same approved by the SPM and/or DCPL. The approved Safety Policy shall be displayed prominently in the Contractor’s site office. Contractor shall take active interest and participate in the development and operation of safety programs at site. His responsibility does not cease with establishment of Safety Group and approval of its various activities. He shall demonstrate his involvement by regular participation in safety meetings, review of safety records and taking corrective action where required, introduction of safety promoting bulletins, posters, suggestions and awards and by setting example by strictly observing safety rules.

Contractor shall remove all waste material and debris from and around the work area and properly clean up the area at the end of each day before leaving the work site.

The Contractor shall take all necessary precautions not only for safe working of his own workmen but also deploy all precautions to ensure safety of structures, equipment and workmen of other agencies in and around his work site. The Contractor shall ensure that his workmen do not trespass into prohibited areas.

SPM and/or DCPL shall have the right to inspect at any time, all items of machinery or equipment brought to site by the Contractor, his agents or workmen and to prohibit the use on the site of any item, which in the opinion of the SPM and/or DCPL is or may be detrimental to the safety of the site. The exercise of such right or the omission to exercise it in any particular case shall not absolve the Contractor or his agents or workmen of their responsibility of adhering to the safe working practices.

Contractor shall execute the work in a manner causing the least possible interference with the business of the SPM and/or DCPL, or with the work of any other Contractor who may be engaged on the premises and shall at all times co-operate with the other Contractors working at site.

Contractor shall obtain work permit from the SPM and/or DCPL before starting any work at site. The work permits are issued to prevent the Contractor from working in un-authorized areas and shall be valid for specific area for a stipulated period.

The Contractor shall ensure at all times that his workers do not lie down or sleep under or around any machine, equipment, vessel, vehicle or structures in his work area.

2.2 RESPONSIBILITIES OF THE CONTRACTOR’S SAFETY OFFICER

He is responsible and accountable for:

a) Preventing injury to personnel, damage to plant and equipment and fires.
b) Instituting ways to improve existing work methods from safety point of view.
c) Legal and contractual requirements affecting safety, health, and welfare of his workmen
d) Provision and use of protective clothing and equipment and use of fire fighting equipment
e) Suitability of new and hired equipment from a safety viewpoint
f) Identifying potential hazards.
g) Changes in safety requirements and fire precautions
h) Carrying out site surveys to see that only safe work methods are in operation, health and safety requirements are being observed and welfare and first aid facilities are adequate and properly maintained.

i) Determining the cause of an accident or dangerous occurrence and recommend means of preventing recurrence.

j) Supervising the recording and analysis of information on injuries, damage and production loss. Assess accident trends and review overall safety performance.

k) Assisting with training of employees at all levels. Organizing periodic demonstration of practicing safe working conditions by experienced safety instructors.

l) Taking part in discussions on injury, damage and loss control.

m) Keeping up-to-date with recommended codes of practice and safety literature. Circulating information applicable to each level of employees.

n) Fostering within the company an understanding that injury prevention and damage control are an integral part of business and operational efficiency.

o) Attending job progress meetings where safety is an item on the agenda. Report on job safety performance.

The Safety Officer shall inspect and ensure the following:

a) All electrical equipments are securely earthed.

b) Standard access platforms and ladders are provided for inspection, operation and maintenance of equipment.

c) The equipment are periodically inspected for their condition, maintained properly and operated by trained personnel at design speeds and loads.

2.3 WORKING AT HEIGHTS

For carrying out work at heights exceeding 2 meters or near openings in floors and roofs etc. precautions as given in following para shall be taken.

Adequate safety precautions like use of safety belts, crawling-ladders, safety nets etc. shall be taken. The workers shall wear safety belts with hook properly fastened.

All workmen engaged on work at heights shall be experienced in such work.

Written permission of the SPM and/or DCPL shall be obtained before undertaking work on roofs. Wherever possible, steel staging or platform shall be erected.

Staging with toe guards shall be provided with simple safety rails or ropes at waist height throughout its length on all open sides.

Staging supports shall be All Purpose Scaffolding (APS) steel tubes scaffolding, safety secured and supported on firm level footings or slung from overhead beams. The supports shall be situated at maximum distance of 2.5 meters apart and the staging shall be secured to each support.

Wherever it is not possible to put up staging and/or use of safety belts, safety nets shall be slung beneath the place of work for safety.

When working over open process vessels or tanks, safety belts and safety nets shall always be used whether or not staging and scaffolding is provided.

Safe access to all points of works shall be provided in the form of suitable ladders and stairways etc. Area around the work place shall be barricaded suitably or fenced off to avoid injuries to personnel passing by. Suitable warning boards and signs shall be put up.

2.4 LIFTING GEAR

The Contractor shall submit a valid Test Certificate to the SPM and/or DCPL, from approved certifying authorities for all of his lifting gear and hoists, slings, chains, wire ropes, hooks, chain-pulley blocks, winches, hoists and cranes etc. before commencing work.

These certificates shall be available at site in the Contractor’s office for inspection as and when required.
2.5 PRESSURE AND LEAK TESTING
Pressure and leak testing of equipment shall be carried out hydraulically. However, in special cases where pneumatic testing is specified, written approval shall be obtained from the SPM and/or DCPL before starting work. Under no circumstance gases other than nitrogen, carbon dioxide, air or steam shall be used for testing.
In case nitrogen or carbon dioxide is used for testing, the equipment shall be adequately ventilated and gas tested to ensure oxygen content of 21% before permitting a worker to enter the equipment.

2.6 WORKS INSIDE AN EQUIPMENT OR DRAINAGE SYSTEM
All equipment and associated piping shall be isolated, completely drained, purged and well ventilated before entry of a worker. The atmosphere inside the vessel or equipment shall be tested to ensure absence of toxic and flammable gases.
Toxic and flammable liquids and gases in the equipment shall be safely disposed of as per the statutory requirements to the satisfaction of the SPM and/or DCPL.
Workers carrying out drainage, purging and testing operations shall wear gas masks and other protective gear appropriate to the material being handled.

While a worker has entered equipment or a drainage system, another worker shall be present outside at all times to assist the worker inside in the event of an emergency.

2.7 ELECTRICAL
Portable power tools rated for above 50 V supply and hand lamps rated for above 24 V supply shall not be used at site.

An armoured cable with a 3 pin Reyrolle type plug, properly earthed shall be provided between the Contractor’s DG set and step down transformer.

All power supply and distribution boards shall have canopy for protection and all the distribution boards shall be earthed securely.
All supply points shall have proper plug and socket.

The Contractor shall check tightness of connection of cable terminations and joints before starting the work.

2.8 WELDING
Only qualified welders shall be employed at the work site. The Contractor shall organise the qualifying test at site for his welders and the SPM and/or DCPL shall approve the welders. All welders shall have to undergo qualifying test and only on passing the test, they shall be allowed to work at site. The welders engaged for erection and commissioning work shall be IBR approved.
For all welding work at site, generator sets shall be used instead of AC transformer sets.
AC Transformer sets are banned for welding jobs inside vessels (both open and closed top type).
The Contractor shall get his welding sets certified by the SPM and/or DCPL before starting work.
These certificates shall have to be renewed every two months. A copy of the certificates shall be displayed on respective welding sets. Only cables in good condition and insulated holders shall be used. The length of supply cable to welding site shall not exceed 8 metres and the welding set body shall be properly earthed. A charged fire extinguisher of CO₂ type shall be carried with each welding set. The Contractor shall keep Halon or equivalent type fire extinguishers near hot jobs like cutting oil lines. The welder shall not use a building structure, pipeline or railway track etc. as a return path of the current. Adequately rated circuit breaker shall be provided in the power circuit for human protection on all power supply points.
2.9 **HOT WORK**

Before starting any hot work like gas cutting, welding and grinding etc., the Contractor shall obtain hot work permit from the SPM and/or DCPL. The permit shall be renewed on day-to-day basis.

The Contractor shall ensure purging of piping and equipment to make it totally safe before carrying out any hot work.

Smoking is strictly prohibited in work areas inside the SPM premises.

No combustible material shall be stored on or near any source of heat like hot pipes, welding or gas. Before leaving the place of work or the Contractor’s sheds, the Contractor’s workmen shall ensure that no material or item that could start a fire is left at site. Special attention shall be paid to collection and disposal of oil soaked cotton waste or rags. On no account are these to be dropped into corners, pushed below equipment or left hanging on pipes.

Gas cylinders shall be used in a safe manner. These shall not be dropped from heights or dragged on the floor. Trolley with rubber rimmed wheels shall be used for transporting gas cylinders within the site. Acetylene cylinders shall be kept in upright position. Oxygen cylinders shall not be kept near inflammable materials like oil etc.

Tarpaulins shall not be used in the vicinity of welding and gas cutting jobs.

The Contractor’s supervisor of the rank of a foreman or equivalent shall examine the arrangements made for hot work before commencement of work and shall satisfy him that all reasonable safety precautions have been taken.

The Contractor shall return the hot work permit after completion of welding work.

2.10 **PERSONAL PROTECTIVE EQUIPMENT**

Workmen at site shall wear protective clothing, head, leg and eye protection safety equipment at all times as per the job requirements. These are to be supplied and provided by the Contractor. Adequate number of IS approved safety helmets shall be available at site.

Welders shall wear good quality insulated welding gloves, goggles, face shield, shoes and overalls while at work.

2.11 **ACCIDENTS**

In case of injury or serious illness of a worker, the DCPL/SPM shall be notified immediately. All accidents shall be recorded by filling in the ‘Accident Report’ form, which shall be kept in easy accessible location in the site office of the Contractor. Any ‘Near Miss’ incident shall also be reported by the Contractor and recorded.

2.12 **INSURANCE**

All the Contractor’s workmen shall be covered under the Employees State Insurance Scheme, Medi Claim Policy or any other scheme which may be specified by the Statutory Authorities from time to time.

2.13 **REVIEW MEETING**

The SPM and/or DCPL shall conduct fortnightly Safety Review Meeting to review the safety conditions practised at work areas by the Contractor.

2.14 **WORK AFTER NORMAL WORKING HOURS**

Extra care shall be taken for jobs to be carried out after normal working hours with due revalidated work permit and supervised by the Contractor’s site in-charge. The site-in-charge shall make available his residential address and telephone number to the SPM and/or DCPL so that he can be contacted in case of an emergency.

Proper lighting shall be ensured at the workplace for any work carried out after the normal working hours.
2.15 **CONVEYANCE FOR EMERGENCY**

The Contractor shall ensure that conveyance and person with driving license is available at site at all times of work execution so that in case of an accident, the victim can be rushed to nearest medical centre.

2.16 **SAFETY PRACTICES**

Avoid working under un-insulated live conductors or working on freshly painted steel, which is still wet.
Stairs and railing shall be in place as long as necessary. Ladders shall be periodically checked for any defects. Ladders shall be securely fastened to prevent movement while in use.
The Contractor shall advise his workmen to take the following precautions while using ladders:

a) While ascending or descending, face the ladder. Use both hands for holding.
b) Do not climb higher than the third rung from top on straight or extension-ladders and second rung from top on set ladders.
c) Step-ladders shall be fully open before use.
d) Sliding down a ladder shall be prohibited.
e) Make shift ladders such as clear fastened across a single rail and short ladders spliced together shall never be used.
f) Ladders shall be kept free from dirt and grease.
g) Defective ladders shall be removed from use.
h) Ladders shall not be left un-attended unless these are securely anchored at top and bottom.
i) While using ladders, shoes shall not be greasy, muddy or otherwise slippery.
j) Ladder shall not be used during severe windy conditions.

Lumber shall be piled out of the work area. Nails shall be removed or bent while handling lumber to avoid injury to workmen.
While tearing down plaster or brickwork, dust shall be controlled with water.
Walls shall not be subjected to lateral pressure or impact from materials stored or falling materials. The safety valves for boilers shall be set by trained personnel and shall be sealed or padlocked at safe working pressure. Only authorized person shall change the setting of safety valves. The safety valve relieving pressures shall be checked as recommended by the manufacturer and applicable codes.
Blow down valves shall be operated strictly as per instructions. If blow cock is not marked with an arrow to show open and close position, the same shall be marked at site.
Safety slogans and safety instructions shall be prominently displayed in English, Hindi and local language at strategic locations.

2.17 **EMERGENCY PROCEDURES**

The Contractor shall familiarize himself with the emergency procedures, which apply to plants and areas in which his men are working.
First Aid Box shall be kept in the Contractor’s site office. The Contractor’s site-in-charge and his key supervisors shall be trained in administering first aid, preliminary treatment for electrical shocks, fall from height and burns etc.
When an emergency condition exists or on hearing the ‘Stop Work Alarm’ every supervisor shall ensure:

a) All work is stopped at once.
b) All equipment is shutdown.
c) All men are evacuated to a pre-determined assembly point.
d) A roll call is taken and every man is accounted for.
e) No one shall be permitted to return to work until notification has been received from a responsible authorised agency that it is safe to do so.
2.18 RESPONSIBILITY OF THE CONTRACTOR’S SITE IN CHARGE

His primary responsibility is safety of personnel and equipment. He shall:
Understand the company’s policy on maintaining safe working environment and appreciate
the responsibility allocated to each grade of supervision.
Know the safety requirements and relevant Government Regulations, and ensure
their implementation.
Ensure that sound, safe working methods and reasonable welfare facilities are provided for
workers. Determine at the planning stage the following:

2.18.1 The most appropriate order and method of working
2.18.2 Allocation of responsibilities to supervisors
2.18.3 Storage areas and access etc.
2.18.4 Hazards which may arise from overhead or underground services
2.18.5 Facilities for welfare, first aid and sanitation
2.18.6 Work permits procedures and requirements
2.18.7 Basic fire precautions
2.18.8 Provide written instructions to establish work methods, to explain the sequence of
operations, to outline potential hazards at each stage and to indicate precautions to be adopted.

2.19 TIME SCHEDULE

2.19.1 The work shall be executed strictly as per the time schedule given in this Bid Document.

2.19.2 The Bidder shall furnish a proposed time schedule by CPM/bar-chart along with his
quotation. The time schedule should indicate the details considering the date of issue of Letter
of Intent as the zero date and should show completion of various activities there from.

2.19.3 The time schedule shall clearly include all important events regarding engineering,
procurement, construction, testing and handing over for each area, commensurate with the
overall time schedule.

2.19.4 The time schedule shall form a part of the Contract Document.

2.19.5 BI-WEEKLY Progress reporting shall be done by the Contractor for engineering,
procurement and construction activities on mutually agreed formats. Reports on such
formats will be sent regularly in soft copies with six (6) copies of print as per frequency /
periodicity agreed upon from time to time.
# TECHNICAL SPECIFICATIONS

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APPENDIX A  SITE & MILL SERVICES DATA 
APPENDIX B  SCHEDULE OF PIPING MATERIALS 
APPENDIX C  SCHEDULE OF VALVES 
APPENDIX D  MECHANICAL STANDARDS 
APPENDIX E  INSULATION THICKNESS TABLE 
APPENDIX F  INSULATION SCHEDULE 
APPENDIX G  SCHEDULE OF WORK ITEMS 
ANNEXURES I THRU’ III  PROPOSAL SHEET
1.00.00 **INTENT OF SPECIFICATION**

This specification is intended to cover manufacture, testing and inspection at manufacturer's works, packing, forwarding and delivery to mill site, unloading and storing, transportation, pre-assembly at site, consumable materials, complete erection, testing and commissioning of IBR Pipes and Pipe Fittings, Flanges, Valves, etc., including special materials and pipe supporting arrangements required for installation of new Paper Machine.

2.00.00 **SCOPE OF WORK OF THE TENDERER**

The scope of work of the Tenderer for this tender shall be as per List of Requirement under Section VI of this tender document on Turn key basis.

2.01.00 Items of Work:

The successful Tenderer under this specification shall be responsible for the following items of work.

2.01.01 Erection of pipe lines including installation of tees, bends, reducers, all pipe fittings, on line instruments, instrument adaptors, orifice plates complete with nipple & first isolation valve, screwed/socket welded valves of 50 mm NB & below, tapping, cutting and edge preparation wherever required, connection with equipment, installation of on line unions.

Following shall be considered as separate “Work Items”:

a) Installation of Valves 65 mm. NB & above : Sec Clause No. 2.01.02

b) Flanged joints : Sec Clause No. 2.01.03

c) Branching - branch sizes 65 NB & above (Branching for size 50 mm. NB & below) shall not be considered as a separate work item) : Sec Clause No. 2.01.04

d) ‘5D’ pipes bends for small bore pipes (50 mm NB & below) : Sec Clause No. 2.01.05

e) Fabrication of supports & brackets : Sec Clause No. 2.01.06

Following shall not be considered as separate “Work Items”:

a) Butt welded joints

b) Screwed joints (Complete with teflon sealing tapes to be supplied by the erector).
c) Mandatory non-destructive tests required by the applicable Installation Codes and removal of all temporary piping & appurtenances like pumps, tanks, hoses etc.

d) Fixing of supports.

e) Setting & final adjustment of spring hangers- variable & constant type. Spring boxes shall be supplied by the Bidder.

f) Supply & installation and subsequent dismantling of temporary supports required during testing/commissioning

g) Fit up of on line hoses

h) Installation of Orifice flanges.

i) Any other item not specifically called out as “Separate work item”.

2.01.02 Installation of Valves :
(Wafer type, Flanged, S.W. end. Flanged joints for flanged and valves shall be considered as a separate work item. Installation of floor stands & chair wheel operators shall not be considered as a separate work item.

<table>
<thead>
<tr>
<th>2.01.03</th>
<th>Installation of Flanged joints including supply of bolts, nuts &amp; gaskets.</th>
<th>For technical particulars refer to clause no. 4.02.02</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For Schedule of quantities refer to Appendix-B</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.01.04</th>
<th>Branching (for branch sizes 65 mm NB &amp; above) including cutting of hole on run pipe, edge preparation, welding &amp; mandatory testing required by applicable codes.</th>
<th>For technical particulars refer to clause no. 4.02.03</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For Schedule of quantities refer to Appendix-B</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2.01.05</th>
<th>Fabrication of ‘5D’ pipe bends for small bore pipes (50 mm NB &amp; below)</th>
<th>For technical particulars refer to clause no. 4.02.04</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For Schedule of quantities refer to Appendix-B</td>
<td></td>
</tr>
</tbody>
</table>
Fabrication and installation of Local Access platforms including fixation of support legs on paved/graded/concrete surfaces. All materials shall be supplied by the successful Tenderer.

Fabrication of one/two/three/four cut mitred elbows - ‘V’ pieces & crosses.

Contractor may have to carry out small volume of miscellaneous work such as:

a) Concreting, Brickwork, Plastering & net cement finish if required by SPM/DCPL (All materials by contractor)

b) Fabrication & fixing of pipe support inserts if required by Purchaser (contingency). All materials shall be supplied by the successful Tenderer.

c) Fixing of C.S. flanged nozzles on carbon steel tanks (non-pressure) if required by Purchaser (contingency). All materials shall be supplied by the successful Tenderer.

Cleaning/flushing/oiling/steam-blowing/pickling/passivating of pipe lines as may be required for commissioning of lines. Cleaning/flushing/oiling fluids shall be arranged by the contractor except water/steam which may be arranged by the Purchaser. All temporary piping required for cleaning/flushing/oiling/steam-blowing shall be arranged by the Contractor. Removal of temporary piping is also within Contractor’s scope of work.
2.02 Coverage in Respect of Broad Types/Categories and Size Ranges of IBR Pipes and/or IBR Pipe fittings and/or Flanges

Following are the broad types/categories and size ranges of above item covered by this specification.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Item</th>
<th>Type/Category</th>
<th>Size Range, mm NB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Black carbon Steel (C.S. ) Pipes</td>
<td></td>
<td>250 NB &amp; below</td>
</tr>
<tr>
<td>2.</td>
<td>30° /45° /60° /90° C.S. Elbows</td>
<td>Forged/Fabricated</td>
<td>250 NB &amp; Below</td>
</tr>
<tr>
<td></td>
<td></td>
<td>i) Forged</td>
<td>65 NB–250 NB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii) Mitered/ Elbows</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>C.S. Concentric &amp; Eccentric Reducers</td>
<td>Forged/Fabricated</td>
<td>250 NB &amp; below</td>
</tr>
<tr>
<td>4.</td>
<td>C.S. Equal Tee</td>
<td>Socketweld Type</td>
<td>50 NB &amp; below</td>
</tr>
<tr>
<td>5.</td>
<td>C.S. Equal Tee</td>
<td>Butt Welded type</td>
<td>65 NB &amp; above</td>
</tr>
<tr>
<td>6.</td>
<td>C.S. Couplets</td>
<td>Socketweld Type</td>
<td>50 NB &amp; below</td>
</tr>
<tr>
<td>7.</td>
<td>C.S. Couplets</td>
<td>Butt Welded Type</td>
<td>65 NB &amp; above</td>
</tr>
<tr>
<td>8.</td>
<td>C.S. Threaded Couplets</td>
<td>Butt Welded Type</td>
<td>50 NB &amp; below</td>
</tr>
<tr>
<td>9.</td>
<td>Cap</td>
<td></td>
<td>100 NB</td>
</tr>
<tr>
<td>10.</td>
<td>Hexagonal headed Plug</td>
<td></td>
<td>50 NB &amp; below</td>
</tr>
<tr>
<td>11.</td>
<td>C.S. Flange</td>
<td>Forged</td>
<td>150 NB &amp; below</td>
</tr>
<tr>
<td>12.</td>
<td>Gate Valve</td>
<td></td>
<td>150 NB &amp; below</td>
</tr>
<tr>
<td>13.</td>
<td>Steam Traps with in-built valves &amp; strainer</td>
<td></td>
<td>15 NB</td>
</tr>
</tbody>
</table>

The Schedule of quantities of various items, as mentioned above have been furnished in Appendix-B.
3.00.00 **SPECIAL CONDITION FOR SUBMISSION OF OFFER**

For supply of any item, the same will be completely and uniquely defined by a three part designation system comprising its Name, Specification Code No. and Size. For example: 'Pipe', 'Spec. code No. 28' and '150 NB' specified a unique item (i.e. pipe) and the same item cannot be specified/ described by any other designation.

4.00.00 **TECHNICAL REQUIREMENT**

4.01.00 **FOR SUPPLY**

4.01.01 Technical Specification
Items covered by this Specification shall be manufactured, inspected, tested, marked and packed as per the technical specifications furnished in enclosed Appendix-D

4.01.02 Schedule of Quantities
The schedule of quantities of various items as covered under the scope of this Specification have been given in enclosed Appendix-B.

4.02.00 **FOR SERVICES**

4.02.01 Erection of Pipe Lines:
For technical requirements refer to Mechanical standard A4.034.225.3
“Fabrication & Installation of carbon Steel, Alloy Steel & Stainless Steel Piping Systems. - General Requirements.”
Other miscellaneous requirements are listed below.
(a) Instrument adaptors/nipples/first isolation valves/orifice plates shall be installed as per 'Instrumentation Standards' -

4.02.02 Installation of Flanged Joints:
For technical requirements refer to Mechanical Standard No. A4 034.227.3

4.02.03 Branching:

Branching requirements are specified in the “Piping Material Specification” for the project.
Branching (Stub-in) shall be designed according to the applicable” installation code (e.g. ANSI B31.1, IBR ETC.) defined in the “Project Piping Installation specification - Service index.”
Branches (Stub-in) shall be reinforced wherever indicated on the drawing.
Reinforcement pads shall be cut from the line pipe
Reinforcement details shall be as per applicable installation code.
Contractor shall submit details of branch welding & reinforcement pad for approval.
Such details shall show applicable Material Specification Code no./s, size, ranges of run pipe & branch pipe, thickness range of run pipe & branch pipe, and in case of services under IBR, design parameters (i.e. Design Pressure & Temperature).
4.02.04 Fabrication of 5D Pipe Bends:

Forming of the straight pipe shall be done by either hot or cold bending using formed dies or shoes which fit the desired contour of the pipe. Unless stated otherwise in the “Pipe Specification Sheets/Data” and drawings, bends made from straight pipe shall be made to a radius of 5 times the nominal pipe diameter. For hot bending, the temperature shall be carefully controlled to avoid burning and excessive scaling. It is recommended that pipes 40 mm and larger be packed with dry, free running, sulphur free silica sand or equivalent before hot bending. After bending, the sand shall be completely removed. The bores of all pipes that have been hot bent, formed or forged shall be descaled by pickling, blasing or mechanical means. Cold bending will be done using formed dies, and with internal mandrel (where practical), to prevent flattening. ‘Compression’ bending shall be used for thick wall pipes and for large radius bends. ‘Draw’ bending shall be used for thin wall pipes and for small radius bends. The use of any filler material during bending is not permitted. Regarding requirement which have not been covered here, PFI–ES–24 (Pipe fabrication institute – U.S.A.) may be referred to.

4.02.05 Fabrication of Supports & Brackets

Pipe shall be supported as shown in drawings. In general, supports have been shown only for pipe sizes 50 mm and above. Pipes with sizes below 50 mm NB shall be field supported by the piping Contractor as directed by the DCPL/SPM. All materials including the protection saddles shall be supplied by the successful Bidder. Protection saddles wherever required can be cut from the pipe. Fabrication of supports shall conform to the requirements of Mechanical Standard Dwg. No. A4. 034.210.1 “Pipe Support – Notes”. Support details shall in general conform to the “Support Standard” to be issued to the successful tenderer. This, however, shall not prevent the Purchaser from using other support types if found necessary.

4.02.06 Cutting & Refixing of Masonry & Louvre

The work shall be done as directed by the ‘DCPL /SPM’.

4.02.07 Fabrication & Supply of Local Access Platforms

The platforms shall be of structural steel (IS:2026) comprising M.S. Chequered Plates supported on light angle or channel sections to be suitably designed by the Contractor. The live load on the platforms may be considered as 500 kg/m² uniformly distributed throughout the platform surface. Suitable bracing arrangement of the supporting sections, if required, shall be provided by the Vendor. All fabrication pertaining to these platform shall be of welded construction and shall conform to IS:800. Suitable pipe handrail & ladders shall be provided wherever necessary. M.S. Chequered Plates, structural supporting members and Handrail Pipes shall be supplied by the successful Bidder. Two coats of Red Oxide Zinc Chorme Primer (IS:2074) shall be provided for all such platform structures before & after erection.
4.02.08 **Miscellaneous Works**

a) Brickwork, plastering neat cement finish shall be carried out as per Mechanical standard A4.034.225.4 - Appendix - D.
b) Support inserts shall be fabricated and installed as directed by DCPL/SPM.
c) C.S. nozzles shall be fixed on non-pressure C.S. tanks as directed by Purchaser. This shall include cutting of holes on the tank wall.

4.02.09 **Cleaning/Flushing etc.**

Cleaning/flushing/Oiling/steam blowing/pickling, passivating schemes & schedules shall be furnished by the Contractor during execution stage.

4.02.10 **Painting for above ground Steel Pipes**

All above ground Carbon Steel pipes shall be provided with painting as per the following procedures:

1. Exterior surface of CS pipes shall be provided with 2 coats of red oxide primer @ 2.0 Mil per DFT followed by 2 final coats of zinc chromate finish paints @ 1.0 Mil per DFT

   Insulated pipes will not have any finish paints.

2. Stainless Steel pipes shall have three(3) 40mm width colour bands at regular intervals.

4.03.00 **TECHNICAL REQUIREMENT FOR INSULATION WORK**

**A. GENERAL INFORMATION**

4.03.01 Hydrostatic tests of piping to be insulated shall be completed before insulation is applied. All supports and hangers shall be in position and correctly adjusted. Protrusions through insulations which themselves do not require insulation, such as pipe clamps, supports of small piping, instrument take-offs etc., shall be covered to the same thickness as the adjacent insulation and except at hanger rods.

4.03.02 Surfaces to be insulated shall be cleaned of all dirt, oil, loose scale etc. All insulation shall be supplied at ambient temperature and both the metal surface and insulation material shall be dry prior to application of insulation.

4.03.03 Except otherwise indicated in the Project drawings, a minimum of 25 mm clearance shall be maintained between the outside surface of insulation and other adjacent equipment or structural members.

4.03.04 Expansion joints shall be provided as required as per B.S. Code CP 3005 and shall be filled with loose insulation material.

4.03.05 Insulation shall be provided for all piping containing fluids or vapours for which it is necessary to (a) conserve heat (b) maintain process temperature (c) provided personnel protection.
4.03.06 Unless otherwise indicated equipments and piping having surface temperature above 60°C and not requiring insulation for conservation or other process requirements shall be insulated for personnel protection, up to a height of 2500 mm from finished grade or operating platform level and adjacent to and within 600 mm of a walkway, platform or ladder.

4.03.07 Steam traps and piping shall be insulated.

4.03.08 Name plates and data plates shall not be insulated. Insulation around markings or nameplates shall be sealed to be weather-proof.

4.03.09 Drain and vent lines in insulated lines downstream of a first block valve shall not be insulated.

4.03.10 Manholes and hand holes shall not be insulated. Flanges and flanged valves on lines operating below 200°C with the exception of steam lines shall not be insulated. Insulation of pipe shall terminate at such distance from a flanged joint as will allow withdrawal of bolts without disturbing insulation.

4.03.11 Inspection plug shall be provided on pipes to assess corrosion.

**B. INSULATION SUPPORTS**

4.03.12 Insulation supports for pipes shall be generally as per Mechanical Standard Dwg. No. A-001-013 and the relevant dwg. For insulation application as attached herewith.

4.03.13 Suitable supports in form of rings, lugs, or pins shall be used to supports insulation on pipes. Insulation of vertical piping shall be supported by support rings.

4.03.14 Support rings shall be not less than 3 mm thick. However, the insulation contractor shall provide the supports wherever any additional support is required.

4.03.15 Except otherwise noted in the attached drawings, spacing of studs, clips of pins used to support insulation shall be approximately 600 mm centres for Blanket insulation and one per block for block insulation. Split pins, if used, shall be spread, bent over and embedded into the insulation.
C. HOT INSULATION

Insulation application procedure shall be as described herein under.

4.03.16 Application on Piping:

1) Mechanical Standard Dwg. No. A-001-003, shall generally be followed for application of Insulation on piping.

2) Jaketing shall be applied with longitudinal and circumferential laps of 50 mm secured by G.I. Bands spaced 300 mm centres or by self-tapping screws at 150 mm centres. Longitudinal laps on horizontal pipes shall be arranged 30° below the horizontal centre-line to shed water.

3) If insulation thickness exceeds 75 mm, the insulation shall be applied multiple layers. The multiple layers shall be so applied that the butt joints of one layer do not coincide with those of the other layer. At the joint of each layer of insulation, loose insulating material shall be packed firmly.

4.03.17 Application on Flanges & Valves:

Removable covers shall be provided over all flanges and valves, wherever they are required to be insulated. The insulation shall be performed as per the details furnished in Mechanical Standard Dwg. No. A-001-004.

D. MATERIAL

4.03.18 Insulating material shall be mineral wool having density – 120 kg/m³ (in mattress form).

4.03.19 Weather-proofing jacket shall be of Aluminium sheet, jacket thickness for pipes and vessels shall be as follows:

For pipes having dia. over

- insulation less than 350 mm - 24 Gauge (0.56 mm)
- more than 350 mm over insulation - 22 Gauge (0.71 mm)

4.03.20 Wire netting shall be type H2 galvanized per any International Standard and sewing wire shall be of GI per any International Standard.

4.03.21 Self tapping cadmium plated screws shall be used.

4.03.22 Flats/ stays of MS to be used wherever required.
4.03.23 Metallic joints shall be sealed by sealing materials to protect insulation from outside moisture.

4.03.24 **INSPECTION AND TESTING**

All tests on insulation for establishing properties as required by relevant BS Codes shall be carried out and test certificates shall be furnished to SPM/DCPL for approval.

4.03.25 **SCHEDULE OF QUANTITY**

The schedule as furnished herewith is to assess the job quantum only. This is subject to changes as design progresses. Actual work shall be performed based on the necessary final drawings indicating the insulation requirement of the systems. These drawings shall be furnished to the successful Bidder after finalisation of order.

5.00.00 **SPECIAL CONDITIONS FOR RATES OF CERTAIN ITEMS (SUPPLY)**

5.01.00 **Reducers and Reducing Tees**

5.01.01 Sizes on above items are indicated in enclosed Appendix-B as per following procedure:

<table>
<thead>
<tr>
<th>Item</th>
<th>Size Indicated in Appendix-B</th>
<th>Size Indicated in Appendix-B</th>
<th>Reference Document Enclosed for Sizes under Col. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reducers, of all concerned types</td>
<td>Large End</td>
<td>Small End</td>
<td>DCL Mechanical Std. No. A4.034.206.04 Furnished in Appendix-D enclosed</td>
</tr>
</tbody>
</table>

5.01.02 The Tenderer shall quote for the above items which shall be exclusively based on the sizes indicated under Col.2 against above paragraph. For example, the prices of Reducers of a particular Specification and of Sizes, say, 200 mm NB x 150 mm NB, 200 mm NB x 100 mm NB and 200 mm NB x 125 mm NB shall be same. Identical logic shall apply in case of Reducing Tees also.

5.01.03 For Concentric and Eccentric Reducers shall be same for a particular size and Specification.

5.02.00 30°/45°/60° Elbows

Cost of Elbows of a particular Specification and size shall be same irrespective of above included angles. Consequently a total quantity for above included angles is indicated in Appendix-B against a particular Specification Code No. and Size.

6.00.00 CERTIFICATION OF CIB (IBR)

6.01.00 For Supply
Wherever indicated for any item in any enclosed document certificate from above authority of State of manufacture shall be furnished in prescribed Form (IIIA/IIIC) before dispatch of the concerned item. It shall be the total responsibility of the Vendor to get above certificates from the Concerned CIB.

6.02.00 For Erection Services
Wherever the requirement of Certification as per Indian Boiler Regulation (IBR) for erection work of any material is indicated the same shall be furnished in Form- IIIA / IIIC (as applicable for IBR).

6.02.01 In case the available CIB certificates for steam pipes are from outside of Madhya Pradesh, the final certification has to be obtained by the successful tenderer from CIB of Madhya Pradesh prior to erection.

7.00.00 CONDITIONS OF SUPPLY

7.01.00 Marking

7.01.01 In addition to the marking particulars required by the applicable standards (ASTM/IS) all items shall bear the corresponding "Specification Code Nos." used in this Specification. Method of marking shall be as specified in applicable ASTM/IS.

7.01.02 Wherever items are not as per any ASTM/IS Specification the same shall be marked with the particulars and methods specified in relevant ASTM/IS specification for similar items. However, in this case also, the same items shall be marked with the applicable "Specification Code Nos."
7.02.00 **Surface Protection**
Surface of all black carbon steel items shall be protected against atmospheric corrosion by the application of a coat of Oil/Lacquer/Varnish.

7.03.00 **Packing**

7.03.01 All straight pipes shall be packed as per the relevant ASTM/IS standards. For pipes not specified as per any ASTM/IS standard or where packaging specifications are not available the same shall be packed as per specifications of applicable ASTM standard.

7.03.02 All Pipe Fittings shall be properly and securely packed in wooden crates prior to delivery. All such crates shall be legibly marked with the following information.

a) Name of the Purchaser (“Security Paper Mill”)
b) Address of destination as advised in Purchase Order.
c) Purchase Order No. and Date.
d) Name of the Project as advised in the Purchase Order.
e) Names of Pipe/Fittings packed and
f) Specification Code Nos. of pipe Fittings.

8.00.00 **DRAWINGS & DOCUMENTS THAT SHALL BE FURNISHED TO THE SUCCESSFUL TENDERER**

In addition to the various standards and documents referred to above only the following drawings & documents shall be furnished to the Contractor.

A. **Drawings & Documents.**
   1. Flow Diagrams.
   2. Orthographic Drawings (Plans & Sections) showing fully dimensioned layout for lines of sizes 50mm NB size shall have to be field routed & field supported.
   3. IBR approved drawings for lines within the purview of IBR.

B. **Standards**
   1. Instrumentation Standards
   2. Mechanical Standards (called out on the piping drawings).

C. **Schedules**
   1. Schedule of Special Materials
   2. Spring Hanger Schedule
   3. Flushing/Cleaning/blowing/pickling/passivating schedule.
   4. Schedule of local access platforms (Piping & valves)

D. **Others**
   Any other document as may be decided by the Purchaser from time to time.
A. **PHYSICAL & CLIMATOLOGICAL DATA**

1. **Location**
   - Nearest Airport : Raja Bhoj Airport, Bhopal
   - Nearest Railhead : Hoshangabad
   - Nearest Sea Port : Mumbai

2. **Altitude** : 302 Meters above MSL

3. **Ambient Air Temp.**
   - Maximum : 46.3° C
   - Minimum : 3.3° C
   - Average : 32.8° C

4. **Mean Dry Bulb Temp.** : 30.9° C

5. **Mean Wet Bulb Temp.** : 21.2° C

6. **Relative Humidity**
   - Maximum : 91%
   - Minimum : 19%

7. **Rainfall**
   - Annual average : 1225.9 mm
   - Annual Maximum : 2045.7 mm

8. **Wind Velocity**
   - Mean : 0.8 m./sec
   - Maximum : 2.1 m/sec

9. **Earthquake zone** : Seismic Zone III
SITE AND MILL SERVICES DATA (CONT’D.)

B. UTILITY SERVICES DATA

1. Mill water pressure at ground floor : 3.0 bar a
2. Mill air pressure : 6.0 bar a
3. Inst. Air pressure : 6.0 bar a
   - Medium Pressure - 2 : 8.5 bar g, 181°C
   - Medium Pressure - 3 : 5.5 bar g, 162°C
   - Low Pressure - 1 : 3.5 bar g, 148°C
   - Low Pressure - 2 : 1.5 bar g, 130°C
5. Power Supply

   • Primary Distribution Voltage : 33 kV ±5%, 50 Hz ±3%, 3 Phase, 3 Wire, Fault level : 31.5 KA for 3 sec, Earthed through NGR
   • Secondary Distribution Voltage : 11 kV ±5%, 50 Hz ±3%, 3 Phase, 3 Wire, Fault Level: 40 KA for 1sec, Earthed thru NGR
   • 415 V ±10%, 50 Hz ±3%, 3 Phase, 4 Wire, Effectively (Solidly) Earthed, Fault level: 50 KA for 1 sec
## SCHEDULE OF PIPING MATERIALS

<table>
<thead>
<tr>
<th>SPECIFICATION CODE NO.</th>
<th>ITEM</th>
<th>DETAILED SPECIFICATION</th>
<th>SIZE (mm NB)</th>
<th>QUANTITY (METERS/NO)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>150</td>
<td>540</td>
<td></td>
</tr>
<tr>
<td></td>
<td>90° ELBOW</td>
<td></td>
<td>20</td>
<td>70</td>
<td></td>
</tr>
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<td>150</td>
<td>50</td>
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<td>20</td>
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<td></td>
<td>CON. RED.</td>
<td></td>
<td>100</td>
<td>20</td>
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</tr>
<tr>
<td></td>
<td>COUPLING CAP</td>
<td></td>
<td>20X15</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOCKET WELD COUPLLET</td>
<td></td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>THREADED COUPLLET</td>
<td></td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HEXAGONAL HEADED PLUG</td>
<td></td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STEAM TRAPS WITH IN-BUILT STRAINER &amp; VALVE</td>
<td></td>
<td>15</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**SECURITY PAPER MILL**

HOSHANGABAD, INDIA

NEW PM#5 AND UPGRADE PROJECT

REVISION

APP’D

SCHEDULE OF PIPING MATERIALS

DEVELOPMENT CONSULTANTS PRIVATE LIMITED

CONSULTING ENGINEERS
## SCHEDULE OF VALVES

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Spec. Code &amp; Type</th>
<th>Description</th>
<th>Valve Size, mm NB</th>
<th>No’s required (Quantities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gate Valve (GW4035W1) (FOR STEAM TRAP)</td>
<td>Wedge Gate, Socket Weld End, Body rating &amp; End Connection as per ANSI CLASS # 800 M.O.C. for Body- Carbon Steel, Other internals- Stellited Design Pressure &amp; Temperature- 20 kg/cm² (g) &amp; 195°C.</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>2.</td>
<td>Gate Valve (HD1-2800/2801) (150GB4030W1) (FOR STEAM LINE)</td>
<td>Wedge Gate, Flanged End, Body rating &amp; End Connection as per ANSI CLASS # 300 M.O.C. for Body- Carbon Steel, Other internals- SS 13% Gr. Design Pressure &amp; Temperature- 20 kg/cm² (g) &amp; 195°C.</td>
<td>150</td>
<td>2</td>
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</tbody>
</table>

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**SECURITY PAPER MILL**

HOSHANGABAD, INDIA

NEW PM#5 AND UPGRADE PROJECT

DEVELOPMENT CONSULTANTS PRIVATE LIMITED

CONSULTING ENGINEERS
## MECHANICAL STANDARDS INDEX

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>DWG. NO.</th>
<th>DESCRIPTION</th>
<th>SHEET NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>A4.034.227.1</td>
<td>Flange Specification Code Numbering System</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>3.</td>
<td>A4.034.227.2</td>
<td>-DO-</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>4.</td>
<td>A4.034.227.3</td>
<td>Installation of Flange Joints</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>5.</td>
<td>A4.034.227.A.1 thru’2</td>
<td>Flange Spec.-Carbon Steel Plate Type Slip on/Plate type Lap Joint Backing/Blind Flange to Class 150</td>
<td>2 Sheets</td>
</tr>
<tr>
<td>6.</td>
<td>A4.034.227.B.1</td>
<td>-DO-</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>7.</td>
<td>A4.034.227.C.1</td>
<td>Flange Spec.-Carbon Steel Slip on/Welding Neck/ Blind Flange</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>10.</td>
<td>A4.034.228.1</td>
<td>Gasket Specification No. – G1</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>11.</td>
<td>A4.034.228.2</td>
<td>Gasket Specification No. – G2</td>
<td>1 Sheet</td>
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<tr>
<td>12.</td>
<td>A4.034.228.12</td>
<td>Gasket Specification No. – G12</td>
<td>1 Sheet</td>
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<tr>
<td>13.</td>
<td>A4.034.229.1</td>
<td>Bolts Specification</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>14.</td>
<td>A4.034.201.7</td>
<td>Dimension for Socket weld Couplets</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>15.</td>
<td>A4.034.201.9</td>
<td>Details of Welding with Metal Arc Process for IBR Services Attachment Of Branch with Pad Type Reinforcement</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>SL. NO.</td>
<td>DWG. NO.</td>
<td>DESCRIPTION</td>
<td>SHEET NO.</td>
</tr>
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<tr>
<td>16.</td>
<td>A4.034.201.14</td>
<td>Details of Welding with Metal Arc Process for Class-I IBR Services Attachment Of Branch without Reinforcement</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>17.</td>
<td>A4.034.201.21</td>
<td>Details of Welding with Metal Arc Process for Class-II IBR Services Attachment Of Branch without Reinforcement.</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>18.</td>
<td>A4.034.201.22</td>
<td>Details of Welding with Metal Arc Process for Class-I IBR Services Attachment Of Branch without Reinforcement.</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>19.</td>
<td>A.034.203.02</td>
<td>Details of Socket welding attachment Of pipe socket weld End Component (Pipe Fittings or valves)</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>20.</td>
<td>A4.034.203.03</td>
<td>Details of welding for IBR services, Attachment of Branch of Sizes 50NB &amp; below, using socket welding half coupling</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>21.</td>
<td>A.034.204.10</td>
<td>Steam Trap Assemblies Type-T1</td>
<td>2 Sheets</td>
</tr>
<tr>
<td>22.</td>
<td>A.034.204.12</td>
<td>Drip Leg for Steam Lines</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>23.</td>
<td>A4.034.206.04</td>
<td>Reduced Branching using a Tee (Equal or Reducing) and a Reducer</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>24.</td>
<td>A4.034.226.38</td>
<td>Specification for Branch Connection on pipe lines For low and moderate Pressure temperature Services.</td>
<td>1 Sheet</td>
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<tr>
<td>25.</td>
<td>A4.034.226.39</td>
<td>-DO-</td>
<td>1 Sheet</td>
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<tr>
<td>27.</td>
<td>A4.034.225.4</td>
<td>Concreting, Brickwork, Plastering &amp; Excavation</td>
<td>2 Sheets</td>
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<tr>
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<td>DWG. NO.</td>
<td>DESCRIPTION</td>
<td>SHEET NO.</td>
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<tr>
<td>29.</td>
<td>A4.001.001</td>
<td>Tension Band</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>30.</td>
<td>A4.001.003</td>
<td>Insulation for Elbow &amp; Tees</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>31.</td>
<td>A4.001.004</td>
<td>Insulation for Flanges &amp; Valves</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>32.</td>
<td>A4.001.013</td>
<td>Insulation Supports for Vertical Piping</td>
<td>1 Sheet</td>
</tr>
<tr>
<td>33.</td>
<td>A4.034.230.07</td>
<td>Material Specifications-Piping &amp; Valves</td>
<td>1 Sheet</td>
</tr>
</tbody>
</table>
1. **PIPE**

1.1 Material - Carbon Steel Black Pipes

1.2 Dimensions - Type E of ASTM A 53 Grade B (With Carbon Content = 0.25%)

1.3 Wall Thickness - Standard Weight.

1.4 End Preparation - Plain Ends.

2. **FITTINGS**

2.1 Material - ASTM A 234 Gr. WPB (with Carbon Content = 0.25%)

2.2 **Dimensions**

2.2.1 **Elbows (45° and 90° only)**

2.2.1.1 50 NB & below - Socket weld as per ANSI B 16.11. 3000 lb rating.

   Elbows with any included angle other than above two (45° and 90°) shall be fabricated (hot/cold bent with R = 5 x D) at site by Piping Erector from ‘Free Issue’ pipes.

2.2.1.2 65 NB and above - As per ANSI B16.9 Standard weight thick.

2.2.2 **Reducers (Sizes indicated are for large ends only)**

2.2.2.1 50 NB & below - Socket weld to ANSI B16.11. 3000 lb rating with (Only Concentric Reducers)

   a) Bores of Sockets shall match nominal sizes of ends.
   b) Bore diameter ‘D’ shall be for small end size.
   c) Laying length ‘E’ shall be for large end size.

   Above ‘D’ and ‘E’ dimensions correspond to ANSI B16.11 for steel Socket welding Fittings.

---

**MECHANICAL STANDARD**

**PIPE SPECIFICATION**

**NUMBER 28**

<table>
<thead>
<tr>
<th>REV.</th>
<th>DESCRIPTION</th>
<th>APP'D</th>
<th>DATE</th>
</tr>
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<tbody>
<tr>
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<td>RFC – 1st Issue</td>
<td>PSM</td>
<td>May’12</td>
</tr>
</tbody>
</table>

**DEVELOPMENT CONSULTANTS PRIVATE LIMITED**

CONSULTING ENGINEERS
2.2.2.2 65 NB and above - As per ANSI B16.9 Standard Weight thick

2.2.3 Couplets - Type 1 as per DCPL Mech. Std. A4.034.201.7

2.2.4 All other Fittings

2.2.4.1 50 NB and below - Socket weld as per ANSI B16.11, 3000 lb rating.

2.2.4.2 65 NB and above - As per ANSI B16.9 Standard Weight thick

3. PIPE JOINTS

3.1 Erection Joints

3.1.1. 50 NB and below - Use Socket weld Couplings.

3.1.2 65 NB and above - Use Butt weld Joints

3.2 Maintenance Joints

Use Flanged joints for all sizes

4. BRANCH CONNECTION (EQUAL / REDUCING)

As per DCPL Mech. Std. No. A4.034.226.38 & 39

5. NOTES

5.1 This Specification is used for Steam service with following maximum service conditions.

<table>
<thead>
<tr>
<th>Pressure Kg/cm²</th>
<th>Temperature °C</th>
<th>Fluid Service Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.5</td>
<td>195</td>
<td>HD</td>
</tr>
</tbody>
</table>

MECHANICAL STANDARD

PIPE SPECIFICATION

NUMBER 28

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS

RFC – 1st Issue
PSM
May’12

PROJECT – SPM, NEW PM#5 AND UPGRADATION PROJECT
DWG.NO.
A4.034.226.28.2

APPROVED FOR THIS PROJECT: DCPL JOB NO. 11P01

0
1.00.00 GENERAL

The Specification Code Number of any Flange shall consist of two digits and two letters. This alphanumeric combination shall be used to specify a Flange completely.

2.00.00 EXPLANATION

Above code numbering system is explained in following way :

<table>
<thead>
<tr>
<th>First Part (a Letter)</th>
<th>Second Part (a Letter)</th>
<th>Third Part (a Digit)</th>
<th>Fourth Part (a Digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designates the Rated of the Flange as per ANSI B 16.1/ B 16.5 Standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of the flange Construction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major of the Flange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facing details of the Flange</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.00.00 SPECIFICATIONS AGAINST DESIGNATED LETTERS/DIGITS

<table>
<thead>
<tr>
<th>First Part Letter Designation</th>
<th>Second Part Letter Designation</th>
<th>Third Part Digit</th>
<th>Fourth Part Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Class 125*/150</td>
<td>Carbon Steel to following Spec.</td>
<td>1-Slip-On with Hub/Boss</td>
<td>1-Raised Face</td>
</tr>
<tr>
<td>B-Class 250*/300</td>
<td>A- IS2062/ ASTM</td>
<td>2-Slip-On Plate type</td>
<td>2-Flat Face</td>
</tr>
<tr>
<td>C-Class 600</td>
<td>A216 Gr. WCB</td>
<td>3-Welding Neck-Std. Wt.**</td>
<td>3-Ring Type Joint</td>
</tr>
<tr>
<td>D-</td>
<td>B-ASTMA181.Cl.70</td>
<td>4-Welding Neck-Thk.</td>
<td>4-Flat Face &amp; Undrilled</td>
</tr>
<tr>
<td>E-Class 150</td>
<td>C-ASTMA105/A216 Gr. WCB</td>
<td>5-Welding Neck-Sch.80 Thk. **</td>
<td>5-Ring Type Joint</td>
</tr>
<tr>
<td>F-Class 900</td>
<td>D-ASTM</td>
<td>6-Lap Joint Plate type</td>
<td>6-Ring Type Joint</td>
</tr>
<tr>
<td></td>
<td>A105/A216Gr.WCB</td>
<td>7-Lap joint with Hub/Boss</td>
<td>7-Ring Type Joint</td>
</tr>
<tr>
<td>* For Cast Iron/ Spheroidal Graphite with ‘C’ content 0.25%</td>
<td>E-Galvanised Iron</td>
<td>8-Screwed</td>
<td>8-Ring Type Joint</td>
</tr>
<tr>
<td>Iron only</td>
<td></td>
<td>9-Welding Neck Thickness**</td>
<td>9-Ring Type Joint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To be specified</td>
<td>To be specified</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0-Blind</td>
<td>0-Blind</td>
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</table>

** Thickness of Matching pipe at Buttweld End.

---

<table>
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<tr>
<th>MECHANICAL STANDARD</th>
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<tr>
<td>FLANGE SPECIFICATION CODE NUMBERING SYSTEM</td>
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<td>APP'D</td>
<td>DATE</td>
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<td>DWG.NO.</td>
<td>REV.</td>
<td>A4:034:227.1</td>
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### SPECIFICATIONS AGAINST DESIGNATED LETTERS/DIGITS (Cont’d.)

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<th>Third Part Digit Designation</th>
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</thead>
<tbody>
<tr>
<td>G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Cast Iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Spheroidal Graphite Iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alloy Steels to following ASTM (A182/A217) Specifications:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>F1/WC1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>F2/WC4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>F5a/C5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>F9/C12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>F11/WC6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stainless Steels to following AISI Grades</td>
<td></td>
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</tr>
<tr>
<td>S</td>
<td>304</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>304L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>316</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>316L</td>
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</tr>
<tr>
<td>W</td>
<td>317L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>321</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>347</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

### PART DESIGNATION COMBINATIONS WHICH SHALL NOT BE USED

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<tr>
<th>First Part</th>
<th>Second Part</th>
<th>Third Part</th>
<th>Fourth Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) C thru’ F</td>
<td>A.B.I &amp; J</td>
<td>2 &amp; 6</td>
<td>2 &amp; 4</td>
</tr>
<tr>
<td>ii) C thru’ F</td>
<td>I &amp; J</td>
<td>1 thru’ 7</td>
<td>1 &amp; 3</td>
</tr>
<tr>
<td>iii) C thru’ F</td>
<td>I &amp; J</td>
<td>2 &amp; 6</td>
<td>1 &amp; 3</td>
</tr>
<tr>
<td>iv) I &amp; J</td>
<td>D</td>
<td>2 &amp; 6</td>
<td>2 &amp; 6</td>
</tr>
<tr>
<td>v) A</td>
<td>6</td>
<td>1 &amp; 3</td>
<td>2 &amp; 6</td>
</tr>
<tr>
<td>vi) B thru’ Z</td>
<td>2 &amp; 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note : 1. A Flat-faced Flange (Fourth Digit Designations - 2 & 4) shall be used only in case of joining the same with a Cast Iron Item i.e., a valve, pump etc.

### EXAMPLE

A welding Neck Flange of any size with Following Specification.

a) Rating - Class 900
b) Material - ASTM A 182 F 22
c) Thickness of Matching Pipe at Butweld End - Sch.80
Shall be Designated by FR41

### MECHANICAL STANDARD

<table>
<thead>
<tr>
<th>FLANGE SPECIFICATION CODE NUMBERING SYSTEM</th>
</tr>
</thead>
<tbody>
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<td>DESCRIPTION</td>
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<tr>
<td>APP’D</td>
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<tr>
<td>DATE</td>
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</tr>
<tr>
<td>DWG.NO.</td>
</tr>
<tr>
<td>REV.</td>
</tr>
</tbody>
</table>

**DEVELOPMENT CONSULTANTS PRIVATE LIMITED**

CONSULTING ENGINEERS
2.00.0 **MATERIAL**

Material (Flange, Bolts, Nuts & Gaskets) shall be as specified in “PIPING MATERIAL SPECIFICATION: for the Project.

2.00.0 **INSTALLATION REQUIREMENT – GENERAL**

Unless stated otherwise on the drawing, all flange holes shall straddle the center line of pipe.
Maximum allowable misalignment of flanges shall not exceed those shown in FIG. –1.

Flange faces shall not be concave. Convexity of the flange contact face width shall not exceed 1.6 mm/100 mm width of flange face. Flanges with smooth finish or grooved for RTJ Convexity shall not exceed 0.04 mm across the entire width of the raised face mating flanges.

<table>
<thead>
<tr>
<th>REV</th>
<th>DESCRIPTION</th>
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<th>DATE</th>
</tr>
</thead>
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<td>0</td>
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<td>PSM</td>
<td>May’12</td>
</tr>
</tbody>
</table>

**MECHANICAL STANDARD**

**INSTALLATION OF FLANGE JOINTS**

PROJECT – SPM, NEW PM#5 AND UPGRADATION

APPROVED FOR THIS PROJECT: DCPL JOB NO. 11P01

DEVELOPMENT CONSULTANTS PRIVATE LIMITED

CONSULTING ENGINEERS
1. **Size**: All Sizes

2. **Materials**:

2.1 **50 NB and below**:

Carbon steel plate to IS : 226 Gr. Fe 410-S (St 42-S) tested quality.

2.2 **65 NB and above**:

Carbon steel plates to IS : 2062 Gr. Fe 410-W (St 42 - W) tested quality or Carbon Steel plate as specified in AWWA C 207-78.

3. **Dimension**:

3.1 **Slip-on Plate Type Flanges**

3.1.1 **80 NB and below**:

Same as those of Slip-on flange to ANSI B16.5, Class-150, including the knees except that boss/hub is not required. Hence dimensions related to boss/hub are not applicable.

3.1.2 **100 NB and above**:

As per AWWA C207-78, Table-1, Class D including thickness. I.D. of flanges of 650 NB shall be larger by 6.4 mm than the O.D. of the connecting pipe which shall be as per ANSI B 36.10.

3.2 **Lap Joint Plate Type Flanges**

3.2.1 **80 NB and below**:

Same as those of Lap Joint type flanges to ANSI B 16.5, Class - 150 including thickness except that boss/hub is not required. Hence dimensions related to boss/hub are not applicable.

3.2.2 **100 NB and above**:

As per AWWA C 207-78 Table-1, Class - D including thickness I.D. of flanges shall be larger by 6.4 mm than the O.D. of the connecting pipe which shall be as per ANSI B 36.19 Corner of ID on one face shall be filleted/45° chamfered with a radius of fillet / side of chamfered equal to 13 mm.

---

**MECHANICAL STANDARD**

**FLANGE SPEC.-CARBON STEEL**

**PLATE TYPE LAP JOINT BACKING**

/BLIND FLANGE TO CLASS S 150

---

**DEVELOPMENT CONSULTANTS PRIVATE LIMITED**

CONSULTING ENGINEERS
3.3 Blind Flanges:

3.3.1 600 NB and below as per ANSI B 16.5 Class 150

3.3.2 650 NB above:

All dimensions except thickness shall be as per AWWA C207-78. Thickness shall be follows:

<table>
<thead>
<tr>
<th>Size mm NB</th>
<th>650</th>
<th>700</th>
<th>750</th>
<th>800</th>
<th>850</th>
<th>900</th>
<th>950</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness, mm</td>
<td>42.2</td>
<td>44.8</td>
<td>46.8</td>
<td>50.6</td>
<td>52.9</td>
<td>55.3</td>
<td>58.0</td>
<td>60.4</td>
</tr>
</tbody>
</table>

4. Method of Manufacture:

4.1 Slip-on Plate Type/Lap-Joint Plate Type Flanges / Blind Flanges:

Machined from plate to above specification. Each flange shall be machined out of single piece of plate. Alternatively a maximum No. of four segment of plates may be used with butt welded constructional Weld fabrication shall be as per applicable paragraph of IS 2825 latest revision. All weld joints shall be fully radiographed. None of the bolt holes shall be placed on any weld joint. All surfaces of flanges shall be finished machined.

5. Finish of Face

Matching face of slip-on plate type and blind flanges shall have serrations as per ANSI B16.5 specification.

6. Call out codes

<table>
<thead>
<tr>
<th>Letter Codes</th>
<th>Digit Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>2</td>
</tr>
<tr>
<td>1st Digit</td>
<td>2nd Digit</td>
</tr>
<tr>
<td>2-Slip-on plate type</td>
<td>1-Raised face</td>
</tr>
<tr>
<td>6-lap joint plate type</td>
<td>2-Flat face</td>
</tr>
<tr>
<td>0-Blind</td>
<td>4-Flat face &amp; undrilled</td>
</tr>
</tbody>
</table>

6.1 Normally Usable Call our Code:

AA21, AA01, AA62, AA22

For all other applicable call out order refer to Mech. Std. No. A4034.227.1

Note: 1 This flanges shall not be used beyond pressure of 10.5 kg/cm² and temperature of 93°C.
1. **Size**: All sizes

2. **Type of Flanges**: Slip-on, Welding - Neck, Lap-joint & Blind

3. **Material**: ASTM A 181 Class 70

4. **Dimension**: To ANSI B 16.5 for sizes 600 mm NB and below. Thickness at welding ends of welding neck flanges shall be as per call-out codes vide para no. 7 below.

5. **Method of Manufacture**: As per above material specification. Mating face, bore, welding end and seating surfaces for bolts/nuts on back of flanges shall be machine finished all bolt holes shall be drilled.

6. **Finish of Face**: Mating face shall have serrations as per ANSI B16.5 (except Lap-Joint type flanges).

7. **Flange Call-out Spec. Codes**

<table>
<thead>
<tr>
<th>Letter Codes</th>
<th>Digit Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Letter</td>
<td>2nd Letter</td>
</tr>
<tr>
<td>A</td>
<td>Class 150</td>
</tr>
<tr>
<td>B</td>
<td>Class 300</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>

7.1 Normally Usable Call our Code:

AB11, AB01, AB31, BB11, BB01, BB31, AB72, BB72

For all other applicable call-out codes refer to Mech. Std. No. A4034.227.1
1. **Size**: All sizes

2. **Type of Flanges**: Slip-on, Welding - Neck & Blind

3. **Material**: ASTM A 105 / ASTM A 216 Gr. WCB

4. **Dimension**: To ANSI B 16.5 for sizes 600 mm NB and below.

To BS 3293 for slip-on and welding neck flanges for sizes 650 mm NB and above.

To MSS-SP-44 for Blind flanges for sizes 650 mm NB and above. Thickness at welding neck of welding neck flanges shall be as per call out codes vide paragraph no. 7 below.

5. **Method of Manufacture**: As per above material specification. Mating face, bore, and seating surfaces for bolts/nuts on back of flanges and welding end of welding neck flanges shall be machine finished and all bolt holes shall be drilled.

6. **Finish of Face**: Mating face shall have serrations as per ANSI B16.5.

7. **Flange Call-out Spec. Codes**

<table>
<thead>
<tr>
<th>Letter Codes</th>
<th>Digit Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Letter</td>
<td>2nd Letter</td>
</tr>
<tr>
<td>A-Class 150</td>
<td>C</td>
</tr>
<tr>
<td>B-Class 300</td>
<td></td>
</tr>
<tr>
<td>C-Class 600</td>
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7.1 Normally Usable Call our Code:

AC11, AC01, AC31, BC11, BC01, BC31, CC11, CC01, CC31

For all other applicable call-out codes refer to Mech. Std. No. A4034.227.1

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**MECHANICAL STANDARD**

**FLANGE SPEC.-CARBON STEEL**

**SLIP-ON / WELDING NECK / BLIND FLANGE**

<table>
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<tr>
<th>REV.</th>
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**PROJECT – SPM, NEW PM#5 AND UPGRADATION PROJECT**

**APPROVED FOR THIS PROJECT: DCPL JOB NO. 11P01**

A4.034.227.C.1 0

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
1. **Size**: All Sizes

2. **Type of Flanges**: Slip-on, Welding - Neck & Blind

3. **Material**: ASTM A 105 (Carbon content > 0.25%) / ASTM A 216 Gr. WCB (Carbon content > 0.25%)

4. **Dimension**: To ANSI B 16.5 for sizes 600 mm NB and below.

   To BS 3293 for slip-on and welding neck flanges for sizes 650 mm NB and above.

   To MSS-SP-44 for Blind flanges for sizes 650 mm NB and above. Thickness at welding neck of welding neck flanges shall be as per call-out codes vide paragraph no. 8 below.

5. **Method of Manufacture**: As per above material specification. Mating face, bore, and seating surfaces for bolts/nuts on back of flanges and welding end of welding neck flanges shall be machine finished and all bolt holes shall be drilled.

6. **Finish of Face**: Mating face shall have serrations as per ANSI B16.5.

7. **Special Note**: All flanges shall carry certification as per IBR for pressure and temperature data as mentioned in Purchase Order.

8. **Flange Call-out Spec. Codes**:

<table>
<thead>
<tr>
<th>Letter Codes</th>
<th>Digit Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Letter</td>
<td>2nd Letter</td>
</tr>
<tr>
<td>A-Class 150</td>
<td>D</td>
</tr>
<tr>
<td>B-Class 300</td>
<td></td>
</tr>
<tr>
<td>C-Class 600</td>
<td></td>
</tr>
</tbody>
</table>

8.1 Normally Usable Call our Code:

   AD11, AD01, BD11, BD01, AD31, BD31, CD31.

   For all other applicable call-out codes refer to Mech. Std. No. A4034.227.1
1. **Size**: 150 NB and below.

2. **Material**: Hot dip galvanised carbon steel to IS : 226

3. **Dimension**: ANSI B 16.5, Class 150, Bore of Screwed Flange shall suit OD of Pipes to IS : 1239, Part I.

4. **Method of Manufacture**: Forging / Machining with machine cut threads followed by galvanising. If forged, all surfaces shall be machine prior to galvanising.

5. **Finish of Face**: Mating face shall have serrations.

6. **Thread Standard**: As per ANSI B16.5.

7. **Flange Call-out Spec. Codes**:

<table>
<thead>
<tr>
<th>Letter Codes</th>
<th>Digit Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Letter</td>
<td>1st Digit</td>
</tr>
<tr>
<td>AE</td>
<td>8-Screwed</td>
</tr>
<tr>
<td></td>
<td>0-Blind</td>
</tr>
</tbody>
</table>

For all other applicable call-out codes refer to Mech Std. No. A4034.227.1

Normally Usable Call our Code: AE81, AE01, AE82.
1. **Size** - All Sizes

2. **Material** - Neoprene or Nitrile Butadiene Rubber (Buna-N) as per ASTM D 3185.

3. **Dimensions** - As per ANSI B 16.21, for bolting to Cast Iron items - B 16.1, 125 lb, Full-face type.
   
   For all other locations - B 16.5, 150 lb, Flat Ring type.

4. **Thickness** - 1.6 mm

<table>
<thead>
<tr>
<th>REV.</th>
<th>DESCRIPTION</th>
<th>PSM</th>
<th>May’12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APPROVED FOR THIS PROJECT: DCPL JOB NO. 11P01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PROJECT – SPM, NEW PM#5 AND UPGRADE PROJECT</td>
<td>A4.034.228.1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Size - All Sizes
2. Material - Neoprene or Nitrile Butadiene Rubber (Buna-N) as per ASTM D 3185.
3. Dimensions - As per ANSI B 16.21, B 16.5, 300 lb, Flat ring type.
4. Thickness - 1.6 mm
5. Marking - As per specification.
1. Size - All sizes
3. Dimensions - As per ANSI B 16.21, - B 16.5, 150 lb, Flat Ring type.
4. Thickness - 1.6 mm
5. Marking - As per specification.
<table>
<thead>
<tr>
<th>SPEC. NO.</th>
<th>Type</th>
<th>Materials &amp; Dimensions*</th>
<th>Type</th>
<th>Material &amp; Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Machine Bolt</td>
<td>ASTM A 307, Grade B</td>
<td>Heavy Hex. Nuts</td>
<td>ASTM A 563, Grade A</td>
</tr>
<tr>
<td>B2</td>
<td>Stud Bolt</td>
<td>ASTM A 193, Grade B7</td>
<td></td>
<td>ASTM A 194, Grade 2H</td>
</tr>
<tr>
<td>B3</td>
<td>Machine Bolt</td>
<td>ASTM A 193, Grade B7</td>
<td></td>
<td>ASTM A 194, Grade 2H</td>
</tr>
<tr>
<td>B4</td>
<td>Machine Bolt</td>
<td>ASTM A 193, Grade B16</td>
<td></td>
<td>ASTM A 194, Grade 4</td>
</tr>
<tr>
<td>B5</td>
<td>Stud Bolt</td>
<td>ASTM A 193, Grade B16</td>
<td></td>
<td>ASTM A 194, Grade 4</td>
</tr>
</tbody>
</table>

* Length of Bolts shall be as per ANSI B16.5 Standard for the specified rating of concerned flanged joint.
**LIMITATIONS ON SIZE**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>NB</th>
<th>TYPE-1 COUPLER</th>
<th>MAX. ALLOWABLE COUPLER SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>15</td>
<td>TYPE-2 COUPLER</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE:

1. MATERIAL SPECIFICATION OF ABOVE COUPLETS SHALL CONFORM TO THE REQUIREMENTS OF PIPE SPECIFICATION WHERE THESE HAVE BEEN REFERRED TO.
2. ALL OTHER DIMENSIONS INCLUDING "F" SHALL BE EQUAL TO THOSE FOR HALF-COUPINGS AS PER ANSI B 16.11, 3000 LB RATING. REF. PARA. 104.3.1(C2).
3. USE OF ABOVE COUPLETS SHALL BE LIMITED TO THE SPECIFIED CONDITIONS.
4. ALL REFERENCES AS INDICATED ABOVE ARE FROM ANSI B 31.1 WITH SUMMER 1980 ADDENDA.

**MECHANICAL STANDARD**

SOCKETWELD COUPLER

<table>
<thead>
<tr>
<th>REV.</th>
<th>DATE</th>
<th>REDesign</th>
<th>APP'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>23.05.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

APPROVED FOR THIS PROJECT SPNL. NEW PROJ. AND UPGRADE PROJECT DSOL. 0200. NO. 11951

DEVELOPMENT CONSULTANTS LTD
CONSULTING ENGINEERS
NOTE:
1. ABOVE DESIGN OF WELD PREPARATIONS GENERALLY CONFORM TO ONE OR MORE OF FOLLOWING:
   a. ANSI B 31.1 WITH SUMMER 1980 ADDENDA - FIG. 127.4.8 (d) (d).
   c. BS 808 - 1975. FIG. - 16.

2. FOR ABOVE FIGURES FOLLOWING SHALL BE APPLICABLE:
   \[ f = 1.6 \pm 0.8 \text{mm}, \quad g = 2.5 \pm 0.8 \text{mm}, \quad t = \text{SMALLEST OF 5mm OR 0.7tb}, \]
   \[ r = 5 \text{mm MIN. IF } \theta > 135^\circ. \]
RIGHT ANGLE BRANCHING

FIGS. 1 & 2

UNEQUAL BRANCH

FIG. 3

EQUAL BRANCH

FIG. 4

INCLINED OR SLOPING BRANCHING

FIGS. 3 & 4

SECTION AT-Z

SECTION AT-X1

NOTE:

1. THIS DRAWING MUST BE READ IN CONJUNCTION WITH DWG. NO. A.034.201.22.

MECHANICAL STANDARD

DETAILS OF WELDING WITH METAL ARC PROCESS FOR CLASS-1 I.B.R. SERVICES ATTACHMENT OF BRANCH WITHOUT REINFORCEMENT

APPROVED FOR THIS PROJECT

SPH. NEW PLANT & UPGRADE PROJECT

DCPL JOB NO. - 1P01

A.034.201.14

CONSULTING ENGINEERS
FIG.- 1
RIGHT ANGLED BRANCHING
(UNEQUAL & EQUAL)

FIG.- 2
INCLINED OR SLOPPED BRANCHING
(UNEQUAL & EQUAL)

FIG.- 3
SECTION AT 'X' (CROTCH)

FIG.- 4
SECTION AT 'Q'
(BACK OF SLOPING BRANCH)

FIG.- 5
SECTION AT 'Z' (CROTCH)

FIG.- 6
FOR 2SBRANCH O.D. 492
?MAIN O.D. 3

FIG.- 7
FOR 2SBRANCH O.D. 492
?MAIN O.D.

FIG.- 8
FOR BRANCH O.D. = MAIN O.D.

SECTIONS AT Y OR W (FLANK)
(Figs.-7,8 & 9)

NOTE :-
1. FOR ABOVE DESIGN OF WELD PREPARATION, REFER TO BS : 2971-1961 (Fig. 19).
2. FOR BRANCH THICKNESS ≥ 22.2 REFER TO ABOVE BS. SPECIFICATION.
3. FOR ABOVE SKETCHES f = 1.6 ± 0.8 mm & g = 2.5 ± 0.8 mm.

MECHANICAL STANDARD
DETAILS OF WELDING WITH METAL ARC PROCESS FOR CLASS-II IDR. SERVICES
ATTACHMENT OF BRANCH WITHOUT REINFORCEMENT

<table>
<thead>
<tr>
<th>PIPE THK.</th>
<th>'a', mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIN.</td>
</tr>
<tr>
<td>&lt;6.4</td>
<td>1.6</td>
</tr>
<tr>
<td>&gt;6.4, =12.7</td>
<td>1.8</td>
</tr>
<tr>
<td>&gt;12.7</td>
<td>1.6</td>
</tr>
</tbody>
</table>
NOTE:
1. FOR ABOVE DESIGN OF WELD PREPARATION, REFER BS 806-1975 (FIG.-15) & BS 8633-1973 (FIG.26).
2. IF THE WELD AT TE MAKES AN ANGLE < 135°, THE WELD SHALL BLEND WITH A MIN. RAD. OF 6mm.
3. FOR ABOVE SKETCHES, f = 1.6 ± 0.8 mm AND g = 2.5 ± 0.8 mm.
4. THIS DRG. MUST BE READ IN CONJUNCTION WITH DRG. NO. A.034.201.14.

MECHANICAL STANDARD
DETAILS OF WELDING WITH METAL ARC PROCESS
FOR CLASS-I BRL SERVICES
ATTACHMENT OF BRANCH WITHOUT REINFORCEMENT

APPROVED FOR THIS PROJECT 5% OFF-PAGE AND UNDERGROUND PROJECT DEP. JOB NO. - 18 PC1

A.D. V. S. - 95

Dwg. No. A.034.201.24
DEVELOPMENT CONSULTANTS LTD
CONSULTING ENGINEERS

64
MINIMUM WELDING DIMENSIONS REQUIRED FOR SOCKET WELDING COMPONENTS OTHER THAN FLANGES

REF. FIG.-127.4.4C YDE ANSI/ ASTM B31.1 WITH SUMMER 1980 ADDENDA

NOTE:
1. CX AND OTHER DIMENSIONS OF ABOVE FILLET WELD SHALL CONFORM TO THE FIGURE
ATTACHED WITH ER NO.97

MECHANICAL STANDARD
DETAILS OF SOCKET WELDING ATTACHMENT
OF PIPE WITH SOCKET WELD END COMPONENT
(Pipe, fittings or valve)

Dwg. No. DEVELOPMENT CONSULTANTS LTD
A.034.203.02 CONSULTING ENGINEERS

A_V 9-95
NOTES:
1. ABOVE FIGURE NO. REFERENCES ARE FROM ANSI/ASME B31.1 WITH SUMMER 1980 ADDENDA.
2. ABOVE COUPLING SHALL BE USED WITHIN THE LIMITATIONS INDICATED IN DQI. STD. DQI A0.034.201.7

MECHANICAL STANDARD
DETAILS OF WELDING FOR IBR SERVICES
ATTACHMENT OF BRANCH OF SIZES 50 NB AND BELOW
USING SOCKET WELDING HALF COUPLING

A.V 9-65
STEAM TRAP PIPING SCHEMATIC FOR DISCHARGING CONDENSATE TO ATMOSPHERE AT A POINT BELOW THE STEAM MAIN
FOR FLUID SERVICE 'HD', 'HI' ONLY

LEGEND:
- * - STRAINER
- G - STEAM TRAP

NOTE:
1. PIPING AND VALVE SPECIFICATION OF ABOVE ARRANGEMENTS SHALL BE AS PER "SERVICE INDEX-
   MATERIAL SPECIFICATION - PIPING & VALVES."
2. USE FIG. 3 WHEN 'H' IS LESS THAN 2000 MM.
3. FOR FLUID SERVICES 'HY', 'HI' & 'H' REF. MECH. STD. A1200.034.204.10.

MECHANICAL STANDARD
STEAM TRAP ASSEMBLIES
TYPE-T1

DWG. NO. 204.204.10
DEVELOPMENT CONSULTANTS LTD
CONSULTING ENGINEERS

67
### Table 1

**Material Chart for Detail A & Detail B**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Name of Item</th>
<th>Specification</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main Pipe</td>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Drain Pocket Pipe</td>
<td>As per pipe specification for fluid services</td>
<td>Service index, Material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>indicated in sheet 1</td>
<td>specification - Piping</td>
</tr>
<tr>
<td>3</td>
<td>Drain Pipe</td>
<td>As per pipe specification for fluid services</td>
<td>and valves - IEB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>indicated in sheet 1</td>
<td>document, Vol.-1,</td>
</tr>
<tr>
<td>4</td>
<td>Weldolet</td>
<td></td>
<td>section-A</td>
</tr>
<tr>
<td>5</td>
<td>Cap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Socket Weld Couplet</td>
<td>Compatable with pipe material</td>
<td>DCL STD. No.</td>
</tr>
<tr>
<td>7</td>
<td>Threaded Couplet</td>
<td>Compatable with pipe material</td>
<td>038A.400.01</td>
</tr>
<tr>
<td>8</td>
<td>Hexagonal Headed Plug</td>
<td>Compatable with pipe material</td>
<td>3000 P#</td>
</tr>
</tbody>
</table>

### Table 2

**Dimension Chart**

<table>
<thead>
<tr>
<th>Size A (NB) (mm)</th>
<th>Size B (NB) (mm)</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C (mm) D (mm) E (mm)</td>
</tr>
<tr>
<td>65</td>
<td>65</td>
<td>202 483 127</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>210 508 127</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>222 553 152</td>
</tr>
<tr>
<td>125</td>
<td>125</td>
<td>236 594 192</td>
</tr>
<tr>
<td>150</td>
<td>150</td>
<td>248 610 178</td>
</tr>
<tr>
<td>200</td>
<td>200</td>
<td>273 686 178</td>
</tr>
<tr>
<td>250</td>
<td>250</td>
<td>305 711 203</td>
</tr>
<tr>
<td>300</td>
<td>300</td>
<td>358 711 203</td>
</tr>
<tr>
<td>350</td>
<td>350</td>
<td>383 737 203</td>
</tr>
<tr>
<td>400</td>
<td>400</td>
<td>444 788 203</td>
</tr>
<tr>
<td>500</td>
<td>500</td>
<td>470 813 203</td>
</tr>
<tr>
<td>600</td>
<td>600</td>
<td>495 839 203</td>
</tr>
<tr>
<td>650</td>
<td>650</td>
<td>520 889 203</td>
</tr>
<tr>
<td>700</td>
<td>700</td>
<td>546 940 254</td>
</tr>
<tr>
<td>750</td>
<td>750</td>
<td>571 986 254</td>
</tr>
<tr>
<td>800</td>
<td>800</td>
<td>596 992 254</td>
</tr>
<tr>
<td>850</td>
<td>850</td>
<td>821 1017 254</td>
</tr>
</tbody>
</table>

### Table 3

**Size of Valve / Traps**

<table>
<thead>
<tr>
<th>Service Code</th>
<th>Size A (NB) (mm)</th>
<th>Size of Steam Traps with In-built Strainer &amp; Valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA (Above 400)</td>
<td>400 &amp; BELOW</td>
<td>20</td>
</tr>
<tr>
<td>HB (Above 400)</td>
<td>400 &amp; BELOW</td>
<td>20</td>
</tr>
<tr>
<td>HC (Above 400)</td>
<td>400 &amp; BELOW</td>
<td>20</td>
</tr>
<tr>
<td>HD (Above 400)</td>
<td>400 &amp; BELOW</td>
<td>20</td>
</tr>
<tr>
<td>HF (Above 400)</td>
<td>400 &amp; BELOW</td>
<td>20</td>
</tr>
</tbody>
</table>

---

### Mechanical Standard

**Steam Trap Assemblies**

**Type T1**

---

**Development Consultants Ltd**

**Consulting Engineers**

**A.O.324.204.10**

**Sh.2 of 2**
(LINE SIZE 3/4" TO 24")

DRIP LEG IN MAIN RUNS

(PIPE SIZE 3/4" TO 6")

DRIP LEG AT RISERS

<table>
<thead>
<tr>
<th>NOM. LINE DIA. (D) IN INCH.</th>
<th>NOM. DRIP LEG DIA. (G) IN INCH.</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>A (mm)</td>
</tr>
<tr>
<td>1&quot;</td>
<td>1&quot;</td>
<td>250</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>1 1/2&quot;</td>
<td>275</td>
</tr>
<tr>
<td>2&quot;</td>
<td>2&quot;</td>
<td>275</td>
</tr>
<tr>
<td>3&quot;</td>
<td>3&quot;</td>
<td>350</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3&quot;</td>
<td>350</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3&quot;</td>
<td>385</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3&quot;</td>
<td>410</td>
</tr>
<tr>
<td>10&quot;</td>
<td>4&quot;</td>
<td>440</td>
</tr>
<tr>
<td>12&quot;</td>
<td>4&quot;</td>
<td>460</td>
</tr>
<tr>
<td>14&quot;</td>
<td>4&quot;</td>
<td>480</td>
</tr>
<tr>
<td>18&quot;</td>
<td>6&quot;</td>
<td>500</td>
</tr>
<tr>
<td>20&quot;</td>
<td>6&quot;</td>
<td>550</td>
</tr>
<tr>
<td>24&quot;</td>
<td>6&quot;</td>
<td>605</td>
</tr>
</tbody>
</table>

NOTES:

1. FOR STEAM TRAP ASSEMBLY REFER TO DWG. NO. A034.204.10
2. ALL PIPES, VALVES, FITTINGS, FLANGES ETC. SHALL BE IN ACCORDANCE WITH PROJECT PIPING MATERIAL SPECIFICATION.
3. DIMENSIONS 'A' & 'B' CAN BE REDUCED OR INCREASED DEPENDING UPON LAYOUT RESTRICTIONS.
4. DRIP LEG NOT NECESSARY FOR THIS TYPE OF INSTALLATION

MECHANICAL STANDARD

DRIP LEG

FOR STEAM LINES

A.V. 9-95
ITEM IDENTIFICATION CHART

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>'RUN' PIPE</td>
</tr>
<tr>
<td>2</td>
<td>BUTTWELD EQUAL TEE/ REDUCING TEE</td>
</tr>
<tr>
<td>3</td>
<td>BUTTWELD REDUCER</td>
</tr>
<tr>
<td>4</td>
<td>BRANCH PIPE</td>
</tr>
<tr>
<td>5</td>
<td>PIPE NIPPLE WITH ONE END PLAIN AND BEVELLED &amp; OTHER END PLAIN AND SQUARE</td>
</tr>
<tr>
<td>6</td>
<td>SOCKET WELD REDUCING COUPLING (REDDER)</td>
</tr>
<tr>
<td>7</td>
<td>SOCKET WELD EQUAL TEE</td>
</tr>
<tr>
<td>8</td>
<td>PIPE NIPPLE WITH BOTH ENDS PLAIN AND SQUARE</td>
</tr>
</tbody>
</table>

WELD IDENTIFICATION CHART

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>FOR DETAILS REF. DWG. NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>BUTT WELD</td>
<td>A4.034.203.4</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>SOCKET WELD</td>
<td>A4.034.203.2</td>
</tr>
</tbody>
</table>

NOTES:
1. MATERIAL SPECIFICATIONS OF ABOVE ITEMS SHALL CONFORM TO THE REQUIREMENTS OF PIPE SPECIFICATION WHERE THESE HAVE BEEN REFERRED TO.
2. ABOVE REFERENCE DRAWINGS SHALL FROM PARTS OF THIS STANDARD OR IN OTHER WORDS THE LATER SHALL BE READ IN CONJUNCTION WITH THE FÖRDER AS REQUARED.

MECHANICAL STANDARD

REDUCED BRANCHING USING A TEE (EQUAL OR REDUCING) AND A REDEER

Dwg. No. A4.034.206.04

DEVELOPMENT CONSULTANTS LTD
CONSULTING ENGINEERS
1. **EQUAL BRANCHING**

1.1 For ‘Run’ Sizes 50 NB and below

1.1.1 Method of Connection – Use Socket weld Equal Tee

1.1.2 Method of Welding Attachment – As per DCL Std. Drg. A.034.203.02

1.2 For ‘Run’ Sizes 65NB and above

1.2.1 Method of Connection - ‘Branch’ Pipes shall be directly welded on ‘Run’ Pipe. Requirement of external Reinforcement to be welded on a particular Branch Connection and Thickness thereof shall as per Schedule enclosed. Such external reinforcement shall be of ‘Ring’ or ‘Pad’ type and out from ‘Run’/ ‘Branch’ pipe and formed as required.

1.2.2 Method of Welding Attachment
   a) For Branches Without Reinforcement -
      i) For Class I Services under IBR - As per DCL Stds. A4.034.201.14 & A4.034.201.22
      ii) For Class II Services under IBR - As per DCL Std. A4.034.201.21
   b) For Branches with Reinforcement - As per DCL Std. Drg. A4.034.201.9

2. **REDUCED OR UNEQUAL BRANCHES**

2.1 For ‘Run’ Sizes 50NB and below

2.1.1 Method of Connection - Shall be by Use of following :
   a) Socket weld Equal Tee
   b) One No. Pipe Nipple with both Ends Plain and Square
   and  c) One No. Socket weld Reducing Coupling.

2.1.2 Method of Welding Attachment - As per DCL Std. Drg. A.034.206.04, Type -3 .

2.2 For ‘Run’ Sizes 65NB and above

2.2.1 For ‘Branch’ Sizes 50NB and below

Contd. To Dwg. No. A4.034.226.39
2.2.1.1 Method of Connection – Use Socket weld Couplets.

2.2.1.2 Method of Welding - As per DCL Std. Drg. Attachment A4.034.203.03 (Type – 1)

2.2.2 For ‘Branch Sizes’ 65NB and above

2.2.2.1 Method of Connection – Same as against Para 1.2.1 above.
Method of Welding Attachment - Same as against Para 1.2.2 above.

Notes:
1) All Items Required for Making a Branch Connection as per this Standard shall Conform to the Specification Stipulated in Pipe Specification Standard where this standard has been Referred to.

2) All Standards mentioned in this Standard shall form part/s of this Standard. In other words this Standard shall be used in Conjunction with all other Standards Referred herein.
1.00.00 **SCOPE**

This Specification defines the general requirements for Fabrication & installation of Carbon Steel, Alloy Steel and Stainless Steel piping systems.

2.00.00 **CODES & STANDARDS**

Basic installation codes shall be as specified in `PROJECT PIPING INSTALLATION SPECIFICATION-SERVICE INDEX`.

3.00.00 **MATERIALS**

Materials for all piping, fitting, specialties, structural, sheets shall be supplied by Purchaser/Contractor as specified in the `Project Piping Erection Specification`.

For materials supplied by the Purchaser the Contractor shall ensure that there is minimum wastage of `free-issue` piping material. The wastage shall not exceed the following limits:

i) Salvageable/Accountable : 3% of material utilised.
ii) Unsalvageable/Unaccountable : 0.75% of material utilised.

For fittings such wastage shall not be permitted.

All pipes of lengths more than 0.75M up to 50mm NB Size and for flats & Plates which are not less than 200mm in width or three (3) square meters in area shall be treated as returnable materials and pipes and plates with dimensions less than that specified above shall be treated as salvageable.

4.00.00 **FABRICATION**

4.01.00 **General Requirements**

4.01.01 Loading & unloading of materials and equipment shall be by hoisting or skidding so as to avoid shock or damage. Under no circumstance shall material be dropped. Pipes handled or skid ways shall not be skidded or rolled against other pipes.
4.01.02 Sections of pipes shall not be welded together for lengths below 3M (2.5M for large diameter C.S. fabrication and rolled & welded S.S. pipes). Number of lengths shall be kept to a minimum for longer lengths.

4.01.03 Materials which have been damaged or found to have defects shall not be used in fabrication except that minor surface marks may be dressed provided that the nominal wall or minimum wall thickness is not encroached after considering the manufacturing tolerance.

4.01.04 Unless stated otherwise on the drawings all flanges bolt holes shall straddle the centerlines of the pipes.

4.01.05 Longitudinal seams in seam-welded pipe shall be located so as to clear opening and external attachments wherever possible. Longitudinal seams to adjoining courses shall preferably be at 180° but a minimum between seams of 150mm measured around pipe circumference is acceptable.

4.02.02 Fabrication & Installation Tolerances

4.02.01 In addition to tolerance specified in the applicable ‘Installation Code’ (See project piping installation specification-service index) the following also applies.

4.02.02 All linear dimensions involved in the relative position of branches bosses, flanged ends, flow instrument tapings and change in directions to each other shall be maintained within ± 3 mm.

4.02.03 All angular dimensions of bends and branches shall be maintained within ± ¼ degree.

4.02.04 Mechanical Standard Dwg. No. A4.034.227.3 is enclosed herewith which indicates the allowable misalignment of flanges and branch welding ends.
4.02.05 Pipes with a thickness less than 6mm shall not have internal misalignment of pipe wall exceeding 25 percent of pipe wall thickness. Pipe with a thickness of 6mm and above shall not preferably have internal misalignment of pipe wall exceeding 1.5mm. Where the internal misalignment of pipe wall exceeds 1.5mm the component with the wall extending internally shall be internally trimmed.

4.02.06 For items of tolerance which are not covered by this Specification PFI-ES-3 (Pipe Fabrication Institute-USA) shall be applicable.

4.02.07 Regarding any requirement of load bearing structural attachments such as tolerance etc. which are not shown in Purchaser’s Drawing PFI-ES-26 (Pipe Fabrication Institute-USA) shall be applicable.

4.03.00 **Fit – Up**

Pipes shall be properly aligned by Jigs or clamps as required in order to preclude extraneous load & minimize strain during tackling.

5.01.0 **Threading**

4.04.01 All threading shall be carried out after bending, forging or after heat treatment but where this is not possible suitable thread protection must be provided.

4.04.02 Threads shall be concentric with the pipe and rough, wavy, sheared or improperly made threads of any description shall be out from the pipe and new threads to be made to the satisfaction of the Purchaser.

4.04.03 Threaded joints which are to be seal welded shall be made up dry (without thread compound or tape).

5.00.00 **WELDING**

5.01.0 **Welding Process**

All piping shall be welded either by using any one of the following methods or a combination of these:
Manual Metallic Arc : MMA
Tungsten Inert Gas : TIG
Submerged Arc Welding : SMAW
Plasma Arc Welding : -

For specific requirements, if any, refer to “PROJECT PIPING INSTALLATION SPECIFICATION SERVICE INDEX”.

5.02.00 Welding Procedure

5.02.01 S.S. Pipes :

Some of the parameters have been defined in the following documents :

a) Dwg. No. A 034.225.1 Sheets 1 thru’ 7 – Clause Nos. 2.01.00, 20.02.00, 4.00.00, 6.00.00, 10.00.00 thru’ 11.04.02.

5.02.02 DCPL Mech./IN-2/R-0

Other parameters shall be established through “Welding Procedure Specification” (As per Section IX. ASME Boiler & Pressure Vessel Code). No work shall start until the procedure qualification test for the particular type of welding have been inspected & accepted by “Purchaser”.

5.03.01 C.S. Pipes :

Some of the parameters have been defined in the “PROJECT PIPING INSTALLATION SPECIFICATION – SERVICE INDEX”.

Other parameters shall be established through “Welding Procedure Specification”. No work shall start until the procedure qualification test for particular type of welding have been inspected & accepted by the Purchaser.

5.03.00 General Requirements

5.03.01 No welding shall be done on surfaces which are wet. Surfaces to be welded shall be free from paint, rust, oil, grease, dust or any other contamination. Clothes used for cleaning shall be lint free.
Welds shall be cleaned between passes to remove all traces of slag and flux before successive bids or layers are deposited. Completed weldments shall be cleaned to the same extent. The erators at the starting and stopping points of each individual bead shall be carefully examined and any defects shall be removed by grinding. Grinding wheels, wire brushes, chisels, etc. for use on stainless steel shall not be used on any other materials. The grinding wheels should be iron free and wire brushes should be austenitic stainless steel to avoid iron contamination of the stainless steel surfaces.

Pining shall not be permitted.

The welding technique and arc manipulation shall be controlled to ensure the following:

a) Full Penetration.
b) Full Fusion into the base metal without undercutting along the sides of the weld.
c) Full fusion into the preceding bead or layer.
d) Uniformity of surface in both single run passes and beaded layers.
e) Floating all slag, oxide and gases to the surface behind the advancing arc.
f) Delay in electrode travel until base metal fusion at the starting point is assured and until the erector is well filled at the completion of the weld.

Haphazard striking of the electrode on the base metal in establishing the arc shall not be permitted. The arc should be struck either in the joint where the metal surface will be fused into the weld or on a starting tab. Starting tabs shall be of the same material or a material compatible with the base metal being welded.

When welding stainless steel stringer’s bead technique shall be used with slight oscillation if necessary to avoid entrapped slag and to minimize the number of beads needed to fill a joint. Because of higher co-efficient of expansion and lower thermal conductivity of stainless steel, it is necessary to take precautions to reduce distortion, Skip welding, back step welding or effective tack welding before-hand are the usual methods. Control of interpass temperature should also be used.

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**MECHANICAL STANDARD**

**FABRICATION & INSTALLATION OF**

**CARBON STEEL, ALLOY STEEL & GENERAL REQUIREMENTS**

<table>
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<th>May 12</th>
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Sheet 5 of 11
Vertical welds shall be made in an upward direction. On pipes ever 300mm in diameter welding shall be done whenever possible by two welders working simultaneously on both sides of the pipe.

5.03.02 Temporary attachments such as may be required to retain fit up for welding shall be of material compatible with the material to which it is attached.

Removal of temporary attachments may be done by grinding, chipping, sawing or in the case of heavy weldments by arc gauging or flame cutting. The attachment is to be reduced to a very small cross section and then the attachment “knocked off” when arc or flame gauging is used at least 1/8 inch of metal shall be left on the pipe surface which will then be removed by grinding.

All tack welds shall either be removed completely with progress of welding or shall be properly prepared by grinding or filling their stopping and starting ends so that they may be satisfactorily incorporated into the final weld.

End preparation for welding shall be in accordance with the code of application/drgs for the specific project. However, a set of drgs. is enclosed with this specification which shall be referred to in absence of any such stipulated requirements for a project.

All butt welded joints shall have their end preparations formed by machining. Checking should be done with profile gauges. Flame cutting may be used on Carbon Steel material to form the end preparation, provided the cut edge is ground back at least 1/6 inch below the deepest indentation.

5.03.03 Finish of the completed weld shall be as required by the applicable codes/standards.

Intermediate passes or layers shall be of a flat to slightly concave contour, fully fused to the joint side-walls and each other, with sufficient overlap to prevent excess ridges and valleys and to minimise inclusions.

Final contour shall be slightly convex with complete coalescence at the weld tees to base metal. Where no Code/Standards requirements is given for the project, the reinforcement shall not exceed 5.0mm for thickness up to 25.0mm and 6.0mm for thickness 25-50mm and undercut shall not exceed 1.0 mm.
Argon gas used in TIG welding for shielding and purging shall be at least 99.95% pure.

When purging 300 series stainless steel dry Nitrogen conforming to IS 1747 may be used although the use of Argon is preferred.

Purging at a flow rate of approximately 10 cu.ft./hr. subjected to a maximum of 50 cu.ft./hr. depending on the diameter of the pipe until 6 times the volume of the section of piping between the dams has been replaced is usually adequate. In no case should the initial purge be for less than 10 minutes. After initial purging is completed, the flow of backing gas during welding should be reduced to a point where a small positive pressure prevails. All these flow rates should be established at the procedure qualification stage.

Gas backing (purging) is not required on socket type welded joints provided it is ensured that oxidation does not take place in case of stainless steel.

5.03.05 As far as practicable the heat treatment of pipe sections or sub-assemblies should be done in a closed furnaces.

The furnace provided should be capable of accommodating the entire sub-assembly. In case where the pipe section or sub-assembly are too large to be accommodated in one heat, the parts may be heated in more than one heat if the overlap of the heated portions is at least 5 ft. When this procedure is used, the cooling rate of the portion outside the furnace shall be controlled by insulation to provide a gradually diminishing temperature outward from the heated portion. The cross section where the part projects from the furnace shall not intersect a nozzle or other structural discontinuity.

When induction or resistance heating methods are used, the width of the heated band on each side of the greatest width of the finished weld, including welded branch connections, shall not be less than twice the wall thickness of the thicker component. Uniform temperature around the entire circumference of the piping shall be ensured.

The use of gas torches and gas rings shall be restricted to preheating operations not exceeding 250º F.
6.00.00 CLEANING

For cleaning requirements refer to Flushing/Cleaning/Blowings/Pickling/Passivating schedule.

7.00.00 INSPECTION & TESTING

Installed pipe lines/prefabricated spools shall be tested for:

a) Compliances with drawings & other related documents.
b) Soundness of Production welds.
c) Leak tightness.

7.01.00 Rights of Inspection

The Inspecting Authority shall have the right to inspect all welds by non-destructive methods or by removing welds and subjecting them to mechanical tests. The inspection may be made during the welding or after the welding has been completed. Inspectors shall have right to review all the certificates and records pertaining to the Inspection requirement including certified qualifications for welder’s performance and weld-procedure qualification test.

7.02.00 Methods of Inspection

Inspection shall be carried out generally in accordance with applicable parts of Section-I, V and VIII of ASME Boiler and Pressure Vessel Code. API-1104, ANSI B 31.1 and IS: 822-1970.

Non-destructive testing may consist of radiographic inspection or any other methods specified by the Purchaser. (Refer to “PROJECT PIPING INSTALLATION SPECIFICATION - SERVICE INDEX”) The welds may also be examined be destructive means and the specimens in such case shall be prepared and meet the requirements of Section IX of ASME - Boiler and Pressure Vessel Code.

7.03.00 Hydrostatic Testing

Hydrostatic testing for leak-tightness shall be carried out as per the applicable “Installation Code” and PFI-ES-4 (Pipe Fabrication Institute -USA) Hydrostat measures shall be as specified in the “Line List”
7.04.00 **Non-destructive Examination**

The types and extent of non-destructive examinations shall be as specified in the “PROJECT PIPING INSTALLATION SPECIFICATION-SERVICE INDEX”. Welds not requiring non-destructive testing (other than visual) by the design specifications will be judged acceptable if they pass the leak test. (See Clause 7.03.00).

7.04.01 **Visual Examination**:

Visual examination consists of observation of whatever portions of a component or weld are exposed to such observation, either before, during or after completion of welding.

A. **Acceptance Standards.** The following indications are unacceptable:


A2. Under on surface which is greater than 1/32 (1.00 mm) inch deep.

A3. Weld-reinforcement greater than specified in Table 127.4.2 of ANSI B 31.1

A4. Lack of fusion on surface.

A5. Incomplete penetration (applies only when inside surfaces is readily accessible).

7.04.02 **Magnetic Particle Examination**:

Whenever required by design specification, magnetic particles examination shall be performed in accordance with the methods of Article-7, Section-V of the ASME Boiler and Pressure Vessel Code.

A. **Acceptable Standards.** The following relevant indications are unacceptable:

A1. Any cracks or linear indications.

A2. Rounded indications with dimensions greater than 3/16 inch (5.00 mm).

A3. Four or more rounded indications in a line separated by 1/16 inch (2.0 mm) or less edge to edge.
A4. Ten or more rounded indications in any 6 square inches or surface with a major dimension not to exceed 6 inches the area taken in the most favourable location relative to the indications being evaluated.

7.04.03 Liquid Penetrant Examination

Whenever required by the design specification, liquid penetrant examination shall be performed in accordance with the methods of Article-6, Section-V of the ASME Boiler and Pressure Vessel Code.

A. Acceptance Standards. Indications where major dimensions are greater than 1/16 inch (2.0 mm) shall be considered relevant. The following relevant indications are unacceptable.
A1 Any cracks or linear indications.
A2 Rounded indications with dimensions greater than 3/16th inch (5.00mm).
A3 Four or more rounded indications in a line separated by 1/16 inch (2.0mm) or less edge to edge.
A4 Ten or more rounded indications in any 6 square inches of surface with the major dimension of this area taken in the most unfavourable location relative to the indications being evaluated.

7.05.00 Radiography

Wherever required by the design specification, radiography examination shall be performed in accordance with the Article – 3, of Section – V of the ASME Boiler and Pressure Code.

A. Acceptance Standards. Welds that are shown of radiography to have any of the following types of discontinuities are unacceptable.
A1. Any type of crack or zone of incomplete fusion or penetration.
A2. Any other elongated indication which has length greater than:
A2.1 ¼ inch (6.0 mm) for ‘t’ up to ¾ inch (19.0 mm) inclusive.
A2.2 1/3t for t from ¾ inch (19.0 mm) to 2¼ inch (57.0 mm) inclusive.
A2.3 ¾ inch (19.0 mm) for t ever 2¼ inch (57.0 mm) where t is the thickness of the thinner portion of the weld.
A3 Any group of indications in line that have an aggregate length greater than t in a length of 12 t except where the distance between the successive indications exceeds 6L, where L is the longest indication in the group.

A4 Porosity in excess of that shown as acceptable in Appendix-A 250 of Section-1 of ASME Boiler and Pressure Vessel Code.

7.06.00 Ultrasonic Examination

Whenever required by design specification, ultrasonic examination shall be performed in accordance with Article 5 of Section V of the ASME Boiler and Pressure Vessel Code.

7.06.01 Acceptance of Rejection Standards –

Linear type discontinuities are unacceptable if the amplitude exceeds the reference level and discontinuities have lengths which exceeds the following:

- ¼ inch (6.0 mm) for t up to ¾ inch (19.0 mm)
- 1/3 t (8.0 mm) for t from ¾ inch (19.0 mm) to 2¼ inch (57.0 mm)
- ¾ inch (19.0 mm) for t ever 2¼ inch (57.0)

where t is the thickness of the thinner portion of the weld.

8.00.0 MARKING

Pipe lines & sub-assemblies may be marked in accordance with the line designation on the flow diagram & match marked. The materials shall be marked by any method such as die-stamping, etching, painting, etc. that will not result in any harmful contamination or sharp discontinuities and which will identify the material until the system is completely installed.
Concreting, Brickwork, Plastering & Excavation shall conform to the following Specification:

A. Concrete Work

All concrete work shall conform to IS-456 (latest edition). The minimum Cement content for each of Concrete shall be as follows:

<table>
<thead>
<tr>
<th>Grade of Conc.</th>
<th>Minimum Cement Content/M³ of Finished concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-150</td>
<td>325 Kg</td>
</tr>
<tr>
<td>M-200</td>
<td>360 Kg</td>
</tr>
<tr>
<td>M-250</td>
<td>420 Kg</td>
</tr>
</tbody>
</table>

The minimum Cement Content mentioned above are for average conditions. In case Cement Content can be reduced due to continuous and consistent favourable conditions, on account of better quality of cement and aggregates, use of large size of aggregates & better quality control, then the Engineer may instruct lower Cement Content.

B. Brickwork

All necessary work shall be true to lines and levels as shown on dwgs. All masonry shall be tightly built against structural members and bonded with dowels, inserts etc. as shown on dwgs. The minimum compressive strength of brick used shall be 50 Kg/cm². The mortar shall be 1:6 (Cement : Sand). All the Brickwork shall conform to IS:2212 & IS:2250.

C. Plastering & neat Cement finish

Inside surface of the manholes & pits shall be plastered with 1:6 (Cement : Sand) mortar and immediately after achieving a true plastered surface with the help of a wooden straight edge, the entire area shall be uniformly treated with a paste of neat cement finish at the rate of 1 Kg/Sq.m and rubbed smooth with a trowel. The rate should include all rounding, benching etc. complete. The relevant Indian Standard Codes shall be followed for the specification of materials, strength & workmanship. The total thickness of plaster shall be 20 mm thick.

D. Earthwork in Excavation

All work under this specification shall conform to the latest revision of the following Indian Standards:

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MECHANICAL STANDARD

CONCRETING, BRICKWORK

PLASTERING & EXCAVATION

DEVELOPMENT CONSULTANTS

PRIVATE LIMITED

CONSULTING ENGINEERS

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1) IS 3760 * * * Indian Standard for safety code for excavation work.

2) IS 1200 (Part I) * * * Indian Standard Method of measurement of Building & Civil Engineering work, Part-I – Earth Work.

3) IS 4701 * * * Indian Standard Code of Practice for Earthwork on Canals.

All excavations shall be kept free of water. The Contractor shall remove by pumping by other means approved by the Engineer all water inclusive of rain water. The Excavation rate shall include the cost of dewatering & Shuttering wherever required. All materials/facilities required for dewatering & shuttering shall be furnished by the Contractor.

The Contractor is to carry out the Excavation work as per dwg. issued to him and/or Contractor’s dwgs. which are approved by the Engineer and/or the Engineer’s instructions.

**Disposal**

The excavated spoils will be disposed off in any or all the following manners:

a) By using it for back-filling and consolidating the same straightway.

b) By stacking it temporarily for use in backfilling at a later date during the execution of the Contract.

c) (i) By either spreading or (ii) By spreading and consolidating at designated disposal areas.

By selecting the useful material and stacking it neatly in areas designated by the Engineer for use in back-filling by some other agency.

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DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS

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1. **GENERAL**

1.0 These support standard cover only C.S. & S.S. pipes. FRP/PVC/CONCRETE/PLASTIC pipes are not covered by these standards and supports shall be detailed out in the corresponding layout drawings.

1.1 In general only pipe sizes 50 mm NB and above are covered. Pipes with sizes below 50 mm NB shall be field supported by piping contractor/erector as directed by the Field Engineer.

2. **DRAWING NOTES**

2.0 In case of any discrepancy between these notes and the detail drawings, the detail drawings shall govern.

2.1 a) All dimensions are given in millimeters.

b) The material are carbon steel (IS-226) or equal.

c) Dimensions of bolts & nuts shall be in accordance with IS:1363 and IS:3138. Material for bolts and nuts shall be as per IS:1367 Class 4.6 for bolts and Class 4 for nuts.

d) Washer for Bolt, U-bolt and hanger rod setting on channel or angle or I beam shall be 5° or 8° taper washer (stock size).

e) Holes of bolt, U-bolt and hanger rod shall be as per following table :

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Diameter of Holes For Bolts &amp; U-Bolts</th>
<th>Nominal Bolt size</th>
<th>Diameter of Holes For Bolts &amp; U-Bolts</th>
<th>Hanger Rod</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 10</td>
<td>12</td>
<td>M 30</td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>M 12</td>
<td>14</td>
<td>M 33</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>M 16</td>
<td>18</td>
<td>M 39</td>
<td>42</td>
<td>44</td>
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<tr>
<td>M 20</td>
<td>22</td>
<td>M 42</td>
<td>45</td>
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<td>M 24</td>
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</tr>
<tr>
<td>M 27</td>
<td>30</td>
<td>M 52</td>
<td>55</td>
<td>57</td>
</tr>
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**MECHANICAL STANDARD**

0 RFC – 1st Issue

PSM May’12

APP’D DATE

DEVELOPMENT CONSULTANTS PRIVATE LIMITED

CONSULTING ENGINEERS
2.1  

f) All welds to be 6 mm continuous fillet.

g) Welding electrodes shall be selected from the following:

<table>
<thead>
<tr>
<th>Material to be Welded</th>
<th>Electrode Deposit Comp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Steel to Carbon Steel</td>
<td>Carbon Steel</td>
</tr>
<tr>
<td>Carbon Steel to Stainless Steel</td>
<td>Stainless Steel or equal</td>
</tr>
<tr>
<td>Stainless Steel to Stainless Steel &amp;</td>
<td>Stainless Steel or equal</td>
</tr>
<tr>
<td>Alloy Steel</td>
<td></td>
</tr>
<tr>
<td>Alloy Steel to Alloy Steel</td>
<td>Alloy Steel or equal</td>
</tr>
</tbody>
</table>

h) All clamps shall be hot formed.

i) Each carbon steel support item to be thoroughly cleaned and given one coat of red lead Paint after fabrication.

j) All supports to be of welded construction.

k) Attachments on stress relieved piping (such as pipe shoes, dummies, lugs etc.) shall be welded to pipe before stress relieving.

l) During hydrostatic testing of lines supported by springs, temporary rigid supports or block must be installed by piping contractor to prevent overloading of spring devices and excessive strains on piping and equipments.

m) Attachments directly welded to pipe shall be same/equipment to the pipe material.

n) For sliding supports which are designed to slide over the foundation or paving shown below, it is necessary to ensure that the support is not overlapped with mortar or any other obstruction. (see Fig. – 1)

3. Wherever adjustable supports are used, contractor shall make the adjustment to ensure that intended loads are taken up by the support. This shall include but not limited to Rod Hangers, Spring Hangers, Constant Spring Hangers and adjustable low supports at pump suction and discharge.
3. For all spring hangers final adjustment shall be carried out when the line has attained the operating temperature.

For low type support on lines operating at temperature greater than 100°C the shims on adjustable base supports shall be finally adjusted when the line has attained the operating temperature.

**FIG. – 1**
WELDED ELBOW INSULATION

ALL JOINTS BETWEEN ADJACENT BLANKETS SEWN AND BUTTED TOGETHER

METAL CLADDING

BLANKETS SHAPED FOR BEING WRAPPED AROUND THE ELBOW

ALL METAL SHEETS AT JOINTS TO OVERLAP BY 50mm

WIRE MESH

WEATHER PROOFING

BLANKETS SHAPED FOR WRAPPING AROUND TEE

ALL JOINTS BETWEEN ADJACENT BLANKETS SEWN AND BUTTED TOGETHER

G.I. BAND

BITUMINISED ASBESTOS PILLI
MECHANICAL STANDARD

INSULATION FOR FLANGES & VALVES

*B|p = INSULATION THICKNESS OF PIPE
SUPPORT RING

DETAIL A

SELF TAPPING SCREW

(Spacings of support rings)
2-4 M.

METAL CLADDING

SELF TAPPING SCREW

3 MILL BOARD FOR PIPING
OF TEMPERATURE ABOVE 450°C

RIVET

SPACER RING

MECHANICAL STANDARD

INSULATION SUPPORTS FOR VERTICAL PIPING

APPROVED FOR PROJECT: SPW, NEW PMI & UPGRADE PROJECT

A V 9-95
<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>SERVICE</th>
<th>DESIGN.</th>
<th>PRESS. &amp; TEMP.</th>
<th>SIZE</th>
<th>PIPING</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>SPEC. GASK.</td>
<td>FLG.</td>
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<td></td>
<td>STEAM, MEDIUM</td>
<td>200°C</td>
<td>10.5 Kg/cm² (g)</td>
<td>10°C</td>
<td>100°C</td>
<td>10°C</td>
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<tr>
<td></td>
<td>PRESSURE 1</td>
<td>100°C</td>
<td>10.5 Kg/cm² (g)</td>
<td>10°C</td>
<td>100°C</td>
<td>10°C</td>
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<td>PRESSURE 2</td>
<td>100°C</td>
<td>10.5 Kg/cm² (g)</td>
<td>10°C</td>
<td>100°C</td>
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<td>STEAM, HIGH</td>
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<td>10.5 Kg/cm² (g)</td>
<td>10°C</td>
<td>100°C</td>
<td>10°C</td>
</tr>
</tbody>
</table>

*NOTES*
INSULATION THICKNESS TABLE

Design Criteria:

- Design Ambient Air Temperature: 48°C
- Design Surface Temperature: 60°C
- Wind Velocity: 1.0 m/s
- Cladding over Insulation: Aluminium (emissivity: 0.2)
- Insulation Material: Mineral Wool

Recommended insulation thickness in mm against pipe size and Fluid temperature

<table>
<thead>
<tr>
<th>Design Temp. °C</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
<th>450</th>
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<td>50</td>
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<td>80</td>
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<td>120</td>
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<td>75</td>
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<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
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<td>165</td>
<td>210</td>
<td>240</td>
<td>290</td>
</tr>
</tbody>
</table>

Note:
For pipings up to 325 mm O.D. (including insulation thickness), aluminium sheet thickness shall be 24 SWG (0.56 mm). Above 325 mm O.D. (including insulation thickness), aluminium sheet thickness shall be 22 SWG (0.71 mm).
### INSULATION SCHEDULE

#### 1. SCHEDULE OF PIPING TO BE INSULATED

<table>
<thead>
<tr>
<th>Fluid Spec.</th>
<th>Size (mm, NB)</th>
<th>Pipe Length (m)</th>
<th>Temperature (°C)</th>
<th>Insulation Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD1</td>
<td>20</td>
<td>96</td>
<td>185°C</td>
<td>Refer Insulation Thickness Table (Appendix – E)</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>12</td>
<td></td>
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<tr>
<td></td>
<td>150</td>
<td>540</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. SCHEDULE OF VALVES TO BE INSULATED

<table>
<thead>
<tr>
<th>Fluid Code</th>
<th>Nominal Valve Size (mm)</th>
<th>Quantity (Nos.)</th>
<th>Temperature (°C)</th>
<th>Insulation Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD1</td>
<td>15</td>
<td>20</td>
<td>185°C</td>
<td>Refer Insulation Thickness Table (Appendix – E)</td>
</tr>
<tr>
<td></td>
<td>150</td>
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</tbody>
</table>
## SCHEDULE OF WORK ITEMS

### Erection of Pipelines

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Item of Work</th>
<th>Spec No.</th>
<th>Size mm NB</th>
<th>Estimated length of pipe M</th>
<th>Elbow</th>
<th>Tee</th>
<th>Reducer</th>
<th>Couplet/ plug</th>
<th>Union/ Coupling</th>
<th>Cap</th>
<th>Estimated no. of joints (nos.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Socket Welded Pipelines</td>
<td>28</td>
<td>20</td>
<td>96</td>
<td>70</td>
<td>20</td>
<td>60</td>
<td>40</td>
<td>20</td>
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<td>2.</td>
<td>Butt Welded Pipelines</td>
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<td>100</td>
<td>12</td>
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<tr>
<td>3.</td>
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<td></td>
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<td>200</td>
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</tbody>
</table>
PROPOSAL SHEETS
ANNEXURE I THRU’ IV
PROPOSAL SHEETS

ANNEXURES TO TENDER SPECIFICATION

(To be filled by the Successful Bidder)

1.0.0 The Bidder shall fill in the Technical information and the data sheets required in the following Annexures after award of contract.

<table>
<thead>
<tr>
<th>Annexure – I</th>
<th>:</th>
<th>Schedule of Items under Tenderer’s Scope of supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annexure – II</td>
<td>:</td>
<td>Technical Particulars</td>
</tr>
<tr>
<td>Annexure – III</td>
<td>:</td>
<td>Progress Schedule</td>
</tr>
</tbody>
</table>
ANNEXURE – I

SCHEDULE OF ITEMS UNDER TENDERER’S SCOPE OF SUPPLY

(Use Separate Sheets for Each Item)

The Tenderer shall submit this Schedule of Items to show his Scope of Supply quantitatively (Additional Sheets may be used if necessary)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Spec. Code *</th>
<th>Item*</th>
<th>Size, mm NB</th>
<th>Quantity, Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>9</td>
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<td></td>
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</tbody>
</table>
* ‘Spec. Code’ and ‘Item’ should be indicated exactly the same way as indicated in Appendix-B enclosed.
ANNEXURE – II
TECHNICAL PARTICULARS

The Tenderer shall furnish technical information for the materials for a given size range as indicated in Mechanical Standard Sheets, (Appendix-D) covered by this Tender Document in the following format without which Tender shall be considered as incomplete. The Tenderer must fill in separate sheets for separate specification Code Nos. as applicable for this offer.

1.00.00 General

1.01.00 Item : 

1.02.00 Specification Code : 

1.03.00 Name and Address of the Manufacturer : 

1.04.00 Size/Size Range, mm NB : 

2.00.00 Technical Specification

2.01.00 Applicable Basic Code/Standard/Specification for design/fabrication manufacture : 

2.02.00 Material of Construction : 

2.03.00 Dimensional Standard & Thickness : Size NB, mm Thickness, mm

2.04.00 Minimum length per Piece of Pipe, M : 

2.05.00 End Preparation Standard : 

2.06.00 Basic Codes and Standards for testing the following as applicable : 

2.06.01 Material : 

i) Chemical Composition : 

ii) Mechanical : 

iii) Metallographic : 

101
2.06.02 Hydrostatic :

2.06.03 Non Destructive :
   i) Radiographic :
   ii) Ultrasonic :
   iii) Eddy Current :

2.06.04 Hydrostatic Test Pressure :
   kg/cm²

2.06.05 Minimum duration of Hydrostatic Test, Minutes

2.07.00 Basic Codes and Standards :
   for inspection Requirement

2.08.00 Certification Requirement :

2.09.00 Marking Standard :

2.10.00 Type of Surface protection given before shipment
## Technical Particulars (Cont’d.)

### Thermal Insulation

1.00.00 INSULATING MATERIAL

1.01.00 Trade Name : 

1.02.00 Manufacturer : 

1.03.00 Insulating Material Offered exactly conforms to Code : 

1.04.00 Test results conform to relevant Standards ? : 

2.00.00 OTHER MATERIALS

2.01.00 Weather Proofing Jacket (Hot Insulation) : 

2.02.00 Wire Netting (hot insulation) : 

2.03.00 Sewing Wire (hot insulation) : 

2.04.00 Sealing Material (hot insulation) : 

3.00.00 GENERAL

3.01.00 Method of Application of Insulation is as specified : 

3.02.00 Other materials like MS Rods, Flats and other materials as indicated in the specification and as shown in the attached drawings supplied as necessary ? : 

3.03.00 All Consumables like welding electrodes. etc supplied as necessary. Yes/No
ANNEXURE - II

TECHNICAL PARTICULARS (Cont’d.)

3.04.00 Erection Tools & Tackles, e.g. scaffolding, welding sets, etc. arranged as necessary? : Yes/No

3.05.00 Drawing on application procedure furnished? : Yes/No

3.06.00 Illustrative catalogue on the types of materials offered furnished? : Yes/No
ANNEXURE - III
PROGRESS SCHEDULE

The Tenderer shall indicate the time required for different phases of work under the scope of this Specification in the format produced below. The time shall be mentioned in number of weeks considering the date of issue of Letter / Telex/Fax/E-Mail of Intent or Purchase Order as zero date, the time shall include the following activities in sequence.

<table>
<thead>
<tr>
<th>Clause No.</th>
<th>Activity</th>
<th>Time in Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00.00</td>
<td><strong>Procurement of Raw Materials</strong></td>
<td></td>
</tr>
<tr>
<td>1.01.00</td>
<td>Start Issuing Orders</td>
<td></td>
</tr>
<tr>
<td>1.02.00</td>
<td>Complete Issuing Orders</td>
<td></td>
</tr>
<tr>
<td>1.03.00</td>
<td>Start receiving at works</td>
<td></td>
</tr>
<tr>
<td>1.04.00</td>
<td>Complete receiving at Works</td>
<td></td>
</tr>
<tr>
<td>2.00.00</td>
<td><strong>Purchase Order for Boughtout Items</strong></td>
<td></td>
</tr>
<tr>
<td>2.01.00</td>
<td>Start issuing Orders</td>
<td></td>
</tr>
<tr>
<td>2.02.00</td>
<td>Complete issuing Orders</td>
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</tr>
<tr>
<td>2.03.00</td>
<td>Start receiving at Works</td>
<td></td>
</tr>
<tr>
<td>2.04.00</td>
<td>Complete receiving at Works</td>
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</tr>
<tr>
<td>3.00.00</td>
<td><strong>Manufacture at Works</strong></td>
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<td>3.01.00</td>
<td>Start Manufacture</td>
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<td>3.02.00</td>
<td>Complete Manufacture</td>
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</tr>
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<td>4.00.00</td>
<td><strong>Testing at Manufacturers’ Works</strong></td>
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<td>4.01.00</td>
<td>Start Testing</td>
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<td>4.02.00</td>
<td>Complete Testing</td>
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## ANNEXURE - III  
**PROGRESS SCHEDULE** (Cont’d.)

<table>
<thead>
<tr>
<th>Clause No.</th>
<th>Activity</th>
<th>Time in Week.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.00.00</td>
<td><strong>Delivery at site</strong></td>
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</tr>
<tr>
<td>5.01.00</td>
<td>Start delivery F.O.R., Hoshangabad</td>
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</tr>
<tr>
<td>5.02.00</td>
<td>Complete delivery F.O.R., Hoshangabad</td>
<td></td>
</tr>
<tr>
<td>5.03.00</td>
<td>Arrival of first consignment at site (estimated)</td>
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</tr>
<tr>
<td>6.00.00</td>
<td><strong>Erection</strong></td>
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</tr>
<tr>
<td>6.01.00</td>
<td>Start Erection at site</td>
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</tr>
<tr>
<td>6.02.00</td>
<td>Complete Erection at site</td>
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</tr>
<tr>
<td>7.00.00</td>
<td><strong>Testing at Stie</strong></td>
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</tr>
<tr>
<td>7.02.00</td>
<td>Complete Testing</td>
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</tr>
<tr>
<td>8.00.00</td>
<td><strong>Commissioning</strong></td>
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<td>8.01.00</td>
<td>Start Trial Run</td>
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</tr>
<tr>
<td>8.02.00</td>
<td>Complete Commissioning</td>
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</table>
QUALITY CONTROL REQUIREMENTS

1.00.00 QUALITY ASSURANCE PROGRAMME

1.01.00 To ensure that the equipment and services under the scope of Contract whether manufactured or performed within the Contractor's works or at his Sub-contractor's premises or at the SPM’s Site or at any other place or work are in accordance with the specifications, the Contractor shall adopt suitable quality assurance program to control such activities at all points, as necessary. Such programs shall be detailed by the Contractor and shall require acceptance and approval by the SPM/DCPL before the award of Contract.

1.02.00 A quality assurance program of the Contractor shall generally cover the following:
   a) His organization structure for the management and implementation of the proposed quality assurance programs.
   b) Qualification data for key personnel.
   c) Use of suitably qualified and experienced personnel in required number for each type of work.
   d) The procedure for quality assurance in design & engineering.
   e) The methods, procedures and program for presenting, collating and assessing information from the various sources, and its incorporation in designed submissions.
   f) Documentation control system.
   g) The procedure for purchase of materials, parts, components and selection of Sub-contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of materials purchased etc.
   h) The method of protection, storage, stock control and issue of materials at site.
   i) System for shop manufacturing and site erection control including process controls and fabrication and assembly controls.
   j) Inspection, sampling, testing, and acceptance procedures for plant and materials delivered to site.
   k) Control of non-conforming items and system for corrective actions.
   l) Inspection and test procedure both for manufacture and all site related works.
   m) Control of calibration and testing of measuring and testing equipment.
   n) System for quality audit and self-monitoring of QA Systems.
   o) System for indication and appraisal of inspection status.
   p) System for handling, storage and delivery to site.
   q) Final inspection and certification of completed sections of work.
   r) Site security procedures.
   s) The recording and processing of variations to the Works and their incorporation on record drawings.
   t) System for maintenance of records.
   u) Furnishing of quality plans for design & engineering, manufacturing and field activities detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of work.
The Quality Assurance arrangements shall include the preparation of and adherence to documented quality plans. After approval by the SPM/DCPL Engineer the Quality Assurance arrangements shall form an integral part of the Contract. No changes shall be made without the prior written approval of the SPM Engineer.

The Bidder shall list his proposed sub-contractors and shall provide the following information in respect of each sub-contractor:

- **a)** The items which the Bidder proposes to sub-contract.
- **b)** The basis on which the Bidder has assessed, or proposes to assess, the quality assurance arrangements of the sub-contractors.
- **c)** How sub-contractors' quality plans/procedures will be approved, monitored and audited on site during the Contract period.
- **d)** The results of any recent evaluations and audits of the sub-contractor which have been performed by the Bidder or other organizations external to the sub-contractor.

The Bidder shall also state the level of detail of the Quality Plan proposed for each sub-contracted item.

The information supplied in response to the above in the Tender shall be deemed a part of the Bidder's proposed Quality Assurance arrangements.

The Contractor shall provide documentation in such a manner that the SPM Engineer is thereby enabled to satisfy himself as to the effectiveness with which the Contractor is implementing those provisions of the agreed and accepted Quality Assurance arrangements which relate to the monitoring by the Contractor to sub-tier Quality Assurance arrangements.

Audits of sub-tier Quality Assurance arrangements shall be recorded in such a manner that the relevant documentation constitutes, inter alia, objective evidence of the extent of the audits and of the effectiveness with which they have been conducted. All such documentation relating to any one audit shall be made available to the Engineer, on request, as a single self-contained document or as one discrete self-contained package of documents.

**General Requirements - Quality Assurance**

All materials, components, equipment and systems covered under this specification shall be procured, manufactured, erected, commissioned and tested at all the stages, as per a comprehensive Quality Assurance Program. Inspections, and tests at works including shop performance tests and test at site for all equipment and systems shall be as per respective codes and standards and also as required in the specification.

Bidder shall furnish a detailed and exhaustive list of all inspections and tests that he or his sub-contractors shall carry out at works and at site for all equipment and systems covered under this specification. The list shall have to be approved by the DCPL/SPM before Award of Contract.
1.07.03 The Quality Plan for design and engineering shall cover the procedure for independent verification, validation and assessment of designs in terms of fitness for purpose, constructability, safety, compliance with standards, maintenance requirements, cost effectiveness etc.

1.08.00 The detailed Quality Plans for manufacturing and field activities (where applicable) shall be drawn up by the Bidder separately and shall be submitted to DCPL/SPM for approval. Schedule of finalization of such Quality Plans shall be finalized before award of Contract.

1.08.01 Manufacturing Quality Plan will detail out for all the components and equipment, various tests/inspections to be carried out as per the requirements of this specification and standards mentioned therein and quality practices and procedures followed by Contractor's Quality Control organization, the relevant reference documents and standards, acceptance norms, inspection documents raised etc., during all stages of materials procurement, manufacture, assembly and final testing/performance testing.

1.08.02 Field Quality Plans will detail out for all the equipment, the quality practices and procedures etc. to be followed by the Contractor's site Quality Control organization, during various stages of site activities from receipt of materials/equipment at site.

1.09.00 The Bidder shall also furnish copies of the reference documents/plant standards/acceptance norms/tests and inspection procedure etc., as referred in Quality Plans along with Quality Plans. These Quality Plans and reference documents/standards etc. shall be subject to DCPL/SPM's approval without which manufacture shall not proceed. These approved documents shall form a part of the Contract. In these approved Quality Plans, DCPL/SPM representative shall identify Customer Hold Points (CHP). A Customer Hold Point signifies a stage in any item of work which requires documented proof of approval based on tests/checks which shall be carried out in presence of the SPM/DCPL's Engineer or his authorized representative and beyond which the work shall not proceed without consent of SPM/DCPL in writing.

1.10.00 The Contractor shall submit to the Engineer complete field welding schedule for all field welding activities for approval. The field welding schedule shall be submitted along with all supporting procedures like welding procedures, heat treatment procedures, NDT procedures etc.

1.11.00 No material shall be dispatched from the manufacturer's works before the same is accepted subsequent to pre-dispatch final inspection including verification of records of all previous tests/inspections by SPM/DCPL’s Engineer, and duly authorized for dispatch.

1.11.01 Quality assurance/Inspection group of SPM/DCPL would issue a Material Dispatch Clearance Certificate (MDCC) after the inspection clearance which will enable the Contractor to dispatch the equipment and claim the payment.
1.12.00 All materials used or supplied shall be accompanied by valid and approved materials certificates and tests and inspection report. These certificates and reports shall indicate the sheet numbers or other such acceptable identification numbers of the material. The material certified shall also have the identification details stamped on it.

1.13.00 Castings and forgings used for construction shall be of tested quality. Details of results of chemical analysis, heat treatment record, and mechanical property test results shall be furnished.

1.14.00 All welding and brazing shall be carried out as per procedure drawn and qualified in accordance with requirements of ASME Section-IX/BS-4870 or other International equivalent standard acceptable to the DCPL/SPM.

All brazers, welders etc. employed on any part of the contract at Contractor's/Sub-Contractor's works or at site shall be qualified as per the requirement of IBR or ASME Section-IX or BS-4871 or equivalent international standards. Such qualification tests shall be conducted in presence of CIB and/or SPM/DCPL’s Engineer.

1.15.00 All non-destructive examinations (NDT) shall be carried out in accordance with approved international standard. The NDT operator shall be qualified as per SNT-TC-IA (of American Society of non-destructive examination). Results of NDT shall be properly recorded and submitted to SPM/DCPL.

1.16.00 All the sub-vendors proposed by the Contractor for procurement of equipment, material and services and their quality assurance plans shall be subject to DCPL/SPM’s approval.

1.16.01 The list of all major sub-contractors would be submitted along with the Tender and this shall be mutually discussed and agreed to at the time of award of Contract. Regarding the various other minor sub-vendors, the list would be submitted within six (6) months of the award of the Contract and shall be mutually discussed and agreed to.

1.17.00 All the purchase specifications for the major bought-out items, list of which shall be drawn up by the Contractor and finalized with the DCPL/SPM shall be furnished to the DCPL/SPM for comments and subsequent approval before orders are placed.

1.18.00 SPM reserves the right to carry out quality audit and quality surveillance of the systems and procedures of the Contractor’s or their sub vendor’s quality management and control activities. The Contractor shall provide all necessary assistance to enable the SPM carry out such audit and surveillance. Quality audit/approval of the results of tests and inspection shall not prejudice the right of the SPM to reject an equipment not giving the desired performance after erection and shall not in any way limit the liabilities and responsibilities of the Contractor in earning satisfactory performance of equipment as per specification.
Quality requirements for main equipment shall equally apply for spares and replacement items.

Repair/rectification procedures to be adopted to make any job acceptable shall be subject to the approval of the DCPL/SPM.

**Quality Assurance Document**

The Contractor shall be required to submit two (2) copies and two (2) sets of electronic files of the following Quality Assurance documents within three (3) weeks after dispatch of the equipment:

a) Material mill test reports on components as specified by the specification.

b) The inspection plan with verification, inspection plan check points, verification sketches, if used and methods used to verify that the inspection and testing points in the inspection plan were performed satisfactorily.

c) Non-destructive examination results/reports including radiography interpretation reports.

d) Factory tests results for testing required as per applicable codes and standards referred in the specification.

e) Welder identification list listing welders and welding operator’s qualification procedure and welding identification symbols.

f) Sketches and drawings used for indicating the method of traceability of the radiographs to the location on the equipment.

g) Stress relief time temperature charts.

h) Inspection and test reports duly signed by QA personnel of the SPM and Contractor for the agreed customer hold points. During the course of inspection, the following will also be recorded:

   i) When some important repair work is involved to make the job acceptable.

   ii) The repair work remains part of the accepted product quality.

   iii) Letter of conformity certifying that the requirement is in compliance with finalized specification requirements.

**Inspection, Testing and Inspection Certificates**

The Bidder shall communicate to the SPM prior to the readiness of the machine to arrange visit of representative for pre dispatch inspection. The inspection will be carried out for five working days by five authorized representatives of the SPM for monitoring the progress of the various facilities of the machine at the suppliers work.
1.22.01 The Engineer, his duly authorized representative and/or an outside inspection agency acting on behalf of the SPM shall have access at all reasonable times to inspect and examine the materials and workmanship of the works during its manufacture or erection and if part of the works is being manufactured or assembled on other premises or works, the Contractor shall obtain for the Engineer and for his duly authorized representative permission to inspect as if the works were manufactured or assembled on the Contractor's own premises or works.

1.22.02 The Contractor shall give the Engineer/Inspector fifteen (15) days written notice of any material being ready for testing. Such tests shall be to the Contractor's account except for the expenses of the Inspector. The Engineer/Inspector, unless the witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days of the date on which the equipment is notified as being ready for test/inspection failing which the Contractor may proceed with test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of test reports in six (6) copies.

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

1.22.04 When the factory tests have been completed at the Contractor's or sub-contractor's works, the Engineer/Inspector shall issue a certificate to this effect fifteen (15) days after completion of tests but if the tests are not witnessed by the Engineer/Inspectors, the certificate shall be issued within fifteen (15) days of the receipt of the Contractor's test certificate by the Engineer/Inspector. Failure of the Engineer/Inspector to issue such a certificate shall not prevent the Contractor from proceeding with the works. The completion of these tests or the issue of the certificates shall not bind the SPM to accept the equipment should it, on further tests after erection be found not to comply with the Contract.

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

1.22.06 To facilitate advance planning of inspection in addition to giving inspection notice, the Contractor shall furnish quarterly inspection programme indicating schedule dates of inspection at customer hold points and final inspection stages. Updated quarterly inspection plans will be made for each three consecutive months and shall be furnished before beginning of each calendar month.
1.23.00 Archiving

In addition to the requisite number of hard copies as specified, four (4) copies of all quality assurance documents, final inspection and test certificates etc. shall be made available to the SPM in Compact Disks before handing over of the plant.
QUALIFICATION/ELIGIBILITY CRITERIA

1. Bidder Firm should have manufactured, supplied, installed and commissioned at least one similar IBR piping work of different sizes with minimum total length of 648 meters, out of which 540 meter length should be of size not less than 150 mm NB, in one plant, complete with all fittings during last five (5) years ending 31st March 2012.

2. The Bidder firm must have an annual capacity to manufacture and supply at least (1) no. similar installation as above.

3. The average annual turn-over of the Bidder during the last three (3) years, ending 31st March 2012 should be at least Rs.25.50 Lac.

4. The Bidder firm should not have suffered any financial loss for more than one (1) year during the last three (3) years ending 31st March 2012.

5. The net worth of the Bidder firm should not have eroded by more than 30% in the last three (3) years ending 31st March 2012.

6. Either the Indian agent on behalf of the principal/OEM or principal/OEM itself can bid both cannot bid simultaneously for the same item/product in the same tender.

7. If an agent submits bid on behalf of the principal/OEM, the same agent shall not submit a bid on behalf of another principal/OEM for the same item/product.

8. The bidder firm should be authorized by IBR authority to carry out such type of steam piping work.

NOTE:

1. All experience, past performance and capacity/capability related data should be certified by the authorized signatory of the Bidder firm. The credentials regarding experience and past performance to the extent required as per the above eligibility criteria as submitted by the Bidder may be verified from the parties for whom work has been done.

2. All financial standing data should be certified by certified accountants’ e.g. Chartered Accountants (CA) in India and Certified Public Accountant/ Chartered Accountant of other countries.

3. **MOST IMPORTANT NOTE:**
   BIDDER TO FURNISH STIPULATED DOCUMENTS IN SUPPORT OF FULFILLMENT OF QUALIFYING CRITERIA. NON-SUBMISSION OR INCOMPLETE SUBMISSION OF DOCUMENTS MAY LEAD TO REJECTION OF OFFER.
TENDER FORM

To

……………………………………………………………………………………………………………..
……………………………………………………………………………………………………………..
……………………………………………………………………………………………………………..
(Complete address of SPM)

Ref: Your Tender document No. ……………………….dated …………

We, the undersigned have examined the above mentioned tender enquiry document, including amendment No. ------, dated ------- (if any), the receipt of which is hereby confirmed. We now offer to supply and deliver……….. (Description of goods and services) in conformity with your above referred document for the sum of _______(total tender amount in figures and words), as shown in the price schedule(s), attached herewith and made part of this tender.

If our tender is accepted, we undertake to supply the goods and perform the services as mentioned above, in accordance with the delivery schedule specified in the List of Requirements.

We further confirm that, if our tender is accepted, we shall provide you with a performance security of required amount in an acceptable form in terms of GCC clause 6, read with modification, if any, in Section V – “Special Conditions of Contract”, for due performance of the contract.

We agree to keep our tender valid for acceptance for a period upto ------, as required in the GIT clause 19, read with modification, if any in Section-III – “Special Instructions to Tenderers” or for subsequently extended period, if any, agreed to by us. We also accordingly confirm to abide by this tender upto the aforesaid period and this tender may be accepted any time before the expiry of the aforesaid period. We further confirm that, until a formal contract is executed, this tender read with your written acceptance thereof within the aforesaid period shall constitute a binding contract between us.

We further understand that you are not bound to accept the lowest or any tender you may receive against your above-referred tender enquiry ................................. Dated this …………… day of ……………………………

For and on behalf of
(With seal)
Signature

Name
In the capacity of
(DULY AUTHORISED TO SIGN THE BID)
### PRICE SCHEDULE

**Name of Bidder:**

**Offer No. & Date:**

**Plant/ Item:** SPM’s Enquiry Ref. .................................................................

---

#### PART – A

(Sheet 1 of 2)

**Quoted Price of Supply Items (FOR SPM, Hoshangabad)**

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>SPECIFICATION CODE NO.</th>
<th>SUPPLY ITEM</th>
<th>SIZE (mm NB)</th>
<th>QUANTITY (METERS/NOS)</th>
<th>UNIT RATE (Rs.)</th>
<th>AMOUNT (Rs.)</th>
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<td>3</td>
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<td>150</td>
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## Quoted Price of Supply Items (FOR SPM, Hoshangabad)

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<th>SL. NO.</th>
<th>SPECIFICATION CODE NO.</th>
<th>SUPPLY ITEM</th>
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<th>AMOUNT (Rs.)</th>
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<td>16</td>
<td>GW4035 W1</td>
<td>GATE VALVE</td>
<td>Ref. Sheet 1 of Appendix-C</td>
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<td>17</td>
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### Supply of Thermal Insulation (Unit of Measurement – Meter. Measured along the C.L. of insulated pipe line)

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<thead>
<tr>
<th>a)</th>
<th>INSULATION ON PIPES</th>
<th>Ref. of Appendix-F</th>
<th>20</th>
<th>96 METERS</th>
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<tbody>
<tr>
<td>b)</td>
<td></td>
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<td>12 METERS</td>
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<td>c)</td>
<td></td>
<td></td>
<td>150</td>
<td>540 METERS</td>
</tr>
<tr>
<td>d)</td>
<td>INSULATION ON VALVES</td>
<td>Ref. of Appendix-F</td>
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<tr>
<td>e)</td>
<td></td>
<td></td>
<td>150</td>
<td>2 NOS</td>
</tr>
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</table>

### Supply of supports, Hangers & Brackets (Quote per Tonne. Quantity shown is indicative only. Actual quantity shall be as measured during erection)

| a)      | Miscellaneous Pipe Supports | Ref. Cl. No. 2.01.06 of Section-VII of this Specification | 250 Kg    |

### Charges

<table>
<thead>
<tr>
<th>20</th>
<th>Packing &amp; Forwarding charges</th>
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<tr>
<td>21</td>
<td>Freight charges including Unloading at site</td>
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<tr>
<td>22</td>
<td>Taxes &amp; Duties as applicable</td>
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<tr>
<td>23</td>
<td>Total Price of Supply Items (1 to 22) in Figures</td>
</tr>
<tr>
<td>24</td>
<td>Total Price of Supply Items (1 to 22) in Words</td>
</tr>
</tbody>
</table>
# PART – B

**Quoted Price of Services (FOR SPM, Hoshangabad)**

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>SPECIFICATION CODE NO.</th>
<th>ITEM</th>
<th>DETAILED SPECIFICATION</th>
<th>SIZE (mm NB)</th>
<th>QUANTITY (METERS/NOS)</th>
<th>UNIT RATE (Rs.)</th>
<th>AMOUNT (Rs.)</th>
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<td>2</td>
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<td>16</td>
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PART – B

Quoted Price of Services (FOR SPM, Hoshangabad)

<table>
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<tr>
<th>SL. NO.</th>
<th>SPECIFICATION CODE NO.</th>
<th>ITEM</th>
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<th>SIZE (mm NB)</th>
<th>QUANTITY (METERS/NOS)</th>
<th>UNIT RATE (Rs.)</th>
<th>AMOUNT (Rs.)</th>
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<tr>
<td>18</td>
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<td>Application of Thermal Insulation (Unit of Measurement – Meter. Measured along the C.L. of insulated pipe line)</td>
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<tr>
<td>a)</td>
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<td>2 NOS</td>
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<tr>
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<td></td>
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<tr>
<td>a)</td>
<td>Miscellaneous Pipe Supports</td>
<td>Ref. Cl. No. 2.01.06 of Section-VII of this Specification</td>
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<tr>
<td>20</td>
<td>Taxes &amp; Duties as applicable</td>
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<td></td>
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<td>Total Price of Services (1 to 20) in Figures</td>
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<tr>
<td>22</td>
<td>Total Price of Services (1 to 20) in Words</td>
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<tr>
<td>23</td>
<td>TOTAL ERECTED &amp; COMMISSIONED COST OF PIPING (PART-A + PART-B) in Figures</td>
<td></td>
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<tr>
<td>24</td>
<td>TOTAL ERECTED &amp; COMMISSIONED COST OF PIPING (PART-A + PART-B) in Words</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Note:-

1. Cost of fabrication and erection of the above items should be inclusive of cost of sandblasting, cleaning and painting as per requirement of the specification.

2. The method of evaluation of L1 criteria for awarding the Contract shall be on consolidated offer by the bidder and will be decided taking into consideration of total offered price including Part (A+B) as above.

Bidder’s Signature______________________________
QUESTIONNAIRE

The tenderer should furnish specific answers to all the questions/ issues mentioned below. In case a question/ issue does not apply to a tenderer, the same should be answered with the remark “not applicable”.

Wherever necessary and applicable, the tenderer shall enclose certified copy as documentary proof/ evidence to substantiate the corresponding statement. In case a tenderer furnishes a wrong or evasive answer against any of the under mentioned question/ issues, its tender will be liable to be ignored.

1. Brief description of Work and services offered:

3. Your permanent Income Tax A/C No. as allotted by the Income Tax Authority of Government of India:
   Please attach certified copy of your latest /current Income Tax clearance certificate issued by the above authority.

4. Status:
   a) Are you currently registered with the Directorate General of Supplies & Disposals (DGS&D), New Delhi, and/or the National Small Industries Corporation (NSIC), New Delhi, and/or the present SPMICL and/or the Directorate of Industries of the concerned State Government for the goods quoted? If so, indicate the date up to which you are registered and whether there is any monetary limit imposed on your registration.
   b) Are you currently registered under the Indian Companies Act, 1956 or ant other similar Act?
   Please attach certified copy(s) of your registration status etc. in case your answer(s) to above queries is in affirmative.

5. Please indicate name & full address of your Banker(s):

6. Please state whether business dealings with you currently stand suspended/ banned by any Ministry/ Deptt. of Government of India or by any State Govt.

…………………………..
(Signature with date)

…………………………..

…………………………..
(Full name, designation & address of the person duly authorized sign on behalf of the tenderer)

For and on behalf of

…………………………..

…………………………..

(Name, address and stamp of the tendering firm)
BANK GUARANTEE FORM FOR EMD

Not applicable
MANUFACTURER’S AUTHORIZATION FORM

Not applicable
BANK GUARANTEE FORM FOR PERFORMANCE SECURITY

[insert: Bank’s Name, and Address of Issuing Branch or Office]

Beneficiary: [insert: Name and Address of SPM]

Date: __________________________

PERFORMANCE GUARANTEE No.: __________________________

WHEREAS…………………………………………………………………………………………………………………………………………….. (name and address of the supplier) (hereinafter called “the supplier”) has undertaken, in pursuance of contract no…………………………………….. dated ………….. to supply (description of goods and services) (herein after called “the contract”).

AND WHEREAS it has been stipulated by you in the said contract that the supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of ……………… ……………… ………………… (amount of the guarantee in words and figures), and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the supplier before presenting us with the demand. We further agree that no change or addition to or other modification of the terms of the contract to be performed thereunder or of any of the contract documents which may be made between you and the supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

We undertake to pay SPM up to the above amount upon receipt of its first written demand, without SPM having to substantiate its demand.

This guarantee will remain in force for a period of forty five days after the currency of this contract and any demand in respect thereof should reach the Bank not later than the above date.

…………………………… (Signature of the authorized officer of the Bank)

…………………………………………………………

Name and designation of the officer

…………………………………………………………

Seal, name & address of the Bank and address of the Branch

…………………………………………………………

Name and designation of the officer

…………………………………………………………

Seal, name & address of the Bank and address of the Branch
CONTRACT FORM

(Address of SPM’s office issuing the contract)

Contract No............ dated..............

This is in continuation to this office’ Notification of Award No..................dated ............

1. Name & address of the Supplier: ________________________________

2. SPM’s Tender document No...................... dated.......... and subsequent Amendment No.............., dated........ (If any), issued by SPM

3. Supplier’s Tender No................................. dated.................. and subsequent communication(s) No........... dated ...... (If any), exchanged between the supplier and SPM in connection with this tender.

4. In addition to this Contract Form, the following documents etc, which are included in the documents mentioned under paragraphs 2 and 3 above, shall also be deemed to form and be read and construed as part of this contract:
   i) General Conditions of Contract;
   ii) Special Conditions of Contract;
   iii) List of Requirements;
   iv) Technical Specifications;
   v) Quality Control Requirements;
   vi) Tender Form furnished by the supplier;
   vii) Price Schedule(s) furnished by the supplier in its tender;
   viii) Manufacturers’ Authorisation Form (if applicable for this tender);
   ix) SPM’s Notification of Award

Note: The words and expressions used in this contract shall have the same meanings as are respectively assigned to them in the conditions of contract referred to above. Further, the definitions and abbreviations incorporated under Section –V - ‘General Conditions of Contract’ of SPM’s Tender document shall also apply to this contract.

5. Some terms, conditions, stipulations etc. out of the above-referred documents are reproduced below for ready reference:

i) Brief particulars of the goods and services which shall be supplied/ provided by the supplier are as under:

<table>
<thead>
<tr>
<th>Schedule No.</th>
<th>Brief description of goods/ services</th>
<th>Accounting unit</th>
<th>Quantity to be supplied</th>
<th>Unit Price (in `)</th>
<th>Total price</th>
</tr>
</thead>
</table>

Any other additional services (if applicable) and cost thereof: …………………………..
Total value (in figure) _______________(In words) ____________________________

(ii) Delivery schedule

(iii) Details of Performance Security

(iv) Quality Control

(a) Mode(s), stage(s) and place(s) of conducting inspections and tests.
(b) Designation and address of SPM’s inspecting officer

(v) Destination and despatch instructions

(vi) Consignee, including port consignee, if any

(vii) Warranty clause

(viii) Payment terms

(ix) Paying authority

..................................................
(Signature, name and address of SPM’s authorized official)

For and on behalf of..............................

Received and accepted this contract

..................................................
(Signature, name and address of the supplier’s executive duly authorized to sign on behalf of the supplier)

For and on behalf of ..........................
(Name and address of the supplier)

.......................... ......................
(Seal of the supplier)

Date: 
Place: 125
LETTER OF AUTHORITY FOR ATTENDING A BID OPENING

(Refer to clause 24.2 of GIT)

The General Manager
Security Paper Mill
Hoshangabad
M.P – 461 005

Subject: Authorization for attending bid opening on _________(date) in the Tender of _________________________________.

Following persons are hereby authorized to attend the bid opening for the tender mentioned above on behalf of _________________________________(Bidder) in order of preference given below.

<table>
<thead>
<tr>
<th>Order of Preference</th>
<th>Name</th>
<th>Specimen Signatures</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternate Representative</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Signatures of bidder or Officer authorized to sign the bid Documents on behalf of the bidder.

Note:

1. Maximum of two representatives will be permitted to attend bid opening. In cases where it is restricted to one, first preference will be allowed. Alternate representative will be permitted when regular representatives are not able to attend.

2. Permission for entry to the hall where bids are opened may be refused in case authorization as prescribed above is not produced.
SHIPPING ARRANGEMENTS FOR LINER CARGOES

Not applicable
PROFORMA OF BILLS FOR PAYMENTS
(Refer Clause 22.6 of GCC)

Name and Address of the Firm

Bill No. Dated

Purchase order No. Dated

Name and address of the consignee

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Authority for purchase</th>
<th>Description of Stores</th>
<th>Number or quantity</th>
<th>Rate Rs.</th>
<th>Price per Rs.</th>
<th>Amount Rs.</th>
</tr>
</thead>
</table>

Total

1. C.S.T./Sales Tax Amount
2. Freight (if applicable)
3. Excise Duty (if applicable)
4. Packing and Forwarding charges (if applicable)
5. Others (Please specify)
6. PVC Amount (with calculation sheet enclosed)
7. (-) deduction/Discount
8. Net amount payable (Rupees in Words)

Despatch detail:

RR No. /other proof of despatch Dated (enclosed)

Inspection Certificate No. Dated (enclosed)

Modvat Certificate No Dated (enclosed)

Excise Duty Gate pass (enclosed)

Received (Rupees in Words)

I hereby certify that the payment being claimed is strictly in terms of the contract and all the obligations on the part of the supplier for claiming that payment has been fulfilled as required under the contract.

Revenue stamp Signature and of Stamp Supplier
<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>DRAWING NO.</th>
<th>TITLE / DESCRIPTION</th>
</tr>
</thead>
</table>
| 1.      | 11P01-DWG-M-181-340.01_Rev.a | PIPE BRIDGE - YARD PIPING  
PIPING - PLAN & SECTIONS |
| 2.      | 11P01-DWG-P-181-200.01_Rev.b | PIPE BRIDGE – YARD PIPING  
BLOCK DIAGRAM |