SECTION – V

PARTICULAR JOB SPECIFICATIONS (PJS)

3.0 JOB SPECIFICATION

3a) PARTICULAR JOB SPECIFICATION FOR MAINLINE, MECHANICAL & ASSOCIATED WORKS

Sabarmati Gas	**Laying, Installation, Testing and Commissioning of 8" dia. Steel gas pipeline connectivity in PATAN GA**	Resonance Energy
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		

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1.1 PROJECT DESCRIPTION

M/s Sabarmati Gas Limited (SGL), a joint venture company of Bharat Petroleum Corporation Limited (BPCL) and Gujarat State Petroleum Corporation (GSPC), was conceived to retail natural gas by implementing gas distribution networks in Northern Gujarat region. M/s Sabarmati Gas Limited has been promoted by BPCL &GSPC for developing City Gas Distribution Network in the 5 districts of NorthernGujarat viz. Gandhinagar, Mehsana, Sabarkantha, Arvalli & Patan.

This tender deals with engineering, laying (also involving various crossings by various methods), testing and commissioning of underground steel pipelines of 8”dia. and other associated works at Patan GA.

1.2 Brief Scope of Work:

General

The work being tendered is covered as indicated below:

The brief scope of work covered in this bidding document broadly consist of Laying,Testing and Commissioning of 8 x 9.3 km (approx) long pipeline and associated facilities for transportation of Natural Gas in Geographical Areas of Patan.

(Navjeevan to Ashapura) 8‘‘x 9.3 Km	**Total =9.3 Km**

Description of the facilities covered in the above are described in following clauses.

Entire buried pipeline network system shall be catholically protected by providing TCP system.

Fabrication & erection of aboveground piping system, but not limited to the associated works including installation of DRS, MRS and Metering Skid at various locations as shown in Schematic Layouts.

Testing, pre-commissioning & assistance in commissioning of entire pipeline and piping system.

1.3 Description of the facilities covered in the above are described in following clauses:

Line Size	8” NB
Total Line Length	9.3 Km
Material of Pipe and Grade	API 5L Gr. X-52
Design Code	ANSI/ ASME B31.8 Latest Edition
Corrosion Allowance	0.5mm
Major Water Crossings	As per SOR
Major Road Crossings	As per SOR
Rail Crossings	As per SOR
Cathodic Protection Works	As per PJs and SOR

Associated underground pipeline works along with installation of barred tees, Insulating Joint , all type & sizes of valves; Civil Works, Structural works and Electrical & Instrumentation Works

1.3.2 Terminals / Stations

i) Aboveground Piping Works inside proposed various MRS at Industrial Consumer's Stations / DRS etc.

ii) Aboveground Piping Works inside proposed various MRS at Industrial Consumer's Stations / DRS etc.

- Gear & hand operated valves of different sizes and types of all ratings.
- Provision shall be kept for future tap-off, wherever required.
- Local mounted instrument such as PG, TG at CGS.
- Installation of aboveground Insulating Joints, wherever required.
- Associated civil, structural and instrumentation works.

iii) SV Stations at various locations

- Burried installation of full bore ball valves, Buried installation of ball /plug valves of different sizes with underground gas venting facilities shall be provided at every alternate SV Station as per drawing.
- Burried installation of future tap-off provision.
- Burried installation of Insulating Joints at all tap-off points, wherever required in-addition to SV stations.
- Burried installation of all types and sizes of valves on mainline & branchline.
- Associated piping, c vil, structural & instrumentation works.
- Installation of Tees / Barred Tees.

1.4 Construction Fronts

Minimum one no. construction front shall be deployed for the proposedpart.

2.0 WORK TENDERED

- The work tendered in this bid package consists of supply (in CONTRACTOR's scope), fabrication, installation, testing and commissioning of the mainline, tap- off stations, various MRS at Industrial Consumer's Stations / DRS and SV stations including all associated Mechanical , civil,structural, instrumentation works.
- All works of the section & terminals included in the scope will be done simultaneously from the date of issue of FOA. Bidder will organize equipment and manpower accordingly to meet this requirement as per instruction of Engineer-in-charge.

3.0 SCOPE OF WORK

The scope of work shall generally be, but not limited to the following:-

3.1 Procurement

3.1.1 CONTRACTOR shall procure and supply all the materials other than OWNER supplied materials, required for permanent installation of main pipeline and terminals in sequence and at appropriate time. All equipment, materials, components etc. shall be suitable for the intended service. Approved vendor list has been indicated inthe bid package for various items.

For items which are not covered in the vendor list, CONTRACTOR shall obtain Owner's prior approval for the vendor. Equipment requiring specialized maintenance or operation shall be avoided as far as possible. Equipment offered shall be field proven.

3.1.2 CONTRACTOR shall procure all materials, components, equipment, consumable etc. required for successful completion of the pipeline syst m. CONTRACTOR shall also procure and supply spares required for pre-commissioning and commissioning/ start up as recommended for all items supplied by him as per specifications provided in the bid package. Where no specification is available in the contract, the same shall be prepared by the CONTRACTOR based on the piping material specification and shall be subject to Owner's approval.

3.1.3 Material take-off with complete description of size, rating material and thickness.

3.1.4 Only single offer shall be provided by the bidder fully complying to specifications/ drawings/ requirements for Owner's review and approval. CONTRACTOR shall provide for inspection of the items at vendor's works by the OWNER/ Owner's REPRESENTATIVE or by a reputed inspection agency and shall submit inspection reports for Owner's clearance.

3.1.5 Stores management including receipt, warehousing, preserving the material in good condition, issue of material to construction site, reconciling/ handing over surplus material to OWNER for OWNER supplied items.

3.1.6 Carryout proper documentation of inspection and quality assurance programmes for all equipment and bulk materials duly approved by OWNER. CONTRACTOR shall maintain an accurate and traceable listing of procurement records for the location, quality and character of all permanent materials in the Project.

3.1.7 CONTRACTOR shall immediately report to the OWNER of all changes which will affect material quality, and recommend any necessary corrective actions to be taken.

3.1.8 Submit periodic manufacturing progress reports highlighting hold ups and slippages, if any, to OWNER and take remedial measures.

3.1.9 Interact with authorities such as Sal s Tax, Octroi, Excise, Customs etc. as necessary and arrange for transportation of the materials under his scope of supply to site.

3.1.10 All purchase requisitions including purchase orders shall be approved by Owner / Owner's Representative.

3.1.11 Compliance with vendors and supplier's instructions and recommendations for commissioning.

3.2 **Construction**

3.2.1 **General**

All construction works shall be carried out as per ―Approved for Construction‖ drawings, procedures, specification and applicable codesand standards. Any changes at site shall also need prior approval from the OWNER and revision of drawings. Construction drawings will be submitted by the Contractor in a phased manner for Owner's approval in accordance with the procurement and construction plan prepared andfurnished by contractor & agreed by Owner. Owner will take minimum 7 working days from the date of submission of the documents / drawings submitted by the contractor for Owner's comments / approval.

3.2.1.1 All construction works shall be carried out as per―Approved for Construction‖ drawings,

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3.2.1.2 Statutory Approvals

The Owner shall provide to the Contractor the basic / in principal approval for laying the pipeline. However, the Contractor at his own initiative shall obtain all permissions, permits and licenses necessary for the performance of the work. If any such permission, permit or licenserequired for the performance of the work by the contractor can only be granted at the request or recommendation of the Owner, the Owner shall at the request of the Contractor, provide recommendatory letters to thecontractor to obtain or procure the same. The contractor shall not, however be entitled to any additional compensation over and above contracted rates of services for any hardship or increased cost causedby any idleness, suspension or disruption of work or any other account whatsoever as a result of the inability of the contractor to obtain the permission(s), permit(s), license(s) aforesaid to match with the progress of the work nor shall the same constitute a ground for extension of time.

a) The approval from any authority required as per statutory rules and regulations of Central/ State Government, PWD, Irrigation Deptt. etc. shall be the contractor's responsibility unless otherwise specified in the tender document. The application on behalf of the Owner for submission to relevant authorities along with copies of required certificates complete in all respects shall be prepared and submitted by the Contractor well ahead of time so that the actual construction/ commissioning of the work is not delayed for want of the approval/ inspection by concerned authorities. The Contractor shall arrange the inspection of the works by the authorities and necessary coordination and liaison work in this respect shall be the responsibility of the Contractor. However statutory fees paid, if any, for all inspections and approvals by such authorities shall be reimbursed at actuals by the Owner to the Contractor on production of documentary evidence.

b) The defective work resulting from poor workmanship and/ or material supplied by contractor, as pointed out by any statutory authority shall be rectified by the contractor at no extra cost to the Owner. Any change/ addition required to be made to meet the requirements of the statutory authorities, the same shall be carried out by the contractor free of charge. The inspection and acceptance of the work by statutory authorities shall, however, not absolve the contractor from any of his responsibilities underthis contract.

3.2.1.3 The Contractor shall comply with all the conditions and requirements issued by Authorities having jurisdiction in the area where the work is to be performed.

It shall be the Contractor's sole responsibilities to make arrangements forland for setting up of its string fabrication yards, all storage areas for line pipe and other materials, wherever required, and all other workareas.

The Contractor shall make all arrangements for access to his work site athis own cost and responsibility. If no public road exists Contractor shall arrange on his own for access to his work area at no extra cost to the COMPANY.

The CONTRACTOR shall be responsible for claims if any arising out of damage/ obstruction to public utilities like lines of DOT etc. where the claims will cover the

restoration costs as well as loss of revenue due to down time.

3.2.1.4 Providing schedules, progress reporting, organization chart at construction site, quality assurance plan and developing quality control procedures, as per requirements indicated elsewhere in the bid package.

3.2.1.5 Coordination and supervising the work of sub-contractors.

3.2.1.6 Transportation of appropriate materials and taking delivery of Company supply materials, store, worksite, intermediate storage points, maintaining and operating an adequate material control procedure at worksite.

3.2.1.7 Fabrication of all piping, structural components as per approved drawings.

3.2.1.8 All civil / structural works, laying and preservation / commissioning of pipeline works shall be performed in accordance with relevant specifications and requirements enclosed elsewhere in the bid package.

3.2.1.9 CONTRACTOR shall provide complete details of manpower, equipment etc. to be deployed. Mobilizing and providing all equipments, manpower (skilled and unskilled), consumable and other resources etc. as required for the execution of the complete job defined herein and thereafter demobilizing the same upon completion of work.

3.2.1.10 Idle time preservation of pipeline, if required.

3.2.1.11 All incidental and associated works and any other works not specifically listed therein but are required to be carried out to complete entire work related to pipelines and terminals.

3.2.2 Main Pipeline

3.2.2.1 Topographic Survey

The contractor shall be deemed to have to familiarized themselves withroute prior to quoting and take care of all the eventualities. No extra costshall be admissible in any form at a later date. The survey drawings & details to the extent available are being furnished to the successful Bidder. Any additional survey/ route survey and their details required either for local detours during execution or for which the survey work for sections of pipeline have not been carried out by owner, shall be carried out by contractor in similar manner without any extra cost to the owner.However, laying and construction of entire pipeline including detoured portion and pipeline section/ sections of pipeline for which survey work has not been carried out by Owner, shall be within the scope of contractor without any cost implication. Contractor shall be deemed to have considered such survey works while formulating his bid. Pipeline route map showing the pipeline tentative route are enclosed with the bid package.

Preliminary schematic layout of city gas steel pipeline grid & CNG facilities, Typical arrangement of SV stations drawings and otherstandard drawings are included in the Bid Package. These drawings areindicative & tender purpose only and are furnished to enable Bidder toestimate the quantum of work and to quote a firm price for the work.Final construction drawings of all type shall be prepared and submitted for approval to Owner by successful bidder / contractor at or before project execution stage. Approved for Construction drawings may vary to some extent from the drawings included in the Bid Package.Contractor shall carry out all works in accordance with the construction drawings duly approved by Owner without any extra time & cost implication to the Owner.

3.2.2.2 Familiarization of Pipeline Route

Bidders are advised arrange to carry out survey and preparation of Alignment sheets, make site visits to familiarize themselves with all the salient features of terrain and available

infrastructure along the pipeline route. Contractor shall be deemed to have considered all constraints and eventualities on account of site conditions along pipeline route while formulating his bid. Contractor shall not be eligible for any compensation in terms of cost and/ or time, on account of site conditions along pipeline route varying to any extent from whatever described in the Bid Package and the drawings furnished along with the Package.

3.2.2.3 Soil Investigation and Soil Resistivity survey

It shall be Contractor's responsibility conduct soil investigation & resistivity survey along the entire pipeline route as per requirement and direction of EIC CONTRACTOR shall not be entitled for any compensation in terms of time or costs. It shall be Contractor's responsibility to familiarize himself with sub-soil conditions along with the pipeline route and workout the lengths of pipeline to be laid in different subsoil conditions including the quantum of rock excavation that would be necessary. Unit rates quoted shall be also be inclusive of all rock excavation. No extra compensation shall be payable to CONTRACTOR for any rock excavation whatsoever.

3.2.2.3.1 The city condition field / other fields may have lots of PVC, PE & utilitypipelines or other pipelines & cables being used for city utility / otherutilities purposes. CONTRACTOR shall ensure that these lines shall not be damaged / cut affecting the water / power / communication/ othersupply to concerned Users / Owners/ Authorities. Wherever required temporary necessary precautions had to be maintained for uninterrupted supply.

3.2.2.4 Right-of-use (ROU)

For pipelines construction purposes, in city condition, pipeline restricted ROU / Corridor will be made available to Contractor by the Owner, the pipeline shall be laid in restricted ROU / Corridor along side of the existing road, inside available corridor, below road / rail / utility culvert, etc. in city areas.

Where the pipeline passes through city areas / industrial areas / forest areas etc., the ROU will be restricted to required width may reduced up to 1 meter as made available by concerned department. Contractor shall carry out construction work in the width as made available to him with no time and cost implication to the Owner. It shall be Contractor's sole responsibility to make arrangement for any additional land required for fabrication, required. construct on, storage and all other work areas, if required.

The contractor shall notify the owner the probable date of commencement of work at ROU site at least two (02) weeks in advance to enable the owner to arrange handing over of the ROU/ site on the date requested. Should contractor fail in such notification, the owner shall not be liable for any claim by contractor, of whatsoever nature, for delay in the available of a ROU/ site.

3.2.2.5 "Receiving and Taking-over" as defined in the specifications of OWNER supplied externally corrosion-coated and bare line pipes at Owner's designated stacking yard dump site. Management of dumpsite after receiving and taking over of pipes transportation including loading/ unloading, handling, stacking, hauling and stringing of pipes from Owner's stacking yards to Contractor's worksite(s)/ workshop(s)/ pipeline Right-of-use (ROU), including arranging all necessary intermediate storage area(s) required thereoftill the pipes are installed in permanent installation.

3.2.2.6 Carrying out inspection of OWNER supplied line pipes and pipe corrosion coating at the time of receiving and taking-over. Carrying out all repairs, to pipe and pipe coating,

including supply of all materials. All handling, lifting, stacking of coated/ bare pipes required duringinspection.

3.2.2.7 Carrying out repairs (including supply of all materials) of line pipe and pipe coating which will include repair of all defects/ damages occurring during transportation and / or handling after receiving and taking over.

3.2.2.8 ROU acquisition / ROU acquisition / principal permission of laying the pipeline including permission for all crossing i.e., rail, road, river, foreign hydrocarbon & utility pipelines, utility cables, HT lines, etc. will be responsibility of the Owner. However, obtaining all necessary approvals, work permits and liasioning / coordination works for ROU acquisition / permission for laying of pipeline and it's all crossing from concerned local authorities and respective Owner's having jurisdiction, as applicable for performing the work including shifting/ relocation and restoration of telephone/ electrical poles and underground pipes and other utilities etc. as required by local authorities and as directed by contractor. OWNER shall be responsibility of contractor.

3.2.2.9 Stacking, clearing, grading, fencing of Right-of-Use (ROU) asrequired, trenching to all depths in all types of soil including soft & hard rock, controlled rock blasting (if permitted, however, permission /approval / NOC / work permit will be obtained by the contractor) byspecial techniques, chiseling or otherwise cutting etc. to a width to alsoaccommodate the HDPE duct as per relevant standards, drawings,specification etc. transportation of coated pipes to ROU along the route,stringing, aligning, bending, welding, NDT including radiography by X- ray **(Gamma ray will only be permitted in inaccessible area like tie- in pit etc., where Engineer-in-charge feels necessary and decision of Engineer-in-charge shall be final & binding to the contractor)** and ultrasonic (if required), inspection, field weld joint coating including supply of all materials, protective coating of long radius including supply of materials as per specifications, sand padding, laying and lowering of the pipeline, back filling, slope breakers as required, carrying out road, canal, utility and submerged minor water course crossings including bank stablisation of water course crossings as required, crossing of nallah/ canal by conventional method. Supply and installation of anti-buoyancy measures viz. continuous concrete coating, saddle weights, extra cover etc. on pipeline as shown in approved drawings and as directed by OWNER, installation of supports wherever required, supply of select backfill material as required, clean-up, pigging, flushing, hydrostatic testing with the quantity of inhibitor as required, dewatering with the additive, at required dosage, swabbing, pre-commissioning and commissioning of complete pipeline system, including all associated works as per relevant specifications, standards and approved drawings.

3.2.2.10 Field weld joint coating shall be by heat shrink sleeve (Raychem /Canusa) / other suitable material as per specification enclosed with bid package compatible of pipe coating material

3.2.2.11 Installation of all inline/ online instruments/ valves/ insulation joints/ Barred Tees drawings/ appurtenances etc. as per requirements of approved drawings.

3.2.2.12 **Crossings**

Joint site visit shall be conducted with successful bidder to finalise the noof crossing and its methodology for execution. EIC decision in this regard shall be final and binding to the contractor.

All crossings shall be crossed by heaviest wall thickness carrier pipe among available pipes

at site or as per approved drawings/ as decided byEngineer-in- charge.

3.2.2.12.1 Railway Crossings

The general arrangement drawings for railway crossings shall be approved by Indian Railways and construction shall be carried out accordingly. These drawings shall be made available to the Contractor at appropriate time during the execution of the project. Pipeline at railway.

3.2.2.12.2 Road Crossings

i) Contractor shall firm the method of crossing of roads such as open cut/ boring up in consultation with concerned authorities and Company. The Contractor shall also take due care to identify and take due precautions so as not to disturb or damage the utilities likecables, water lines and other structures.

ii) After laying the pipeline in a road crossing by open cut method, theContractor shall either completely backfill the road & make ready for restoration or completely restore the road to its original condition depending upon instructions of Owner / EIC.

iii) While laying the pipeline in road crossings by open cut method theContractor should ensure that the traffic is not stopped dur ng theexecution of work. This may be done by cutting half of the road ata time so as to enable the traffic to pass on the remaining half of the road. Alternatively, the Contractor can provide diversion roads tomaintain the flow of traffic.

iv) The Contractor shall provide proper caution boards during day time and danger lights during night time when the cutting operationof the road is going on.

For cased crossings, the pipeline should be taken through the casing pipe which should be at least 1.2 metres below the road top as specified or as per the requirements of local authorities, whichever is higher. All nationalhighway and state highway as indicated in relevant drawings/ alignment sheets/ or as directed by Engineer-in-charge shall be cased crossing.

3.2.2.12.3 Crossings of rivers/ streams/ canals by conventional method:

i) No damage should be caused to any irrigation sources, while laying the pipeline through canal crossings.

ii) The flood banks of the River/ Canal should be brought to the original condition, if they are damaged by the laying of the pipeline. Stablisation of banks shall be carried out as per requirements of concerned authorities.

iii) In general, the top of the pipeline shall be taken at least 1.5 meter below the scour level of river crossing. If scour level is not known minimum 2.5m cover should be kept unless specified otherwise.

iv) The top of pipeline shall be at least 1.5m to 2.0m below the drain/ canal bed unless specified otherwise.

v) Pre-construction survey, preparation of the detailed construction methodology/ plan and time etc. shall have to be finalised by Contractor in consultation with concerned authorities having jurisdiction over canals/ rivers. Company shall provide assistance by providing introductory letters.

vi) Pre-construction surveys, preparationof detailed construction method statement and calculations for Owner's approval.

vii) Geo-technical investigations, if required.

viii) Site preparation, arranging required land for setting up of string fabrication yard and obtaining necessary permissions from concerned authorities.

ix) Preparation of pipeline Launch way, continuous concrete coating of pipes, repair of damages to corrosion and concrete coating, string preparation, field welding, NDT including radiography, pretest of completed strings, corrosion and concrete coating of field joints. Trenching, laying at approved depth, stabilisation of banks, post installation hydro-test, capping, providing and installing of markers, etc.

x) The major canals with lining/ perennial canals need to be crossed by HDD/ boring method only.

3.2.2.12.4 Crossings by Horizontal Directional Drilling (HDD)

Contractor shall cross the roads /water crossings by HDD method at various depth in different locations as directed by Owner / Consultant eitheras per site conditions or as per instruction received from concerned authorities, whichever will be higher/ stringent and decision of Owner / Consultant in this regard shall be final & binding to the contractor. Before start of HDD, the contractor shall ascertain by pre-construction survey all undergroundobstacles namely electrical/ telecommunication cable, foreign pipeline, water line, drain/ sewerage line etc. and prepare crossing profile drawings showing all elevations & levels. The contractor shall also ascertain, the type of soil & their terrain whether rocky or normal by wayof trial pit or by geo-technical survey in case of river etc. before start of job. The contractor shall submit procedure, profile drawing with complete design calculations of HDD as per requirement of ASME B31.8/ OISD norms and safety requirement that pipe is not under stress during and after crossing for Owner/ Consultant's approval pr or to start the execution of works.

Contractor shall determine the minimum allowable elastic bend radius for pipe from the following considerations:

i) Maximum longitudinal stress during installation

Total maximum longitudinal stress in the pipeline due to tensionand bending at any location shall not exceed 90% of the SMYS ofthe pipe material.

Contractor shall in order to check this requirement evaluate the maximum tensile forces to which the pipeline is subjected to at anyphase of its installation during the pulling operation.

ii) Maximum equivalent stress during final hydrostatic test.

After installation the pipeline shall be hydrostatically tested at a pressure stipulated in the Special Conditions of Contract / relevant Particular Job Specification. During hydrostatic testing thecombined equivalent stress in the pipeline due to bending and testpressure shall not exceed 90% of the SMYS of pipe material.

iii) Maximum equivalent stress during service

Permissible values of maximum equivalent stress during service shall be governed by the requirements of ASME B31.8. Thedetails of pipeline operating parameters are provided in the Special Conditions of Contract.

The minimum allowable radius of curvature for the pipeline shall be the highest value of the minimum pipeline elastic radius as computed from the considerations outlined in clause no. i), ii) & iii) above after correction for drilling inaccuracies (or multiplication by the factor 1.85) whichever results in the highest permissible value of minimum elastic bend radius.

Contractor shall ensure all safety norms regarding distances from end point or from bottom of crossing a d also ensure that external coating ofpipe is not damaged during pulling & handling of pipe for crossing. Forfield joint coating in pipeline string made for HDD, special type of heatshrink sleeve shall be used as per specification enclosed with the tender. For line pipe coating repair, special type of high shear strength repair patch material shall be used which characteristic shall be same orequivalent as original wrap around heat shrink sleeve used in pipelinestring for HDD crossing.

The contractor shall ensure that no any underground existing utilities/ pipelines/ cable etc. are damaged. It shall be responsibility of contractor to compensate any loss or damage to other agency if damaged while crossing. Contractor shall arrange all statutory permission from concernedauthority before start of job. Contractor shall deploy only Owner / REPLapproved HDD agency and approval of HDD agency shall be sought beforedeploying HDD agency.

3.2.2.13 Hydrostatic Testing, Dewatering, Swabbing and Drying of Pipeline

Contractor shall hydro test the pipeline @ 1.5 times of design pressure. The test duration shall be minimum 24 hours.After successful completion of hydrostatic testing of the pipeline, Contractor shall dewater the pipeline. As a minimum, Contractor shall continue the dewatering operation until the volume of water removed is less than volume of 2 metres of full pipe length.

After completion of dewatering operations, Contractor shall carry out swabbing of pipeline by running high/ medium/ low density foam pigs propelled by compressed air through the pipeline. Prior to their launching,Contractor sha l weigh the pigs. On arrival of the pigs at the receiving endthey shall be re- weighed. The swabbing operation shall be repeated till the weight of the last received foam pig does not increase by more than 50% or 10 runs of foam pigs whichever is earlier.

The pipeline/ section(s) of pipeline shall never be left empty (filled with air) after dewatering/ swabbing. Contractor shall take up dewateringand swabbing of pipeline after hydrotesting only when Contractor is readyfor carrying out the drying operation immediately following pipeline swabbing. Till such time Contractor is ready to start drying of pipeline, the pipeline/ section(s) of pipeline after hydro testing shall be kept filled

with inhibited water or the pipeline/ section(s) of pipeline shall not be dewatered. Preservation of pipeline using inhibited water from the time of completion of hydro testing till Contractor is ready for drying of pipeline, shall be carried out by Contractor as part of his scope of work atno extra cost to Owner.

After the results of swabbing operation has been accepted by Owner,nitrogen purging of line may be started for pre-commissioning activities as per specification.

Pre-hydrotesting of aboveground mainline section shall be carried outseparately and test duration shall be minimum 4 (four) hours.

3.2.2.14 Leak Detection

a) Contractor shall submit a detailed procedure for detection of anticipated/ probable leak which is likely to be found during hydro test. Such method of detection shall consume minimum possible time to complete the hydrotest activity withincontractual completion schedules. This procedure needs priorapproval.

b) For Major Leak/ Burst (attributable to Owner) which can be traced visually by re-excavation – rates for locating and rectification shall be paid as per item included in mainline SOR for each Leak/ Burst.

c) For Minor suspected Leak (attributable to Owner) which cannot be visually located and which requires sectionalising of pipeline or any other suitable means, rates of activities for leak detection shall be derived from rates of equipments and manpower available in the Contract. However, for the pipe which needs to be replaced after the leak has been located, the payment will be made as per SOR item i.e. same as (b) above.

In case after sectionalisation/ other method no leak is detected, for such eventuality no payment will be made for efforts made for sectionalising/ other means.

3.2.2.15 Hydrostatic Test Pressure

The pipeline shall be hydrostatically tested to a minimum test pressure 1.5 times the design internal pressure.

3.2.2.16 All tie-in joints including tie-ins with existing facilities, if any. All tie-ins shall be welded tie-ins.

3.2.2.17 Markers

Installation of all types of markers including all associated civil works. Any other work not specifically mentioned above but required for making the entire pipeline system ready for operation.

3.2.2.18 CATHODIC PROTECTION

Scope of Work as per respective PJS, SOR & technical specification

3.2.2.19 Priorities

The Contractor shall start the execution work for entire length of mainline simultaneously and shall deploy adequate manpower, machinery, tool & tackles etc. accordingly.

However, Owner may, at its sole option, assign priority of construction of any section of total pipeline length or to any part/ segment of the work. Contractor shall comply with such

priority of execution and their deployment without any time and cost implication to the Owner.

3.2.2.20 Survey Pillars – Deleted

3.2.2.21 Forest/ Plantation Areas

Where the pipeline route passes through forest/plantation areas, Contractor shall clear only the minimum width required for laying the pipeline as per Owner approved procedure for pipeline construction. Number of trees/ plants to be felled down shall be restricted to a minimum.

3.2.2.22 Restoration of ROU

Clean-up and restoration of ROW and other conveniences like road, rail, canals, cultivable land etc. to original conditions as per specification and drawings to the entire satisfaction of OWNER and/ or Authorities having jurisdiction over the same, including disposal of surplus construction approved by materials to a location identified by local authority without causing any CONTRACTOR disturbance to environment, locals and to the entire satisfaction of OWNER. Upon restoration of ROU the Contractor shall furnish documentary evidence in support of acceptance of the same duly signed by land Owner without any extra cost.

3.2.2.23 Preparation and submission of as built drawings, pipe books, documents, photographs of major activities, and project records as per specification and instructions of the OWNER including furnishing of all Test Certificates/ Inspection Reports for all materials used for permanent installation in requisite numbers as mentioned elsewhere in this document.

3.2.2.24 Idle Time Preservation of the Pipeline – (if required)

3.2.2.25 ROW Clearing

During ROU clearing, the vegetation shall be cut off at ground level leaving the roots intact. Only stumps and roots directly over the trench shall be removed for pipeline installation.

3.2.2.26 Pre-commissioning and Commissioning Assistance

3.2.2.26.1 Drying and pre-commissioning including supply of all materials, consumables and manpower of the complete pipeline system and terminal piping work.

3.2.2.26.2 Making the entire system ready for commissioning and providing assistance during the complete duration of commissioning operations.

3.2.2.26.3 Completion of all mainline activities as detailed in SOR.

3.2.2.26.4 Complete N2 purging before the start of welding at all hook up works as indicated/ shown in schematic drawing enclosed in Tender Document.

3.2.3 Terminals (Tap-off Point, various MRS at Industrial Consumer's Stations / DRS)

3.2.3.1 Piping Works

Supply of assorted pipe, fasteners, gaskets, fittings, flanges, utility piping & Piping supports and other supply wherever specified as per SOR.

- Taking delivery of free issue materials from Owner's designated stores and its transportation to site.

- All fabrication, erection, testing and commissioning of piping above ground at all elevations and below ground at all depths including provision shall be kept for installation of temporary flanged end header for Pig Launching, all valves, insulating

joints, barred tee and other fittings associated piping works as per drawings and specifications. All Mechanical works, underground and above ground, complete piping including fabrication, welding, all non-destructive testing of welds repairs/ pretesting, hydrostatic testing, cleaning/ flushing, functional testing, cutting of mainline and bevelling (if required), excavation in all types of soil for installation of piping and pipe supports.

- Installation of all inline/ online instruments.
- Obtaining all necessary approvals and work permits from concerned local authorities having jurisdiction including hot work permit as applicable for performing the work.
- Carrying out welding including cutting, edge preparation (inclusive of grinding the edges on fittings, flange, etc. to match with the matching edges of different thickness wherever required
- NDT requirements for process and other piping shall be in accordance with relevant specifications enclosed with the tender document.

- Preparation of plot plan cum piping GAD based on schematic drawings provided in the tender document for tap-off station, various MRS at Industrial Consumer's Stations / DRS & SV stations. Preparation of isometric drawings and final Bill of Material based on piping detail GA drawings prepared by contractor & duly approved by Owner / Consultant.
- Cleaning and servicing of all free issue materials including equipment, valves to make it suitable for installation.
- Completion of all Mechanical works as detailed in SOR.
- SV station, branch piping shall be hydrostatically tested to the test pressure in accordance with Specification for piping fabrication, erection. Test pressure shall be 1.5 times design pressure and minimum duration of test shall be four (4) hours. All ball and plug valves in the piping network being hydro tested shall be kept in the partially open position.

3.2.3.2 Equipment and Vessels – As per SOR

3.2.3.3 Civil & Structural Works

Civil & Structural Works shall be carried out as per the scope detailedin PJS, SOR and Technical Specification.

3.2.3.4 Electrical - DELETED

3.2.3.5 INSTRUMENTATION SCADA & TELECOM

3.2.4.5.1 Instrumentation – DELETED

3.2.4.5.2 SCADA & Telecom – Scope of Work as per respective PJS, SOR & technical specification

3.2.3.6 Painting

- Painting (including supply of all materials) of all equipment, piping, structural steel elements for pipe supports, and all structural miscellaneous items as required and as directed by Company. Paint shall be suitable for highly corrosiveenvironment as per specification providing total DFT of 345 µ minimum as per Specification No. REPL/S/05/21/07. Painting shall include primer and finish coats as per specifications. Prior to painting surface shall be sand blasted as per instruction of Engineer-in-charge.
- For equipment, valves and other free issue items only one finishcoat of final paint will be provided.

3.2.3.7 Other Works

- Obtaining all necessary approvals and work permits, as applicable, for performing the work.
- Carrying out all additional surveys, test and collection of data not furnished by company but required for construction of facilities.
- Provision is to be kept in the terminal for installation of Permanent Cathodic System.
- Extension/ provision of the utilities at desired locations fromthe consumers battery limit, the utilities are fire water, instrumentair, plant air, drinking water, service water and electrical power.
- Any other work not specifically listed herein but required for the construction of the terminals and making it ready for the operation.

4.0 SCOPE OF SUPPLY

4.1 Material to be supplied by Company as 4.2

4.2.1 Line pipe (Bare/ Coated) of all required sizes including valves, IJ as available

Three Layer PE Coated line pipes shall be provided to the contractor as free issue material however other material to the extent available to the company shall be made available to the contractor.

Contractor shall receive and take over the pipes, valves & other material from Owner's designated store. At the time of taking-over contractor shall perform inspection of pipes, pipe coating & valves and record all defects noticed in the presence of Company's Representative. Contractor shall repair all defects recorded at the time of taking-over pipes & valves and shall be compensated as per rates set forth in the Schedule of Rates.

Any repairs to 3-Layer Polyethylene coating shall be carried out by Contractor using suitable material compatible with parent coating system and meeting the requirements

of coating system specified in specification for 3-layer polyethylene coating. The coating repair material and procedure for application shall be submitted to REPL for approval prior to start of construction.

4.2.2 Deleted.

4.2.3 Contractor to note that quantities of line pipe indicated in the bid document includes contingency/ extra length over and above the actual requirements. Surplus pipes shall be taken over by the Installation Contractor from Coating installation works. It is Contractor at storage yard after completion of the responsibility of Installation Contractor to return surplus pipes to the COMPANY storage yard as per instructions Engineer In- Charge after completion of installation works.

4.2.4 Receiving and taking over of bare and coated line pipes at Storage yard including its inspection. All trucks / trailers for transportation of line pipes from storage yards to site/ ROU/ Contractor's storage Yard shall be supplied by contractor. The coating contractor shall load the coated/ bare line pipes onto the truck/ trailers supplied by Contractor.

4.2.5 Contractor shall note that Chainage indicated for SVs are approximate and may vary along the pipeline chainage, based on the availability of land and NH/SH/ Rail approach. The exact location of Company's storage yard shall be intimated to the Contractor at the time of award. Contractor shall be responsible for performing all works as per scope of work at the finally selected storage yard location by the COMPANY at no extra time/ cost to the COMPANY.

4.2.6 Transportation of pipes and other free issue material from place of issue is in Contractor's scope. Contractor shall note that the prices indicated in the Schedule of Rates shall be inclusive of taking the delivery and transportation of line pipes and other material from the above storage yard/ stockyard to work place(s).

4.2.7 Bevel Protectors of the line pipes shall be the property of the pipeline installation Contractor. He has to collect and dispose off the bevel protectors. Contractor shall quote accordingly.

4.2.8 Supply of Telecommunication, Civil & Structural items as elaborated in respective particular job specification and SOR enclosed elsewhere with the tender document.

4.3 Company's storage point for free issue material of this project shallbe as mentioned in Annexure-2 to SCC.

Contractor shall arrange all trucks/ trailors, cranes etc. for transportation of above mat rials including loading at Company store, unloading at contractor's storage yard/ work site, arrangement of cranes, handling etc.

Contractor shall return all surplus material to company designated storage yard as decided by Engineer-In-Charge.

4.4 Conditions for issue of Company Supplied Material

Contractor shall prepare and submit Material Issue Vouchers to enablestage wise issue of materials. All materials shall be issued for incorporation in permanent works only and shall not be used for any temporary or ancillary works without the written consent of Engineer-in-charge. These materials shall be issued to the contractor from the Owner's storage points. Contractor shall be responsible, at this own cost, for lifting of the materials from Owners issue points, measuring,weighing, loading, unloading, transportation and return of materials to designated storage points. Contractor shall also be responsible forconstructing covered godowns with adequate supports and clearances forsafe storage of materials.

Every month the contractor shall submit an account for all the materials issued by the owner in the proforma prescribed by the Engineer-in-charge. On completion of the work, the contractor shall submit materialsappropriation statement for all materials issued by Owner.

4.4.1 All materials issued by the COMPANY to the CONTRACTOR shall be preserved against deterioration and corrosion. Any damages/losses suffered on account of poor or improper storage while under CONTRACTOR'S custody and non-compliance with the requirements stipulated herein shall be considered as losses suffered due to willful negligence on the part of the CONTRACTOR and he shall be liable to compensate the COMPANY, for the losses suffered, at penal rates as elaborated elsewhere in the bid document.

Various equipments/ materials intended for the installation will be received by COMPANY in unpacked, skidded, crated, packed or loosecondition and will be stored in the COMPANY warehouses & open yards. In general, material will be issued to the CONTRACTOR in "as- received" condition. It will be the CONTRACTOR'S responsibility to draw, load and transport all materials from COMPANY's designated place (s) of issue to the point of installation.

The CONTRACTOR at his own cost shall duly protect all materials supplied by the COMPANYwith appropriate preservative likeprimer/lacquer coating, grease etc, if required.

The Contractor shall be required to take Insurance Cover in terms ofgeneral conditions of contract.

4.4.2 The CONTRACTOR shall check that valves, fittings and specials are not subject to corrosion from hydrostatic test liquid remaining saturated in the packing. Any such conditions when detected should be brought to the notice of the Engineer-in-charge and remedial measures taken as directed. Small and medium size pipe, fittings shall be stored in rack to be constructed from this purpose in a covered godown. When large size pipe fittings are to be stored, these may be kept in the open on surfaced storage yards on proper wooden supports.

4.4.3 All machined surfaces shall be properly greased and shall be maintained and protected from damages.

4.4.4 Openings of equipment, machinery, valves etc. shall be kept blocked/ covered with blinds to prevent entry of foreign matter.

4.4.5 All valves, instruments, pressure gauges, thermometers etc. supplied independently, as well as alongwith equipment and machinery shall be stored separately, inside the covered godown on racks.

4.4.6 As far as possible materials shall be transported to the erection site, just prior to their actual erection and shall not be left laying around indefinitely. Instructions for the Engineer-in-charge shall be followed strictly in this regard.

4.4.7 Repairs of Pipe Defects

Immediately prior to aligning pipe for welding, the bevelled ends of each joint of pipe and the area immediately adjacent thereto (at least 25 mm from the edge on the inside and outside of the pipe) shall be thoroughly cleaned of paint, rust mill scale, dirt or other foreign matter by use of power-driven wire buffing wheels, disc sanders, or by other method approved by COMPANY. This shall be done at no extra cost.

All damaged ends of pipe that are bent, cut or otherwise mutilated such that, in the opinion of the COMPANY, faulty alignment or unacceptable welding would result, shall be repaired or cut-off and rebevelled to the correct angle with a bevelling machine of a type approved by COMPANY. No compensation shall be allowed by reason of such re- cutting or bevelling, except when required because of the original bevel being damaged before the pipe is "taken over" by CONTRACTOR.

CONTRACTOR shall remove dents in bevels with a depth of less than 1 mm during cleaning and grinding, ahead of the welding in the field. No compensation hall be paid to Contract or on this account.

CONTRACTOR shall rebevel dented bevel ends with a depth of dent between 1- and 3- mm. Dents over 3 mm depth shall be repaired by cutting and rebevelling. The CONTRACTOR shall be entitled for extra compensation only for cutting and rebevelling of defects recorded at the time of taking delivery as per the rate set forth in the "Schedule of Rates".

4.5 Material to be supplied by Contractor

The procurement and supply, in sequence and at appropriate time and place, including inspection and expediting, of all materials and consumables required for completion of the work as defined in this bid document except the materials specifically listed under para 4.1 above as COMPANY free issue material, shall be entirely the CONTRACTOR's responsibility and the item rates quoted for the execution of the WORK shall be inclusive of supply of all these materials. All materials supplied by the CONTRACTOR shall be strictly in accordance with the requirements of relevant COMPANY material specifications enclosed with the Contract document. All equipments, materials, components etc. shall be new and specifically purchased for this job from Company approved vendors, duly inspected by third party inspection agency, only manufacturer certificate shall not be adequate.

Contractor shall appoint anyone of the following TPIA for inspection purpose, wherever required as per tender document. Contractor has to propose minimum 4 nos. of below listed agencies to be approved by Owner /Consultant:

a) Lloyd Register of Industrial Services

b) Technische Ulierwachungs Verein(TUV)

c) Det Norske Veritas (DNV)

d) AB-Vincotte

e) Bureau Veritas

f) SGS

g) American Bureau Services

h) Velosi Certification Services

i) Certification Engineers International Limited (CEIL)

Apart from inspection by TPIA, inspection may also be performed by REPL / Owner's personnel.

As a minimum, the materials to be supplied by CONTRACTOR shall include but not limited to the following:

4.5.1 Mainline

4.5.1.1 All equipments & consumable such as welding electrodes, oxygen, acetylene, inert gases, all types of welding electrodes, filler wires, brazing rods, flux etc. for welding/ cutting and soldering purposes.

4.5.1.2 Supply of 1.0 mm thickness & width (D+300) warning mat. The mat rial of warning mat shall be of high density polyethylene and non biodegradable type. It shall have non-toxic and anti-rodent properties.

4.5.1.3 All materials and consumables required for external corrosion coating and concrete coating (where required) of field weld joints.

4.5.1.4 All materials required for field joint coating, corrosion coating of LR bends, pup pieces of sectionalising valves and repair of damaged corrosion coating of line pipe. Contractor shall confirm that proposed field joint coating material is suitable for type of terrain encountered along pipeline route. Contractor shall take prior approval from COMPANY for field joint coating material to be used. The cut back length shall be 150 mm + 20 (-0) mm.

4.5.1.5 All material, equipment & consumables for HDD works including Direx heat shrink sleeves by Covalence Raychem or TBK heat shrink sleeves by Canusa- CPC or equivalent.

4.5.1.6 All materials required for carrying out two component epoxy coating for internal surface of casing pipe, wherever required by statutory authorities.

4.5.1.7 All materials required for sand/ soft soil padding around pipeline and optical fibre cable,

PVC warning mats, select backfill of approved quality, slope breakers, bank stabilization of water crossings etc.

4.5.1.8 Mobilizing and providing all necessary barricading material, safety signboards, warning lights etc to safeguard the pipeline against accidents during construction of line in city area.

4.5.1.9 All safety tools, tackles, devices, apparatus, equipment etc. including ladders and scaffolding complete as required.

4.5.1.10 All stud bolts, nuts, jack screws, all type of gaskets (metallic spiral wound gaskets) in required quantities to be used for permanent installation into the system for all sizes and ratings of flanges and flanged valves, equipment etc., including nuts, bolts, gaskets, washers, U bolts, clamps, clips etc. for pipe/ equipment supports. All materials for supports shall be in contractor's account.

4.5.1.11 All types of coating and painting materials including primer and paints suitable for normal corrosive environment for painting above ground piping and 100% solid high build epoxy (minimum 500 micron thk) for underground piping/ valves, etc.

4.5.1.12 All pipes, fittings, flanges, blind flanges, gaskets, nuts, bolts, clamps, strainers, equipment/ consumable, metallic blinds, temporary gaskets as required for filling, pressurising, hydrostatic testing and dewatering, swabbing etc. including test headers for pigging and hydrotesting.

4.5.1.13 All materials required for repair/ restoration of pavements, roads, bunds, walls, other structures affected/ damaged by Contractor's construction activities. Materials shall be equivalent/ superior to those used for original construction of the facility.

4.5.1.14 All equipment and consumables required for hydrostatic testing like pumps, pressure and temperature gauges, test water and corrosion inhibitors for test water for hydrostatic testing.

4.5.1.15 VOID

4.5.1.16 All materials, consumables and equipment required for welding and for all types of tests and NDT such as radiography, ultrasonic testing, magnetic particle, dye penetrate examination etc. including radiography film, X-ray/ gamma ray machines, developing equipment and consumables, Ultrasonic equipments etc.

4.5.1.17 All safety tools, tackles, devices, apparatus, equipment etc. including ladders and scaffolding complete as required.

4.5.1.18 All materials for corrosion protection of buried piping, pipe fittings, valves, casing pipes, etc.

4.5.1.19 Mobilizing Pipe/ cable locator for locating existing pipelines/ cables

4.5.1.20 Corrosion inhibitor, oxygen scavengers and bactericides for water used for hydrostatic testing including water for testing.

4.5.1.21 Required quantities of nitrogen for idle time preservation and pre- commissioning of

Pipeline and associated facilities, if required.

4.5.1.22 Required quantities of nitrogen for commissioning of Pipeline and associated facilities.

4.5.1.23 All pigs for cleaning, gaugaing, filling, dewatering, swabbing, drying, pre-commissioning of the pipeline.

4.5.1.24 All materials i.e. fittings, flanges, valves, blind flange etc. required for isolation and nitrogen purging for pipe section, manpower, equipment, pigs, consumables, nitrogen required for carrying out commissioning of pipeline along with necessary piping and instrumentation connection for monitoring flow rate, pressure, temperature etc. providing temporary facilities for venting/ flaring along with necessary piping, valves and instrumentation etc. shall be contractors scope.

4.5.1.25 All other materials not specified above but required for successful completion of the entire work whether temporary or permanent in nature.

4.5.1.26 All materials for all types of pipeline markers / warning marker including HDPE Warning Sheet, cement, sand, reinforcements, structural steel etc.

4.5.1.27 All Materials required for continuous concrete coating/ saddle weigh for providing negative buoyancy to the pipeline wherever required.

4.5.1.28 Supply of Bends of radius (R=3D) in contractor's scope as detailed in SOR.

4.5.2 Terminals

4.5.2.1 Piping, Equipment & Vessels

a) Studs, nuts, washers, U bolts, clamps, clips, pipe supports,gaskets for piping works.

b) Shims, wedges and packing plates (machined wherever required)Galvanized steel piping of all sizes for instrument air/ service air.

c) Portable Fire Extinguisher System.

d) Painting material

e) other items/ materials as may be required for completion of

All contractual scope of work and in SOR but not covered under material tobe supplied by company as free issue material at 4.1.

4.5.2.2 Civil & Structural

All materials as elaborated in respective SOR and PJS enclosed elsewhere with the tender.

4.5.2.3 Cathodic Protection Works – Scope of supply as per respective P JS, SOR & technical specification

4.5.2.4 Instrumentation & Telecom

4 .4.2 .4.1 Instrumentation – As per SOR

4 .4.2 .4.2 Telecom – Not in Scope

4.4.2.5 All painting materials. Paint shall be suitable for highly corrosive environment.

4.5.3 General

4.5.3.1 All consumables for welding such as oxygen, acetylene, inert gases and all types of electrodes suitable for pipes of grades as specified in the specification, low hydrogen electrodes, filler wire,solder wire, brazing rods, flux etc. for welding / cutting and soldering purpose.

4.5.3.2 Equipment like hydrostatic pump etc., water and corrosion inhibitor for water used for hydrostatic testing including all pipes, fittings and equipment, metallic blinds, temporary gaskets as required for filling, pressurising and dewatering in completion connection with hydrostatic testing.

4.5.3.3 All pigs for cleaning, filling, dewatering and swabbing of pipeline.

4.5.3.4 All pipes, fittings and equipment metallic blinds temporary gaskets as required for filling, pressuring and dewatering in connection with hydrostatic testing completion.

4.5.3.5 All consumables for welding of structural steel.

4.5.3.6 Materials and equipment required for all types of test such as radiography, magnetic particle and dye penetrate examination.

4.5.3.7 All safety tools/tackles, devices / apparatus / equipment etc. including ladders and scaffoldings etc. complete as required.

4.5.3.8 Supply of nitrogen and other consumables, tools and tackles required for venting, pre-drying, purging and filling of station piping.

4.5.3.9 Any other material not specifically listed herein, but required for the execution of the work.

4.5.3.10 The item rates quoted for the execution of the work shall be inclusive of supply of all materials mentioned above unless specifically covered otherwise under schedule of rates. The quantities indicated in schedule of rates under Contractor's scope of supply are approximate. Contractor shall carryout MTO of all materials required based on IFC general arrangement drawings, P & IDs and firm up the actual requirement of materials. All escalation/ extra materials procured by Contractor for contingencies shall be Contractor's property and no payments shall be made for such materials. Payment shall be made for actual materials installed by the Contractor as a part of permanent installation.

In case, any item is covered in scope of work but is not present in Schedule of Rates (SOR), it will be assumed that bidder has included cost implication of those items in their total price.

4.5.3.11 List of materials to be supplied and quantities indicated in SOR is tentative.

These quantities can vary during execution to any extent and the same unit rate shall be applicable for payment. Final quantities will be based on the drawing issued to the

contractor for construction. Quantities covered in SOR are for as erected quantities. Bidder will procure additional materials as required to cover cutting, scraps, wastages and damages during erection, testing and commissioning. For these extra quantities no additional payment will be made.

5.0 **DOCUMENTS, SPECIFICATION, STANDARDS A D DRAWINGS**

5.1 Owner shall furnish tender purpose drawings as listed in content of Volume-III of III of the tender document and other typical standard drawings attached with respective technical specifications enclosed with Volume-II of III of the tender document. Contractor shall prepare detailengineering drawing, bill of materials and all construction drawings and submit to Consultant for approval prior to start of the job/ any procurement.

5.2 Contractor shall prepare isometric drawing & bill of materials and submit the same for Owner/ Consultant's approval/ record.

Contractor shall prepare drawing for utilities line as required as per SOR and submit the same for Owner/ Consultant's approval/ record.

5.3 No construction small or big shall be carried out without proper construction drawings duly approved by Owner / Consultant.

For Mainline route alignment drawing shall be furnished along with bid by Owner. However, detail pipeline route alignment sheets, detail- crossing drawings with crossing methodology shall be submitted by Contractor for prior approval after survey carried out by contractor at site before execution of pipeline work. Any additional survey and data required to complete above shall be also done by Contractor without any extra time & cost implementation to Owner.

5.4 After Completion of construction & commissioning of pipeline system, Contractor shall incorporate all the correction in drawings, prepare and issue the drawings "as-built drawings" as listed below to Owner as final submission of drawings. For Mainline pipeline alignment sheet, all X-ing details, all CP drawings, pipe book etc. and for tap-off points, various MRS at Industrial Consumer's Stations / DRS & SV Stations – layout drg., piping GAD, Isometric, all civil drawings. For final submission only 4 sets of documents plus the original transparencies shall be handed over by Contractor. Any construction done by Contractor without duly approved drawings shall be wholly at his risk and cost.

Contractor shall also submit soft copy of pipe book in excel along with hard copy. Soft copy of all as-built drawings shall be also submitted in AutoCAD. Videography/ photograph of all major activities/ milestone achieved shall also be arranged and submitted by the Contractor. For details of documentation to be submitted for mainline and terminal refer enclosed specification for documentation for pipeline construction enclosed elsewhere with the tender.

5.5 **Specifications**

The work shall be carried out by CONTRACTOR strictly in accordance with the

specifications enclosed in Volume II of III of this document.

5.6 Drawings

The drawings are included in Volume –III of III of the bid package for BIDDER's reference purpose only; Bidders are advised to go through these drawings and also visit the site before submitting their bids. The Contractor shall develop the all type of drawings required for construction works as detailed in respective SCC, PJS & SOR etc.

5.7 Drawing and Documents

5.7.1 The drawings accompanying the Bid document are indicative of scope ofwork and issued for tendering / bidding purpose only. These drawingsindicate the general scheme as well as the route layout to enable the contractor to make an offer in line with the requirements of the owner. Final construction shall be done as per construction drawing prepared by the successful bidder / contractor & duly approved by Owner.

5.7.2 Construction drawings prepared by successful bidder / contractor prior to execution work shall be submitted to Owner progressively based on construction progress achieved by contractor. Owner will take approvalperiod as minimum 7 (seven) working days from the date of receipt of drawings / documents.No extra claims in terms of time & cost,whatsoever shall be entertained forany variation between tender drawings and approved for construction drawings.

6.0 RESOURCES FACILITIES

6.1 Recruitment of Personnel by Contractor

The Contractor shall not recruit personnel of any category from amongthose who are already employed by the other agencies working at the sites but shall make maximum use of local labour available.

6.2 Construction Water and Power Supply

No water and power will be provided by the owner. It should be the responsibilities of the contractor to arrange water and power at his own cost.

6.3 Land for Residential Accommodation

Owner shall not provide any land for residential accommodation of contractor's staff and labour.

7.0 PROJECT SCHEDULING & MONITORING

The following schedules/ documents/ reports shall be prepared and submitted by the Bidder/Contractor for review/approval at various stages of the contract.

7.1 Along with Bid

a) Time Schedule

The Completion Time Schedule for the work (including mobilization period) as per Annexure-3 to SCC.

The Bidder is required to submit a Project Time Schedule in Bar Chart Form,

along with the Bid. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner interface activities shall be clearly identified with their latest required dates. Owner reserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line with the overall project requirement.

b) Scheduling & Monitoring System

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package andsample outputs.

7.2 After the Award of Contract

a) Overall Project Schedule

The Contractor shall submit within 1 week of Fax of Intent, a sufficiently detailed overall Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.

The network will be reviewed and approved by Engineer- in- Charge and the comments if any shall be incorporated in the network before issuing the same for implementation. The network thus finalised shall form part of the contract document and the same shall not be revised without the prior permission from Engineer-in- Charge during the entire period of contract.

b) Progress Measurement Methodology

The contractor is required to submit within 1 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/ delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner reserves the right to modify the methodology in part or in full.

c) Functional Schedules

The contractor should prepare detailed functional schedules in linewith network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and consstruction.

7.3 Project Review Meetings

The Contractor shall present the programme and status at various review meetings as required.

a) Weekly Review Meeting

Level f : Contractor's/Consultant's RCM/ Participation Site In charge & Job Engineers.

Agenda :
a) Weekly programme v/s actual achieved in the past week & programme for nextweek.
b) Remedial Actions and hold up analysis.
c) Client query/ approval.

Venue : Site Office

b) Monthly Review Meeting

Level f Participation : Senior Officers of Owner /REPL and Contractors.

Agenda :
a) Progress Status/
b) Completion Outlook
c) Major hold ups/slippages
d) Assistance required
e) Critical issues
f) Client query/ approval

Venue : Owner /REPL Office/ Site at thediscretion of Owner/ REPL.

7.4 Progress Reporting Proforma

A) Monthly Progress Report

This report shall be submitted on a monthly basis within 10(ten) calendar days from cut-off date, as agreed upon covering overallscenarios of the work. The report shall include, but not limited to the following:

a) Brief Introduction of the work.
b) Activities executed/ achievements during the month.
c) Schedule versus actual percentage progress and progress curves for Detail Eng. Sub ordering,

Manufacturing/ Delivery, Sub-contracting, Construction, Commissioning and Overall and quantum wise status & purchase orders against schedule.

d) Area of concern/ problem/ hold-ups impacts and action plans.

e) Resources deployment status.

f) Annexure giving status summary for drawings, MRs,deliveries, sub-contracting and construction.

g) Procurement status for items to be supplied by Contractor.

B) Weekly Reports

The report will be prepared and submitted by the Contractor on weekly basis and will cover following items:

a) Activities programmed and completed during the week.

b) Resource deployed men and machines.

c) Quantities achieved against target in construction

d) Record of Man days lost.

e) Construction percentage progress schedule and actual.

C) Daily Repots

a) Activity programme for the day

b) Progress of the previous day and commutative progress.

c) Manpower & machinery deployed.

7.4 Progress Reports

7.4.1 CONTRACTOR shall make every effort to keep the OWNER adequately informed as to the progress of the WORK throughout the CONTRACT period.

CONTRACTOR shall keep the OWNER informed well in advance of the construction schedule so as to permit the OWNER to arrange for requisite inspection to be carried out in such a manner as to minimize interference with progress of WORK. Itis imperative that close coordination be maintained with the owner during By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER a detailed report covering the progress as of the last day of the previous month. These reports will indicate actual and scheduled percentage of completion of construction as well as general comments of interest or the progress of various phases of the WORK. The frequency ofprogress reporting by the CONTRACTOR shall be weekly.

7.4.33 Once a week, CONTRACTOR shall submit a summary of the WORK accomplished during the preceding week in form of percentagecompletion of the various phases of the WORK, to the OWNER.

7.4.4 Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs, test certificate etc. Such progress reports shall be in the form and size as may be required by the OWNER and shall be submitted in at least 3 (three) copies.

7.4.5 Contractor shall prepare daily progress report (DPR) in the desired formatand submit it to Engineer-in-charge along with schedule of next day to Engineer-in- charge.

8.0 CONSTRUCION

OWNER reserves the right to inspect all phases of Contractor 's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other duly authorized representatives made known to the CONTRCTOR present during progress of the ORK and such representatives shall always have free access to the WORK at all times . The presence or absence of an Owner's representative does not relieve the CONTRACTOR of the responsibility for quality control in all phases of the WORK. In the event that any of the WORK being done by the CONTRACTOR or any SUB-CONTRACTOR is found by OWNER's representatives to be unsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the CONTRACTOR shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS, procedures and SPECIFICATIONS.

8.1 Rules & Regulations

CONTRACTOR shall observe in addition to Codes specified in respective specification, all National and Local Laws, Ordinances,Rules and Regulations and requirements pertaining to the WORK and shall be responsible for extra costs arising from violations of the same.

8.2 Procedures

Various procedures and method statements to be adopted by CONTRACTOR during the construction as required in the respective specifications shall be submitted to OWNER in due time for APPROVAL. No such construction activity shall commence unless approved by OWNER in writing.

8.3 Field Inspection

CONTRACTOR shall have at all times during the performance of the WORK, a Competent Superintendent on the premises. Any instruction given to such superintendent shall be construed as having been given to the CONTRA TOR.

8.4 Erection and Installation

The CONTRACTOR shall carry out required supervision and inspection as per quality Assurance plan and furnish all assistance required by the OWNER in carrying out inspection work during this phase. The OWNER will have engineers, inspectors or other authorized representatives present who are to have free access to the WORK at all times. If an Owner's representative notifies the Contractor's authorized representative not lower than a Foreman of any deficiency, or recommends action regarding compliance with theSPECIFICATIONS, the CONTRACTOR shall make every effort to carry out such instructions to complete the WORK conforming to the SPECIFICATIONS and approved DRAWINGS in the fullest degree consistent with best industry practice.

8.5 Construction Aids, Equipment, Tools & Tackles

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction Equipments, Special Aids, Cranes, Tools, Tackles and testing equipment and appliances. Such construction equipment's etc. shall be subject to examination by owner and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER shall be immediately got rectified, repaired or the equipment replaced altogether, by CONTRACTOR .OWNER shall not in any way be responsible for providing any such equipment, machinery, tools and tackles.

The OWNER reserves the right to rearrange such deployment dependingupon the progress and priority of work.

Tie-end between main line and starting point of terminal is included in thescope of contract, as and when main line section is available for Tie-ins.

9.0 DOCUMENTATION

9.1 "As Built" Drawings

Notwithstanding the provisions con ained in standard specifications, uponcompletion of WORK, the CONTRACTOR shall complete all of the related drawings to the "AS BUILT" stage and provide the OWNER, the following: -

a) One complete set of all original tracings.

b) Three complete bound sets of Contractor‘s specifications including design calculations.

c) Three complete sets, in the form of hand bound volumes, of the manufacturer's data book for all the equipment’s, instruments etc.including certified prints and data. Data books shall be completed with index as to tag numbers associated with manufacturer's data shown, Equipment data shall include as a minimum requirement the principle and descriptions of installation and maintenance instructions, drawings anddimensions, parts list and priced purchase orders including those ofmajor sub-vendors and suppliers. Requirements pertaining to "VENDOR DATA REQUIREMENT" attached with standard specifications for the documents to be included in the Data Bookfor each equipment, instruments etc. shall also be complied with.

d) Three bound copies each of the Spare Parts Data Books and theLubricants Inventory Schedule.

e) Soft copy of all the as built drawings prepared in AutoCAD in Three set of re-writable compact Disc and photographs covering measure activities at site including all documents in soft copies.

f) The Contractor shall submit coloured photographs covering all the activities of pipeline constructions highlighting theprogress or other areas of work in 2 sets to Engineer-in-charge at site office along with monthly progress report. Similarly photographs for problem areas should be submitted well in advance with a proposed methodology to execute the works and meet the construction schedule. The cost of same shall bedeemed to be inclusive in the rates and no separate payment shallbe made.

g) All as-built drawings as mentioned in specification for documentation enclosed elsewhere in the tender.

9.2 Completion Document

The following documents shall be submitted in hard binder by CONTRACTOR in the THREE sets, as a part of completion documents:

a) Welding Procedure Qualification Report.
b) Welder Qualification Report.
c) Radiographic Procedure Qualification.
d) Radiographic Report alongwith radiographs (Radiographs only with the original).
e) Batch Test Certificate from manufacturers for electrodes.
f) Pretesting and final Hydrostatic and other Test results and reports.
g) All other requirements as specified in the respective specifications.
h) Test results and reports.
i) Pre-commissioning/commissioning checklist.
j) Completion Certificate issued by Owner's Site Engineer.
k) No claim certificate by the Contractor.
l) Consumption statements of steel and certified by owner's site Engineer.
m) Completion certificate for embedded and covered upwherever work applicable.
n) Recovery statement, if any.
o) Statement for reconciliation of all the payments and recoveriesmade in the progress bills.
p) Copies of deviation statement and order of extension of time, i granted

10.0 <u>SURVEY AND LEVE /SETTING OUTWORK</u>

10.1 Before the WORK or any part thereof are begun, the Contractor's agentand the Engineer-in-Charge's representative shall together survey and

take levels of the SITE and decide all particulars on which the survey is to be made, and on which measurements of the WORK are to be based. The CONTRACTOR shall plot such particulars and after agreement the Engineer-in-Charge shall sign the drawings.

10.2 The CONTRACTOR shall be entirely responsible for the horizontal and vertical alignment, the level and correctness of every part of the WORK and shall rectify any errors or imperfections therein. The CONTRACTOR at his own cost shall carry out such rectifications, whenthe Engineer-in-Charge or his representative issues instructions to thiseffect.

10.3 The Engineer-in-Charge shall furnish the relevant existing grid point with Bench Mark on the land. It shall be Contractor 's responsibility to set outthe necessary control points in and to set out the alignment of the variousworks. The CONTRACTOR shall have to employ efficient survey team for this purpose and the accuracy of such setting out work shall be Contractor's responsibility.

10.4 The CONTRACTOR shall give the Engineer in-Charge not less than 24 (twenty four) hours' notice in writing of his intention to set out or givelevels for any part of the WORK so that arrangements may be made checking the same.

10.5 WORK shall be suspended for such times as necessary for checking linesand levels on any part of theWORK.

10.6 The CONTRACTOR shall at his own expense provide all assistance, which the Engineer-in-Charge may require for checking the setting out ofWORKS.

10.7 Before commencement of any activity, contractor's quality control set updluly approved by company must be available at site.

11.0 ORDER OF WORKS/PERMISSIONS/RIGHT OF ENTRY/CAREOF EXISTING SERVIE ES.

11.1 The order in which the WORK shall be carried out shall be subject to the approval of the Engineer-in charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently. OWNER reserves right to fix up priorities, which will be conveyed, by Engineer-in-Charge and the CONTRACTOR sha l plan and execute work accordingly.

11.2 Existing Service

11.2.1 Drains, pipes, cables, overhead wires and similar services encount red incourse of the works shall be guarded from injury by the CONTRACTOR at his own cost, so that they may continue in full and uninterrupted use tothe satisfaction of the Owners thereof, or

otherwise occupy any part of theSITE in a manner likely to hinder the operation of such services.

11.2.2 Should any damage be done by the CONTRACTOR to any mains, pipes, cables or lines (whether above or below ground etc.), whether or not shown on the drawings the CONTRACTOR must make good or bear thecost of making good the same with out delay to the satisfaction of the Engineer-in-Charge.

12.0 **MAKE OF MATERIAL/BOUGHT OUT ITEMS**

An Appendix-I of approved vendors for various major items is enclosed with this tender specification. The bidder shall consider such names only as indicated in the aforesaid list and clear y indicate in the bid the name(s) as selected against these items. For any other item not covered in the list enclosed with this tender document, prior approval shall beobtained by the contractor for its make/ supplier's name.

13.0 **INSPECTION OF SUPPLY SITE**

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner/Consultant in writing at least 10 days in advance of the date of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ Consultant. All costs towards testing etc. shall be borne by the contractor within their quoted rates. All inspection of various items shall be carried out based on Quality Assurance Plan, which will be submitted by the Contractor and duly approved by Owner/Consultant.

14.0 **ESCALATION**

The Unit Rates quoted shall be kept firm till completion of work, and no price Escalation shall be paid.

15.0 **DOCUMENTS TO BE SUBMITTED/ PRODUCED ALONG WITH R.A. BILLS**

i) Computerized R .A. B ill/ M annual B ill, with I T No./ ST N o./ L about License No. Printed thereon.

ii) ESI/ EPF clearance certificates for the last month along with R.A. Bills.

iii) Insurance Policy as per relevant clauses of Contract Agreement.

iv) Attendance Register and Salary Records.

v) Photocopy of the measurement book to be attached with R.A. Bills.

vi) Any other document required for the purpose of processing the bills.

vii) Registration Certificate with Sales tax authorities of state concerned.

16.0 Following new clauses are also to be considered wherever required which arespecific to city conditions laying.

i) Preliminary Activities, Design and Detailed Engineering

- Contractor shall carry out all preliminary activities, surveys of utilities to the extent required for main pipeline and distribution/ branch lines, laying underground pipelines and prepare alignment sheets, crossing drawings alongwith bill of material with all details necessary for construction of the main and branch lines. The minimum pipeline cover shall be kept as follows:

Pipeline Burial Requirement

The entire pipeline shall be buried and provided with a minimum coveras given in Table below:

Pipeline Burial Require ents	
Location	**Min. Cover (m)**
a) Stream / Canal / Nala and other minor water crossing (below firm bed level)	1.5
b) Cased/ Uncased Road/ cart track crossings	1.2
c) Cased railway crossings	1.7
d) Drainage, ditches at roads/ railway crossings	1.0
e) Industrial, Commercial, Residential and other locat including rocky areas	1.0
f) Major water crossings (below scour level)	2.5
g) Riv r crossing with rocky bed (below scour level)	1.5

Note:

i) The depth of cover shall be measured from the top of the pipe coating to the top of the undisturbed surface of soil or the top of graded working strip, whichever is lower. The fill material in theworking strip shall not be considered in the depth of cover.

ii) The cover shall be measured from the top of road or top of rail, as the case may be;

iii) For river / water courses that are prone to scour and erosion, adequate safe cover as mentioned above or as advised by concerned authorities (whichever is

stringent) shall be provided below the predicted scour profile expected during the life time of the pipeline

iv) When scour level is not known, an additional cover of at least 1 m oras advised by concerned authorities shall be provided from the existing firm bed of the river / water course except in case or rocky river bed;

v) Minimum cover mentioned above against sl. no. a), b), c), d) & e) category may be increased based on the statutory requirements from concerned authorities and authorities requirement shall be final and binding to the contr actor.

vi) Soft soil / sand padding of minimum 100 mm thickness or as mentioned in standard drawing (whichever is stringent) to be providedaround the pipeline where gravel / hard soil or rocky area is encountered.

- Contractor shall carry out detailed engineering asrequired for preparation of General Arrangement Drawings (GADs) for DRS / MRS Stations, Piping at consumer ends, connection at existing tap-off location and for future connections along with bill of materials.

Owner will provide typical sketches for above ground installation (i.e. at DRS/ MRS Etc.) Contractor shall develop General Arrangement Drawings (GADs) good for construction for various sizes and locations based on typical sketches/ drawings along with bill of materials and submit to Owner for reviews/ approval. Construction work shall be carried out based on construction drawings duly approved by Owner/ Consultant.

- The detailed engineering for above ground installation shall include detail engineering pertaining to all disciplines along with billof materials.
- All the documents/ drawings prepared by the Contractor shall be submitted to Owner/ Engineer-in-charge for review and approval. All works shall be executed based on the drawings/ documents only
- Contractor shall obtain all clearance from Government authorities

However, bank guarantee / required fee or changes shall be submitted by owner

- Contractor shall carry out corrosion survey, design, detail engineering, installation, testing & Commissioning for temporary cathodic protection including of all times for design life of 2 years.

ii) Main and Distribution Pipeline

- "Receiving and Taking-over" as defined in the Specifications of Owner supplied Carbon Steel externally corrosion coated/ bare line pipe of specified sizes and thickness from Owner's designated stacking yard(s), place(s) of issue in/ around the concerned city, transportation including loading, unloading, handling, stacking, hauling and stringing of pipes from Owner's stacking yard(s)/ designated point(s) of issue to Contractor's own stock yard(s)/ work site(s)/workshop(s)/ pipeline Right-of-Use, including arranging all necessary intermediate storage area(s) required thereof till the pipes are installed in permanent installation. The exact location of the Purchaser's stackingyard near each city shall be intimated to the Contractor after the award of contract.

- Carrying out inspection of pipes and pipe coating at the time of receiving and taking-over and recording all the defects etc., noticed in the presence of Owner's representative and carrying out all repairs including supply of **a**ll repair materials.

- Carrying out repairs of the pipes and pipe coating not attributableto Owner (including supply of all materials) including defects/ damage occurring during transportation and/ or handling after receiving and taking-over including supply of all materials.

- Receiving and taking-over of all owner supplied material other than corrosion coated CS line pipe, loading, unloading, handling, stacking, storing and transportation to workshop, work site of all materials that may be used for the construction of pipeline systemeither supplied by Owner at their designated stockyard(s)/ designated stores and/ or by Contractor as the case may be.

- All additional route/ topographic surveys and/ or soil investigation required for local detours of main line and survey soil data for branch lines as required, including preparation of plan and profile drawings without any extra cost to Owner.

- Staking, clearing, grading, fencing of Right-of-Use (ROU) wherever required, trenching to all depths in all types of soil including soft and hard rock, including chiseling, or otherwise cutting etc. to a width to also accommodate the optical fiber cable/ cable conduit as per the relevant

standards, drawings,specifications etc. Aligning, bending, welding, NDT including100% radiography, field weld joint coating, external corrosion coating of long radius bends and buried fittings/ valves includingsupply of coating material as per the field joint coating specification, laying and lowering, carrying out road, canal, utility and submerged water crossings including bank stabilization of water crossings as required including arranging all temporary land/ area required for construction purposes; supply and installation of anti-buoyancy measures viz. Continuous concrete coating, select backfill, extra cover, etc. on pipeline. Blasting of rock is not allowed. The excavated soil is to be kept/ disposed at the place specified by the Engineer-in-charge.

- Barricading of trench as per instruction of EIC / tender drawings wherever required.
- Carrying out corrosion coating of 500 micron thick two component underground coal tar epoxy, applied with minimum three coats for underground valves & fittings.
- Welding of all tie-in joints for pipeline section laid across other utility crossings along with insulating joints up to and including valves and fittings.
- Placement of PE warning mat D + 300mm wide and 1.0mm thick over pipeline along complete route or as per standard drawing,whichever is stringent.
- Backfilling, temporary restoration including supply of select back fill material wherever required, compaction, clean-up, flushing, pigging, hydrostatic testing with the quantity of corrosion inhibitor as required, de-watering, swabbing of the main pipeline and removal of water by compressed air in branch lines. The backfilling and sand padding shall be carried out as per the instructions of Engineer-in-charge/ any relevant drawingenclosed with tender.
- Clean-up and restoration of Right-of-Use as per specification and drawings and other conveniences like road, rail, canal, utilitycrossings etc. to original condition, to the **e**ntire satisfaction of Owner and/ or authorities having jurisdiction and returning excess construction materials to Owner's designated stock- yard (s).

  Obtaining all necessary permissions, approvals and work permitsfrom local authorities as applicable for performing the workincluding shifting of telephone/ electrical poles, hume pipes etc., if required.
- Pre-commissioning, providing commissioning assistance, nitrogen purging of the complete underground pipe network including supply of all materials such as required type and quantity of pigs, consumables and

manpower that are requiredduring pre-commissioning and commissioning activities includingall coordination with and assistance to other agencies/ contractorsduring commissioning operations and all associated works.

- Installation of all on-line instruments, pressure gauge, valves, insulating joints, appurtenances, etc.
- Loading, unloading, handing over and transportation of all surplus Owner supplied free issue materials including short length pipes to Owner's designated store and stacking the same as per thedirections of Engineer-in-charge.
- Cutting/ up rooting of trees within ROU, counting the number andtype of trees cut during pipeline laying works in presence of DFO/ concerned authorities and keeping record thereof, staking and banding over of all cut trees as per the direction of Engineer-in- charge.
- All requirements and stipulations of statutory authorities shall be adhered.
- Repair of leaks/ burst, not attributable to Contractor, occurring in Owner supplied material shall be carried out by the Contractor and the Contractor shall be compensated as per provisions of thecontract. However repair of such defects attributable to Contractor shall be carried out by Contractor at no extra cost to Owner.
- Hook-up of piping facilities by welding, hot tapping or flanged connection (as shown in AFC drawings) with equipment'sand at the battery limit with the facilities installed by othersincluding cutting, fit-up, welding, NDT, radiography, interface / co-ordination as required for inlet connection to DRSaboveground installation.
- Any other works not specifically listed herein above but are required to complete in installation work of pipeline and associated facilities in all respects.
- Preparation of as-built drawings, pipe-books, project records and photograph as per specifications and instruction of Engineer- in-charge.

iii) Associated Works for Pipeline Construction

- Installation of casing pipe (by open cut / jacking / boring / HDD)assembly, including supply of all materials viz. casing insulatorsand end seals etc. complete at cased crossings.
- Supply and installation of all types of pipeline markers includingtheir painting, suitable for normal corrosive environment as per specification and all the associated civil works.
- Sand/ soft soil padding around pipe where required including supply of sand/ soft soil

- Application of continuous concrete coating on line pipe and fieldjoints as required.
- Excavation along existing pipe-route up to 1.6m depth to locate existing underground tap-offs, backfilling, and restoration excavated soil. Valve pits and joint pits shall be made as per drawing closed at locations specified by the Engineer -in-charge.
- Fencing at SV Stations, DRS/ MRS installations shall be carried out by Contractor including supply of all civil & structurematerials, complete foundation & civil works, fabrication & installation of chain link fencing, gates, painting etc. as per drawings & specifications.
- Corrosion survey, design, detailed engineering, supply & installation of temporary cathodic protection works as per enclosed specification and as directed by Engineer-in-charge.
- Providing barricading for safety during fabrication, installation and testing f pipeline as per tender specification.

iv) Future Tap-off Connections

- Complete works for installation of all piping works at all depthsinside the pit, including all piping, valves, fittings at all depthsinside the pit, all civil works including excavation of pits, pipe supports foundations etc. as shown in the relevant enclosed typical drawing. The side wall and bottom of the pit have awithstand an outside hydrostatic pressure of at least 1 kg/cm2.
- Protective coating of 500 micron thick two component coal tar epoxy, applied with the help of minimum 3 coats, duly approved by Owner including supply of materials for all piping, valves, fittings, structural steel etc. for buried and installation inside pit.
- Corrosion coating of all field weld joint coating for buried pipingof all sizes including supply of all materials.
- Filling and grading of areas around valve station for avoiding any local flooding of the area.

v) Restoration of Existing Facilities

All restoration works damaged during construction such as roads, pavements, utilities, cables, pipeline, sewers, streams, drains, ditches and any other facilities. All restoration work shall be carriedout to original condition to entire satisfaction of Owner and concerned authorities.

- All roads, footpaths (including roads and footpaths inside colonies) shall be restored to original condition, and to the satisfaction of the Engineer-

in-charge and the concernedauthority. The specification for restoration work shall be inline with the technical specification of various elements such as footpath, filling work, curb stores, drains, pavement, service road,main road and highways as per the respective concerned

Government Authorities such as PWD local civic authority etc. In case of any dispute, the decision of Engineer-in-charge shall befinal and binding on the Contractor.

In the event of Contractor's failure to adhere to thesespecifications and time schedule owner reserves the right to get these restoration work completed by approaching a third agency at Contractor's risk and cost.

Contractor shall obtain clearance certificate regarding satisfactoryrestoration from concerned Authority.

The concrete surfaces shall be restored and the concrete shall beplaced with a minimum thickness of 50mm in footpaths and 100mm in roadways and driveways. To retard curing of the installed concrete, wet sack cloth is to be placed on the finished surface and kept damp for a period of 36 hours.

Where slabs and blocks are to be restored, the level of the compacted sub-base is to be adjusted according to the slab/ block thickness. The slabs or blocks should be laid on moist beddingmaterial, which should be graded sand, mortar or mortar mix.The slab or blocks should be tapped into position to ensure they do not rock after laying.

The restored slabs or blocks should match the surrounding surface level Joint width should match the existing conditions, and be filled with a dry or wet mix of mortar.

Turf shall be replaced in highly developed grassed area. In lesser-developed grassed areas topsoil should be replaced during the restoration process.

When permanent surface restorations cannot be completed immediately, the Contractor shall provide and maintain a suitable temporary running surface for vehicular traffic and pedestrians. The Contractor will be responsible for the maintenance of allrestoration carried out, for the duration of the contract guarantee period.

The Contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose and properly compacted. Where the required standards are not achieved the Contractor will be required to replace the defective restoration work.

Note that payment for pipe laying will only be authorized on satisfactory restoration, and where the sites has been cleared of allsurplus materials etc.

Markers are to be installed as part of the reinstatement process.
The types of markers are as specified in the specification attached

All trees to be uprooted at the time of pipe-laying activitiesshould be properly replanted to a nearby area as directed by the Engineer-in- charge so that there is minimum loss of plantation.

In some areas, restoration will be carried out by respective statutory authority. In this case, CONTRACTOR has to backfill and compact the trench and remove all surplus material as per the instruction of Engineer-In-Charge.

Following points shall be taken care by the contractor before during the execution works.

i) Contractor shall be totally responsible for the occurrence of anyaccident during excavation of road and shall be liable for damages / expenses due to the same.

ii) Concerned authority / Owner shall not be responsible for any loss/ damage.

iii) One copy of the permission shall be made available with contractor's responsible workman at the place where excavation is undertaken While executing the subject work, excavation shall be done in consultation with the concerned authority engineer of that area.

iv) Necessary safety measures shall be taken for the gas pipeline,since high tension lines and other services carriers are running along with in gas pipeline route in the area.

Special note pertaining to Schedule of Rates (SOR).

i) All SOR item shall be quoted by the bidder in the price part of the bid,other-wise bid will be rejected.

ii) The quantities given above against individual items are indicative andshall not be considered to be binding. The quantities may be increased, decreased or deleted at site at the time of actual executionand as per discretion of Owner / Engineer-in-charge. The unit rate shall be operated to work out the final payment due to Contractor.

iii) The payment will be made as per actual certified measurement at site.

iv) The scope as mentioned in the SOR is of indicative nature only and shall include all activities as detailed in the relevant clauses of the respective Particular Job Specifications, Technical Specifications, DataSheets & drawings, etc.

v) The quantities mentioned in SOR for contractor supplied items shall be finalized and procured by contractor only after due approval of Engineer-in-charge. Contractor supplied any surplus item during reconciliation shall not be accepted / taken by the Owner.

18.0 LIST OF SUPPLIERS OF MAJOR BOUGHT- OUTITEMS (APPENDIX-I TO

PARTICULAR JOB SPECIFICATION FOR MAINLINE, MECHANIAL & ASSOCIATED WORKS)

Appendix-I To Particular Job Specification of Work

LIST OF SUPPLIERS OF MAJOR BOUGHT- ITEMS

(Mechanical &Fire Fighting Equipment)

A) Mainline&Mechanical

i) PIPECARBONSTEELTOINDIANSTANDARDS

1. A.S.T.PIPESPVT.LTD.(ASTGROUP)
2. ADVANCESTEELTUBELTD.
3. APLAPOLLOTUBESLTD.(ER.BIHARTUBESLTD.
4. ASIANMILLSPVT.LTD.
5. ASRANITUBESLIMITED
6. DADUPIPES(P)LTD.
7. ESSARSTEELLIMITED(ERHAZIRAPIPESMILL)
8. GAURANGPRODUCTSPVTLTD.(ASTGROUP)
9. GOODLUCKSTEELTUBESLTD.
10. HI-TECHPIPESLIMITED
11. INDUSTUBELIMITED
12. JINDALINDUSTRIESLTD
13. JINDALPIPESLTD.
14. JINDALSAWLTD(KOSIWORKS)
15. JOTINDRASTEEL&TUBELTD
16. LALITPIPESANDPIPESLTD.
17. MAHARASHTRASEAMLESSLTD.
18. MANINDUSTRIES(INDIA)LTD.–PITHAMPUR
19. MANINDUSTRIES(INDIA)LTD.ANJAR
20. MUKATTANKS&VESSELSLTD.
21. NEZONETUBESLIMITED
22. NORTHEASTERNTUBESLIMITED
23. PRATIBHAINDUSTRIESLIMITED
24. PRATIBHAPIPES&STRUCTURALLTD.
25. PSLLTD(CHENNAI)
26. PSLLTD(V1,V2&NC)
27. RAMASTEELTUBESLTD.

28. RATNAMANIMETALSANDTUBESLTD.
29. RAVINDRATUBESLIMITED
30. SAMSHIPIPEINDUSTRIESLIMITED
31. SURYAROSHNILTD.
32. SWASTIKPIPESLTD.
33. UTKARSHTUBES&PIPESLTD.(FORMLYBMW)
34. WELSPUNCORP.LIMITED(DAHEJ)
35. ZENITHBIRLA(INDIA)LIMITED

ii) <u>PIPE&TUBULARSTOA.P.I.STANDARDS</u>

1. ARCELORMITTALTUBULARPRODUCTSROMANSA,ROMANIA
2. BHEL(TRICHY),INDIA
3. DALMINESPA(ENQUIRYTOTENARIS),UAE
4. EEWKOREACO.LTD(GERMANY),KOREA
5. EEWKOREACO.LTD.(KOREA),KOREA
6. EISENBAUKRAMERGMBH,GERMANY
7. HYUNDAIRBCO.LTD. SOUTHKOREA
8. ILVALAMIEREETUBISRL(ENQTOILVASPA,ITALY
9. INOXTECH.SPA,ITALY
10. ISMTLTD.AHMEDNGR,INDIA
11. ISMTLTD.BARAMATI,INDIA
12. JINDALPIPESLTD.,INDI
13. JINDALSAWLTD.(KOSIWORKS),INDIA
14. JINDALSAWLTD.(NASHIKWORKS),INDIA
15. LALITPIPESANDPIPESLTD. INDIA
16. MAHARASHTRASEAMLESSLTD.,INDIA
17. MANINDUSTRIES(I)LTD.(PITHAMPUR),INDIA
18. MUKATTANKS&VESSELSLTD.,INDIA
19. PRATIBHAINDUSTRIESLIMITED,INDIA
20. RATNAMANIMETALSANDTUBESLTD.,INDIA
21. SIDERCAS.A.I.C(ENQUIRYTOTENARIS),UAE
22. SUMITOMOMETALIND.LTD.,INDIA
23. SURYAROSHNILTD.,INDIA
24. SWASTIKPIPESLTD,INDIA

25. TATASTEELUKLIMITED(FORMERLYC702)
26. TUBOSDEACERODEMEXICOSA(ENQ.TENARIS),UAE
27. TUBOSREUNIDOSSA SPAIN
28. UMRANSTEELPIPEINC(TURKEY),TURKEY
29. VALCOVNYTRUBCHOMUTOV,CZECHREPUBLIC
30. VALLOURECANDMANNESMANNTUBES,FRANCE
31. WELSPUNCORPLIMITED(DAHEJ),INDIA

iii) PIPE/TUBECS(SEAMLESS)TOASTMSTDS

1. ARCELORMITTALTUBULARPRODUCTSROMANSA,ROMANIA
2. BHEL(TRICHY),INDIA
3. CHANGSHUSEAMLESSSTEELTUBECO.LTD.,CHINA
4. DALMINESPA(ENQUIRYTOTENARIS,UAE
5. HEAVYMETALS&TUBESLIMITED(MEHSANA),INDIA
6. ISMTLTD.AHMEDNGR,INDIA
7. ISMTLTD.BARAMATI INDIA
8. JFESTEELCORPORATION,UAE
9. JINDALSDAWLTD(NASHIKWORKS) INDIA
10. KLTAUTOMOTIVEANDTUBULARPRODUCTSLTD.,INDIA
11. MAHALAXMISEAMLESSLIMITED,INDIA
12. MAHARASHTRASEAMLESSLTD,INDIA
13. PRODUCTSTUBULARESS.A.U,SPAIN
14. RATNADEEPMETALTUBESLTD.,INDIA
15. STAINEESTTUBESPVTLTD.,INDIA
16. SUMITOMOMETALIND.LTD.,INDIA
17. TUBOSREUNIDOSSA SPAIN
18. VALCOVNYTRUBCHOMUTOV,CZECHREPUBLIC
19. VALLOURECANDMANNESMANNTUBESFRANCE
20. YANGZHOUCHENGDESTEELPIPECO.LTD DUBAI(UAE)

iv) PIPECARBONSTEEL(WELDED)TOASTMSTDS

1. EEWKOREACO.LTD.(GERMANY),KOREA
2. EEWKOREACO.LTD.(KOREA),KOREA
3. EISENBAUKRAMERGMBH,GERMANY

4. HYUNDAIRBCO.LTD.,SOUTHKOREA
5. INOXTECH.SPA,ITALY
6. JINDALSAWLTD(KOSIWORKS),INDIA
7. LALITPIPESANDPIPESLTD.,INDIA
8. MANINDUSTERIES(I)LTD.(PITHAMPUR),INDIA
9. MANINDUSTRIES(INDIA)LTD.ANJAR,INDIA
10. MUKATTANKS&VESSELSLTD.,INDIA
11. RATNAMANIMETALSANDTUBESLTD.,INDIA
12. SUMITOMOMETALINDIALTD.,INDIA
13. TATA STEEL UK LIMITED

v) Valve

a) **GlobeValves**

1. M/s Weir BDKValves (Aunitof Weir India Pvt.Ltd.)
2. M/s Datre Corpn(Calcutta)
3. M/s KSBPumpsLtd., Coimbatore, India
4. M/s L&TAudco
5. M/s Neco Schuber &Salzer Ltd. (New Delhi)
6. M/s NitonValve IndiaPvt. Ltd. India
7. M/s OrnateValves (Mumbai)
8. M/s PanchavatiValves&Flages (P)Ltd.,India
9. AV ValvesLtd., India
10. BHEL(Trichy), India
11. Econo Valves PvtLtd, India
12. Fouress Engg (I) Ltd (Aurangabad), India
13. Leader ValvesLtd,India
14. Oswal Industries Ltd,India
15. Petrochemical Engineering Enterprises, India (Fouress Group)
16. Sakhi EngineersPvt Ltd.,India
17. Shalimar Valves PvtLtd.,India

18. Flowchem Industries
19. Petro Valves Pvt.Limited, Ahmedabad
20. Fluid LineValves Co.(P)Ltd., India
21. MICONEngineers (Hubli)(P) Ltd., India

b) CheckValves

1) M/s AdvanceValves Pvt.Ltd., Noida
2) M/s Aksons&Mechanical Enterprises,Mumbai
3) M/s Larsen&Toubro Limited (M/sAudco IndiaLimited, Chennai)
4) M/s AVValvesLtd.,India
5) M/s Weir BDKValves (Aunitof Weir IndiaPvt.Ltd.)
6) M/s BHEL,Trichy
7) M/s Datre CoroportionLimited, Calcutta
8) M/s Leader Valves Ltd.,Jalandhar
9) M/s Neco schubert&Salzer Ltd., New Delhi
10) M/s NitonValves Industries (P) Ltd.,Mumbai
11) M/s PrecisionEngg.Co.,Mumbai
12) Econo Valves PvtLtd, India
13) Fouress Engg (I) Ltd (Aurangabad)
14) KSB PumpsLtd (Coimbattore), India
15) NSSLLtd. (Neco Schubert&SalzerLtd)
16) Oswal Industries Ltd,India
17) Panchvati Valves& Flanges PvtLtd, India
18) Petrochemical Engineering Enterprises, India (Fouress Group)
19) Sakhi EngineersPvtLtd
20) Shalimar Valves PvtLtd
21) Steel Strong Valves IndiaPvt Ltd,India
22) Fluid LineValves Co.(P)Ltd., India
23) MICONEngineers (Hubli)(P) Ltd., India

c) Plug Valves

1) M/s BredaEnergia SestoIndust ia Spa, Italy
2) M/s Fisher Sanmar Ltd.,Chennai

3) M/s Larsen&Toubro Ltd., (Audco) New Delhi
4) M/s Nordstrom Valves, USA
5) M/s SerckAudcoValves,UK
6) M/s SumitomoCorporation India Pvt.Ltd., NewDelhi
7) M/s Z Corporation,Korea
8) M/s Hawa Valves(India)Pvt.Ltd.,Mumbai
9) M/s Steel Strong Valves India Pvt.Ltd., NaviMumbai
10) M/s EconoValvesPvt.Ltd., India (WSSLLtd. Group Co.)
11) M/s Flow-ServePTE (Mfr. SE CK), India

d) Ball Valves

1. M/s Hawa Valves(India)Pvt.Ltd, NaviMumbai
2. M/s Larsen&Toubro (Audco), India
3. M/s Oswal Industries Ltd., India
4. M/s VirgoEngineers Ltd.,Delhi
5. M/s BoteliValve GroupCo. Ltd.,China
6. M/s Cameron Italys.r.l.,Italy
7. M/s Dafram S.P.A., Italy
8. M/s FangyuanValve Group Co.Ltd., China
9. M/s FranzSchuckGmbH,Germany
10. Kita Mura ValveManufacturing Co.Ltd., India
11. Petrol Valve S.R.Italy
12. Piplviesse S.P.A.Italy
13. Tormene Gas TechnologyS.P.A.Valvetalia Group, Italy
14. ValbeotS.R.L.Italy
15. KMC Corporation, SouthKorea
16. MSA a.s. CzeekRepublic
17. OMS Aleri, Italy
18. PCC Valvess.r.l.Italy
19. Perar s.p.a.(Engineering. ToTRPsrl),Italy
20. Italys.r.l., Italy
21. MIR Valves,Malaysia

vi) <u>Flow Tee</u>

1) M/s Coprosider SPA, Italy
2) M/s GEAEnergySystemIndia Limited,Chennai
3) M/s MultitexFilteration
4) M/s PipelineEngineering,UK
5) M/s ScomarkEngg. Limited (U.K.)
6) M/s SkeltonhallLimited,Engaland(U.K.)
7) M/s Technospecial SPA, Italy
8) M/s TectubiSPA,Italy
9) M/s RMAGermany

vii) Split Tee

1) M/s Ipsco, Canda
2) M/s TDWillamsons,USA

viii) Flanges

1. M/s Aditya ForgeLtd.,Vadodara
2. M/s Amforge Industries Ltd.,Mumbai
3. M/s CDEngineering Co.,Ghaziabad
4. M/s EchjayForgingsPvt.Ltd. (Bombay),Mumbai
5. M/s EchjayIndustriesLtd., Rajkot
6. M/s Forge&ForgePvt. Ltd.,Rajkot
7. M/s Golden Iron&SteelWorks,New Delhi
8. M/s JK Forgings,New Delhi
9. M/s MetalForgings vt.Ltd., Mumbai
10. M/s PerfectMarketings Pvt.Ltd., New Delhi
11. M/s SkyForge,Faridabad
12. M/s S&G,Faridabad
13. ChaudhryHammer Works Ltd, India
14. JAV Forgings (P)Ltd, India
15. Kunj Forgings PvtLtd, India
16. MS FittingsMgf. Co.Pvt.Ltd.
17. R.N. Gupta&Co.Ltd, India
18. R.P.EngineeringPvtLtd,India

19. Sanghvi Forgings &Engineering Ltd
20. Shri GaneshForgingsLtd., India
21. Uma Shankar Khandelwal &Co., India
22. SawanEngineers, Baroda
23. Stewarts &Lloyds of India Ltd., Kolkata
24. Engineering Services Enterprises
25. Abasi Engineersing Works, India
26. AnandmayeeForgingsPvtLtd, India
27. CD Industries., India
28. Fivebros ForgingsVotLtd., India
29. Good LuckEngineeringCo., India
30. Korea Flange, SouthKorea
31. Lal MetalForgeLtd, India
32. Melesi Officine
33. AmlrojieMelesi &C. srl.Italy
34. Nicola Galperti & Figlio S.P.AIndia
35. ParamountForge, India
36. Pradeep MetalLimited, India
37. Punjab Steel Works(the), India
38. R.D.Forge, India
39. Shah Industrial &Comml. Corporation, India
40. Ulma Forja S. Coop.
41. Vivial ForgePvt.Ltd.,Vadodara

ix) Fittings

1. M/s Commercial Supplying Agency,Mumbai
2. M/s Dee Development Engineers Ltd.
3. M/s EbyIndustries, Mumbai
4. M/s FlashForgePvt.Ltd., Vishakhapatnam
5. M/s GujaratInfra Pipes Pvt.Ltd., Vadodara
6. M/s M.S. FittingsMfg.Co. Pvt.Ltd., Kolkata
7. M/s Stewarts& LloydsofIndia Ltd.,Kolkata
8. M/s TeekayTubesPvt. Ltd.,Mumbai

9. M/s PipeFit,Baroda
10. M/s SkyForge,Faridabad
11. M/s S&G,Faridabad
12. M/s SawanEngineers, Baroda
13. EbyFasteners, India
14. R.N. Gupta & Co.Ltd, India
15. ExtenE ngg PvtLtd
16. Sivananda Pipe& Fittings Ltd
17. Chero PipingSPA,Italy
18. CSA Fittings, India
19. EBY Fasteners, India
20. FittnoxSRL, Italy
21. Keonsae High PressureCo. Ltd.,SouthKorea
22. Munro &Miller FittingsLtd., U.K.
23. TK Corporation,SouthKorea
24. TubeTurn (India)PvtLtd., India
25. Topaz Piping Industries,India
26. Technoforge SPA, Italy
27. P.K.Tubes& FittingsPvt. Ltd., India
28. Vivial Forge Pvt. Ltd.,Vadodara

x) <u>Gaskets</u>

1. IGPEngineers (P)Ltd.,Madras
2. Madras IndustrialProducts, Madras
3. Dikson&Company,Bombay
4. Banco Products (P) Ltd.,Vadodara
5. Goodrich GasketsPvtLtd
6. StarflexSealing IndiaPvtLtd, India
7. TeekayMetaFlexPvtLtd
8. UNIKLINGER Ltd

9. HEMEngg. Corp.
10. Unique Industrial Packing Pvt.Ltd.

xi) Fasteners

1. Nireka Engg.Co.(P)Ltd., Calcutta
2. PrecisionTaps&Dies,Bombay
3. AEP Company,Vithal Udyoug Nagar
4. FixFitFasteners, Calcutta
5. Precision Engg. Industries, Baroda
6. Echjay Forgings Pvt. Ltd., Bombay
7. Capital Industries,Bombay
8. Boltmaster India PvtLtd,India
9. Deepak Fasteners Limited, India
10. Fasteners &Allied Products PvtLtd,India
11. Hardwin Fasteners PvtLtd, India
12. J.J. Industries, India
13. Multi Fasteners Pvt Ltd, India
14. Nexo Industries,India
15. Pacific Forging & Fasteners PvtLtd,India
16. Pioneer Nuts & Bolts Pvt Ltd,India
17. Precision AutoEngineers, India
18. President Engineering Works, India
19. Sandeep Engineering Works, India
20. Syndicate Engineering Industries, India
21. BEA SRL, Italy
22. Korea Parts & Fasteners(KPF) South Korea
23. Kundan Industries Ltd.,IndiaMega Engineering Pvt.Ltd., India
24. OME Metallurgica ERBESES.R.L, Italy
25. Pankaj International, India
26. Udehra Fasters Ltd.,India

xii) WeldingElectrodes

1. For Mainline –Lincon make
2. For Terminal –For rootpass-LinconMake

   For otherpasses –Lincon, D&H orequivalent make

xiii) Fire Fighting Equipments

a) **FireExtinguishers**

1. Avon Services (Production&Agencies) Pvt.Ltd.,Bombay
2. Kooverji Devshi&Co., Bombay
3. Zenith Fire Services, Bombay
4. Safex Fire Services, Bombay
5. Reliable (FireProtection) India Ltd., Bombay
6. Brij Basi Hitech Udyog
7. Bharat Engg Works, India
8. Gunnebo India Ltd
9. Nitin Fire Protection Industries Ltd, India
10. Supremex Equipments, India
11. Vimal Fire Controls PvtLtd., India

b) FireHydrants, Monitors, DelugeValve, Nozzles

1. Zenith
2. Minimax
3. Newage
4. HDFire
5. VijayFire
6 Asco Strumech PvtLtd, India
7. Brij Basi Hi tech Udyog
8. Gunnebo India Ltd
9. Nitin Fire Protection Pvt Ltd.
10. Shah Bhogilal Jehamal and Brothers
11. Venus Pumps and Engineering Works

c) RRL Hoses

1. Jayshree
2. Newage

d) Hoses

1. Ashit Sales Corporation.,Bomabay
2. Royal India Corporation, Bombay
3. Gayatri Industrial Corporation
4. Simplex Rubber Products Ltd., Ahmedabad
5. Zaverchand Marketing Pvt. Ltd.,Baroda
6. Presidency Rubber Mill,Calcutta
7. The Cosmopolite, Calcutta

8. SimplexRubber Products, Thane

e) HoseDelivery

1. Chhatarya Rubber &ChemicalIndustries,
2. Nitin Fire Protection Industries Ltd, India

f) FireHoseAccessories

1. Asco StrumechPvtLtd
2. Brij Basi Hi-tech Udyog
3. Gunnebo India Ltd
4. Shah Bhogilal Jethamal & Brothers
5. Vimal Fire Controls PvtLtd., India

xiv) Heat Shrinkable Sleeves

1. Covalence Raychem (BerryPlastics Corporation)
2. Canussa – CPS

xv) Cold AppliedTapes

1. Denso GmBH
2. Polyken (BerryPlastics Corporation)

xvi) PUR Coating

1. Powercrete (BerryPlastics Corporation)
2.

xvii) Casing End Closure

1. Raci, Italy
2. Raychem RPG Limited

xviii) <u>Rockshield</u>

1. Raychem RPG Limited

xix) <u>Warning mat</u>

1. Sparco Multiplast Pvt. Ltd., Ahmedabad
2. M/s Raychem RPG Limited
3. Singhal Industries Private Limited

xx) <u>High uildEpoxy Coating</u>

1. BerryPlas ics –Powercrete
2. Specialty Polymer Canada
3. Denso Protal,Canada

xxi) <u>Casing Insulators</u>

1. Raci, Italy
2. Raychem RPGLimited
3. VeekayVikram

xxii) <u>NDTAGENCY</u>

1. NDTServices, Ahmedabad
2. GEECY Industrial Services Pvt.Ltd., Mumbai
3. Corrosion Control Services, Mumbai
4. Perfect Metal Testing &Inspection Agency, Calcutta
5. Inter Ocean Shipping Co., New Delhi
6. RTD, Mumbai
7. Sievert, Mumbai
8. X-Tech, Vizag

xxiii) <u>LONGRADIUSBENDS</u>

i) M/s BHEL,Trichy,Tamilnadu

ii) M/s Jindal SAWLimited,(Koshi Works), U.P.

iii) M/s PSL Limited, Gandhidham, Gujarat

iv) M/s Welspun,Gujarat

v) M/s Fabricon,Be gium

xxiv) INSULATING JOINTS (IJ)

i) M/s IGP Engineers,chennai

ii) M/s Basco (UK)

iii) M/s Bramsthal Postfach,Germany

iv) M/s Nuovagiungas ,Italy

v) M/s Phoceene DeMetallurgic,France

vi) M/s Piping Technology,France (ErstwhileM/sLall Storm)

vii) M/s Prochind SPA,Italy

viii) M/s Zunt Italiana

ix) M/s Meteor Pvt.Ltd.

x) M/s Alpha Engineering,italy

xi) M/s Igawara Industrial Services and TradingPvt.Ltd.

xii) M/s Sanghai Fiorentini Equipment

xiii) M/s RMA Maschinen

xiv) M/s FranzSchuk

xv) M/s Advance Electronics Systems,Vadodara

xvi) M/s VeekayVikram, Vadodara

1) For procuring boughtout items from vendors other than those listed above,except welding electrode the same maybe acceptable subjec to thefollowing:-

a) The vendor/ supplier of boughtout item(s) is a manufacturer/ supplier of saiditem(s) for intended services and the sizes being offered is in the irregular manufacturing/ supply range.

b) The vendor / supplier should not be in the Holiday list of Owner/REPL/other PSU.

c) Should have supplied at least one single random length (i.e. 5.5 metersto6.5meters) for item assorted pipes/tubes and for other items, which are to be supplied in quantity on number-basis (other than assorted pipes/tubes) minimum 01(One) number of same or higher in terms of siz and rating as required for intended services.

The bidder should enclose documentary evidences i.e.PO copies, InspectionCertificate etc. for the above, alongwiththeir bids.

2) For any other item(s) for which the vendor list is not provided, bidders cansupply those item(s) from vendors / suppliers who have earlier supplied sameitem(s) for the intendeds ervicesinearlierp rojectsa ndtheitem(s)o fferedisintheirregular manufacturing/ supply range.

The bidder is not required to enclose documentary evidences (PO copies, Inspection certificate etc.) along with their offer, however in case of successful bidder, these documents shall required to be submitted by them within 30days from date of Placement of Order for approval to Owner / REPL.

3) The details of vendors indicated in this list are based on the information available with REPL, Contractor shall verify capabilities of each vendor for producing the required quantity with. PMC does not guarantee any responsibility on the performance of the vendor. It is the contractor's responsibility to verify the correctstatus of vendor and quality control of each parties and also to expedite the material in time.

B) Architectural

List of Approved Manufacturers of Architectural /Building Products

	Item/Name of Manufacturer	Place	Brand Name
1.0	**Floor Finishing**		
1.1	**Terrazzo Tiles**		
A	Nitco	Delhi	NITCO
B	Hindustan Tiles	Delhi	Hindustan Tiles
1.2	**Ceramic Tiles**		
A	Regency Ceramics Ltd.	Hyderabad	Regency
B	Kajaria Ceramics Ltd.	Delhi	Kajaria
C	Orient Ceramics & Industies Ltd.	Delhi	Orient
D	Bell Ceramics	Vadodara	BELL
E	SPL Ltd.	Delhi	Somany

F	H&R Johnson(I) Ltd.	Mumbai	Johnson
G	Spartek Ceramics	Chennai	Spartek
H	Murudeshwar Ceramics Ltd.	Hubli	Naveen
1.3	**Vitrified Tiles**		
A	Regency Ceramics Ltd.	Hyderabad	Regency
B	Orient Ceramics & Industies Ltd.	Delhi	Orient
C	SPL Ltd.	Delhi	Somany
D	H&R Johnson(I) Ltd.	Mumbai	Johnson
E	Murudeshwar Ceramics Ltd.	Chennai	Spartek
F	Kajaria Ceramics Ltd.	Hubli	
1.4	**Acid Resistant Tiles**		
A	Regency Ceramics Ltd.	Hyderabad	Regency
B	H&R Johnson(I) Ltd.	Mumbai	Endura
1.5	**PVC Tiles/Rolls**		
A	All Manufacturers Listed(Having Operative and Valid License) by HISAIBIS Website ehttp://www.bis.org in		
B	Armstrong World Industries	Mumbai	Excelln
C	Bhor Industries	Delhi	MARBLFX
D	Shyam Vinyl	Chennai	Shyam Vinyles
1.6	**PVC Tiles/Rools/Anti-Static)**		
A	Armstrong World Industries	Mumbai	SolidLG1
B	Premier Poly Film Ltd.	Delhi	ANSTAT
1.7	**Epoxy Coating**		

A	Fosroc Chemical(I) Pvt. Ltd.	Bangalore	NitofloorSL2000/1000
B	Sika	Kolkata	Sika Floor
C	Buildtech Products(I)Pvt. Ltd.	Delhi	Build poxy-SL
D	Anupam Industries	Kolkata	-
E	STP	Delhi	
1.8	**Floor Hardener**		
A	Cico Technologies Limited	Delhi	CICO
B	Samcock Chemicals(P) Ltd.	Ahmedabad	Samhard STD
C	PCCCSS Procfssor and Traders	Kolkata	Doronite

Sl. No.	**Item/Name of Manufacturer**	**Place**	**Brand Name**
1.9	**Designer Paver Tiles/Interlocking Tiles ISI Marked/Grass-Jointed Tiles(1stQualityOnly)**		
A	Pavit, Ultra, Hindustan, Eurocon, Vyara, Na Tional Tiles, Gem, Unistone, Konkrete		
B	Rammica Indusries	Delhi	Rammica
C	The Bombay Burmah Trading Corpn.	Delhi	Formica
2.0	**Wood Work**		
2.1	**Block Board/Flush Door**		
A	All Manufacturers Listed(Having Operative and Valid License) by HISAIBIS WebSit ehttp://www.bis.org.in		
2.1	**Plywood**		

A	AllManufacturersListed(HavingOperativeandValidLicense)byHISAIBI SWebSitehttp://www.bis.org.in		
2.2	**Laminates**		
A	AllManufacturersListed(HavingOperativeandValidLicense)byHISAIBISWebSit ehttp://www.bis.org.in		
2.3	**MDFBoards**		
A	NuchemLimited	Faridabad	NULAM/NVWUD
B	MangalamTimberProductsLimited	Delhi	Nuwud
C	WesternBioSystemsLtd.	PUNF	Ecoboard
D	BajajEco-TechProductsLimited	Noida	Bajaj
2.4	**ParticleBoard(Plain/Veneered/Pre-Laminated)**		
A	AllManufactureresListedbyBISUnderis309 7(HavingOperativeandValidLicense)atBISWeb Sitehttp://www.bis.org.in/		
2.5	**PressedSteelDoorFrames/CupboardandWindowFrames(Fabricators)**		
	M/sSAIL		
	M/sTATA		
3.0	**Steel/Aluminium/FireRatedDoors,Windows,Ventilators**		
3.1	**PressedSteelDoors/Windows**		
A	SKSSteelInd.	Delhi	-

B	DhimanSteel	Delhi	-
C	SupperSteelWindowsCo.	Delhi	-
D	RDGEngineering	Mumbai	-
E	AnandIndustries	Delhi	-
F	RaymusEngineering	Gurgaon	-
G	M/sLoyalSafeWorksMayapur	NewDelhi	
H	M/sMultiwynIndustrialCorpn.Clacutta	Kolkata	
I	M/sMetalWindowCorpn.	NewDelhi	
J	M/sChhabraSteelUdyog	260SadarBazar, MeerutCantt	
K	M/sDeliteSafeWorks,	RaniJhansiRoad,NewDelhi	
L	M/sIshwarIndustries,	175/ABomayBazar,Meerut Cantt	
M	M/sChandniIndustries	J-142,Patelnagar1st,	

		Ghaziabad	
3.2 A	**Aluminimum/Doors/WindowsSections**		
A	JindalAluminiumLimited	Bangalore	
B	Hindalco	Mumbai	
3.2 B	AlluminumlDoor/Windows/GlazingFabricatorandAnodized		

A	M/sAlumilitePvt.Ltd.,C.AHLCON	NewDelhi	
B	M/sAjitIndiaPvt.Ltd.	Mumbai	
3.3	**FireProofDoors**		
A	NavairInternational	Delhi	Viper
B	RDGEngineering	Bombay	Radiant
3.4	**SteelWindows,Ventilators(asperIS-1038of1983)&framespressedsteeldorr/window)**		
A	M/sMultiwynIndustrialCorpnCalcutta	Kolkata	
B	M/sMetalWindowCorpN/Delhi	NewDelhi	
C	M/sGovindEnterprises,Delhi	Delhi	
D	M/sChhabraSteelUdyog260,SadarBa		
	zar,MeerutCantt,AgentSteelMFGPvt .Ltd.Ahmedabad,Godrej.		
E	M/sChandniIndustries,J-142,PatelNagarIst,Ghaziabad	Ghaziabad	
3.5	**RollingShutters(ISImarked)**		
A	Swastic	Mumbai	
B	Hercules	Bangalore	
C	Shubdwar		
D	M/sBharatRollingShutersIndustriesAgraRamaRollingShutterWorks		
E	GandhiEntranceAutomationsPrivateLimited		
4	**Door/WindowsFittings**		
4.1	**MorticeLockswithHandles**		

A	Godrej&Boyce	Mumbai	Godrej
B	EveriteAgencies(P)Ltd.	Delhi	Everite
C	GoldenIndustries	Delhi	Golden
4.2	**HydraulicDoorCloser(Overhead/FloorMounted)**		
A	AllManufactureresListedbyBISUnderis308 7(HavingOperativeandValidLicense)atBISWeb Sitehttp://www.bis.org.in/		
B	DoorkingIndustries	Delhi	Doorking
4.3	**Misc.DoorFittingse.g.Hingee,TowerBots,Latches,Stoppersetc.**		
A	AllManufacturersListedbyBISunderIS:308 7(Havingoperativeandvalidlicense)atBISWeb Sitehttp://ww.bis.org.in/		
B	EveriteAgencies(P)Ltd.	Delhi	Everite
C	EBCOIndustries	Delhi	EBCO
D	ECIE(P)Ltd.	Mumbai	ECIE
D	HardwynTraders	Mumbai	Hardwyn

Sl. No.	Item/Name of Manufacturer	Place	BrandName
	Aluminimum /Doors/Windows Fittings		
	M/sWlite EnterprisesC/6ShalimarHardware133,JargMahal,DhobitalaoMumbai400002		
	M/sMohanMetalIndustries178/2-A,BholeNathNagar,Shahadara,Delhi11003 2		
	Mepro,ArgentNewDelhi,Classic,NewDelhi		
	ArgentNewDelhi,		
	GoldenIndustriesPvt.Ltd.	Delhi	
4.4	**AutomaticGlassDoor**		
A	Ditec(Gandhi)	Mumbai	
4.5	**AluminiumGrill**		
A	AluGrill,ArihantAluminiumCorporation,Decogrille	Bangalore	Decogrille
4.6	**BuildersHardware**		
A	M/sGoldenIndustriesPvt.Ltd.Everite,Sol	delhi	
5.0	**RoofTreatment(Water-Proofing)**		
5.1	**P.U.BasedWaterproofing(OneComponemt)**		
A	LlyodInsulations(I)Ltd.	Delhi	IsothaneEma
B	CicoTechnologiesLtd.	Delhi	Corchem2061

C	FosrocChemical(I)Pvt.Ltd.	Bangalore	Nitoproof
5.2	**P.U.BasedWaterproofing(TwoCompo emt)**		
A	ShivalikAgroPolyProductsPvt.Ltd.	Delhi	Shivabond903
B	IndustrialProductManufacturingCompany	Pune	EZECOAT
C	FosrocChemical(I)Pvtl.Ltd.	Bangalore	Brushbond
D	Sika	Kolkata	Sikala tic
E	SipIndustriesLimited	Chennai	Sipguard
5.3	**ApprovedMembrane**		
A	LlyodInsulations(I)Ltd.	Delhi	LloyedPlastolan
B	BuildtechProductsPvt.(I)Ltd.	Delhi	BuilDwrapP
C	CicoTechnologiesLtd.	Delhi	CICOShield
D	FosrocChemical(I)Pvt.Ltd.	Bangalore	Proofex
F	Sika	Kolkata	SikaWPShield
G	STPLtd	Kolkata	SuperThermolay
H	IWLIndiaLtd.	Chennai	Hyperplas
I	PureLeathersPvt.Ltd.	Delhi	Roofseai
6.0	**PaintingWorks**		
	Plastic/AcrylicEmulsionPaint	Jodhpur	
6.1	**(InternalandExternal,Distemper/AcrylicDistemper)**		
A	ICIPaints/ICIIndiaLtd.	Kolkata	
B	BergerPaints	Kolkata	LewisBerger
C	AsianPaints	Mumbai	AsianPaint
D	ShalimarPaints	Mumbai	ColorSpace

E	NerolacPaints	Mumbai	
F	Acropaints/Imited	Delhi	
G	GodavariPaintsPvt.Ltd.	Mumbai	
H	NEPaintUdyog	Sivasagar (Assam)	

Sl. No.	**Item/NameofManufacturer**	**Place**	**BrandName**
6.2	**SyntheticEnamelPaint(forBuildingWorks)**		
A	ICIPaints/ICIIndiaLtd.	Kolkata	
B	BergerPaints	Kolkata	
C	AsianPaints	Mumbai	
D	ShalimarPaints	Mumbai	
E	NerolacPaints	Mumbai	
F	GodavariPaintsPvt.Ltd.	Mumbai	
G	NEPaintUdyog	Sivasagar(Assam)	
6.3	**WaterproofCementPaint**		
A	KillickNixonLtd.	Mumbai	Snowcem
B	GodavariPaintsPvt.Ltd.	Mumbai	Superemcem
C	Acropaints/Imited	Delhi	Acrocfm
D	SnowWhiteIndustrialCorpn	Chennai	Superclm
E	RajdootPaints	Delhi	Xlracem78SuperCe

			mentP int
6.4	**DecorativeTexturedCoating**		
A	LuxtureSurfaceCoatingsPvt.Ltd.	Ajmer	Luxture
B	BakeliteHylamLtd.	Secundrabad	Heritage
C	NCLAlltekandSeccolorLtd.	Hyderabad	Alltek
D	AcropaintsLtd.	Delhi	Acrotextures
E	Unitile	Delhi	Unitile
F	SpectrumPaint	Delhi	Spectrum
6.5	**Ploshing(forWoodwork)**		
A	AsianPaints	Mumbai	AsianPaint
B	ShalimarPaints	Mumbai	Mellac
7.0	**RoofingSheets&Accessories**		
7.1	**PrecoatedProfiledG.I./Galvalume/ZincalumeSheets**		
A	LlyodInsulations(I)Ltd.	Delhi	Lloydeck
B	InterarchBuildingProducts(P)Ltd.	Noida	Tracdek
C	MultiColourSteel(I)Pvt.Ltd.	Delhi	Multi……
D	Hardcastele&WaudMfg.Co.Ltd.	Mumbai	FeroColour
E	JapanMetalBuildingSystemsPvt.Ltd.	Bangalore	JMBS
F	TATABluescopeSteelLimited	Pune	TrimdfCK
G	EraBuildingSystemsLimited	Delhi	ERA
H	ShreePrecoatedSteelsLimited	Mumbai	Metacolour
7.2	**C.G.I.Sheet**		
A	ISPATIndustriesLtd.	Delhi	Everest
B	SteelAuthorityofIndiaLtd.	-	SAIL
C	TATASteel	-	TISCO

7.3	**AluminiumSheet**		
A	JindalAluminiumLimited	Bangalore	
B	Hindalco	Mumbai	
7.4	**FiberGlassSheet&Panels**		
A	SimbaFrp(P)Ltd.	Delhi	
8.0	**Sanitary,PlumbingFittings&Fixtures**		
8.1	**SanitaryFittings**		

Sl. No.	**Item/Name of Manufacturer**	**Place**	**BrandName**
A	AllManufacturersListedbyBISunderIS:3087(HavingoperativeandvalidlicenseatBISWebSitehttp://ww.bis.org.in/		
8.2	**PlumbingFittingsandFixtures**		
A	JupiterAquaLinesLtd.	Mohali	Jupitor
B	OthelloFaucetsPvt.Ltd.	Delhi	Mayur
C	OrientCeramics	Delhi	Orie t
D	GemInternational	Faridabad	Gem
E	ParkashBrasswareIndustres	Delhi	Parko
F	Jaquar&CompanyLtd.	Delhi	Jaqu r
G	PlastocraftSanitaryIndiaPvt.Ltd./HSW	Delhi	Kingston
8.2H	CastIronPipesandFittings HinddustanEngineerngProductsCompany	Calcutta	
8.2I	**RCCPipes**		
A	IndianHumePipeCompany	Delhi/Allahabad/Chandigarh/Lucknow	

B	HindustanPressurePipes	Kolhapur	
C	DhereConcreteProducts	Pune	
8.2J	**GIPipes**		
A	IndianTubeCompany	Culcutta	
B	KalingaTubesLimited	RanchiGujarat	
C	SteelTube		
D	ZenithTubeCo.	Kolaba	
E	BharatSteelTube	NewDelhi	
F	Jindal		
G	ShivmoniSteelTubesLimited	Bangalore	
H	SekharIronWorks	Calcutta	
I	JainTubes,	Ghaziabad	
J	KhandelwalTubes	Nagpur	
8.2	**G.I.Fittings**		
K			
A	InternationalPipeWorks	Calcutta	
B	R.M.EngineeringWorks	Jalandhar	
C	BombayMetalCompany	Bombay	
D	TarapadaDas&Sons	Howrah	
E	AnnapurnaMetalWorks	Calcutta	
8.2L	**GunMetalValvesandCopperAlloyValve**		
A	LeaderEngineeringWroks	Jalandhar	
B	NetaEngineeringWorks	Jalandhar	
C	LakshmiMetalWorks	Jalandhar	
D	BombayMetal&AlloysCompany	Bombay	

E	LusterSanitaryFittings	Jalandhar	
F	AnnapurnaMetalWorks	Culcutta	
8.2 M	**SluiceValves,CheckValvesetc.**		
A	ShivaDurgaIronWorks,	Howrah	
B	LeaderEngineeringWroks	Jalandhar	

Sl. No.	**Item/NameofManufacturer**	**Place**	**BrandName**
C	KirloskarBrosLimited	Pun	
D	IndianValve	Calcutta	
E	GeetaIron&BrassWorks	Baroda	
8.2 N	**BrassFittings**		
A	LeaderEngineeringWroks	Jalandhar	
B	L&KMathura		
C	LusterSanitaryFittings	Jalandhar	
D	AnnapurnaMetalWorks	Calcutta	
E	NetaEngineeringWorks	Jalandhar	
F	HoneyIndustrilCorporation	Bombay	
8.2 O	**C.P.Fittings**		
A	EgoMetalWorks	Ballabhgarh	
B	Jaquar&CompanyLtd.	Delhi	
C	SomaPlumbingFixturesLimited	Calcutta	
D	GemSanitaryAppliancesPvt.Ltd.	Delhi	
E	EsscoSanitations	Delhi	

F	Bilmet	Bombay	
8.2 P	**Hydrants**		
A	Brady's	Bombay	
B	Firex	Bombay	
C	UpadhyaValves	Calcutta	
D	EddyFoundry	Calcutta	
E	Minimax	Delhi	
8.2 Q	**StoneWare(Salt-Glazed)Pipes**		
A	HindCeramicsLimited	Orissa	
B	CeramicIndustriesLimited	Sambalpur	
C	ShrikamakshiAgencies	Madras	
D	BinaryUdyogPvt.Lmited	Howrah	
E	TirumatiMouldsLimited	Nagpur	
F	KiranPotteries	Hyderabad	
G	PerfectSanitaryPipes	Bharatpur	
8.3	**Mirror/Glass**		

A	AtulGlass	Delhi	Atul
B	GujaratGuardianLtd./Modi/SaintGovin	Delhi	Modiguard
C	TriveniGlass	Kolkata	Triveni
D	ContinentalFloatGlass	Delhi	Continental
E	HindustanSafetyGlass	Kolkata	Hindustan
9.0	**FalseCeiling**		
9.1	**AluminimumStrip/TrayType**		

A	InterarchBuildingProducts(P)Ltd.	Noida	Trac
B	HunterDouglas	Delhi	Luxalon
C	MascotOversfas	Delhi	Mctacie/ Trulon
D	LlyodInsulations(I)Ltd.	Delhi	Lloyd Lineal Celings
9.2	**GypsumBoard**		

Sl. No.	**Item/NameofManufacturer**	**Place**	**BrandName**
A	Saint-GobainGuprocIndiaLtd.,LA,IPBoard	Mumbai	Gypboard
9.3	**FalseCeiling(POP/GypsumBoard)**		
A	Armstrong,Daiken,Luxalon,Llyods		
10.0	**FalseFlooring**		
A	UnitedInsulation	Mumbai	
B	LlyodInsulations(I)Ltd.	Delhi	
C	MutiFloors	Delhi	
D	A.R&Brothers	Chennai	
E	BestlockSystem&Concepts,Goderej	Mumbai	
11.0	**Insulation**		
11.1	**UnderdeckInsulation**		
A	BakeliteHylamLtd.	Secundrabad	Phenotherm
B	LlyodInsulations(I)Ltd.	Delhi	Isolloyd
C	UPTwigaFibreGlassLimited	Delhi	TWIGA
11.2	**OverdeckInsulation**		
A	LlyodInsulations(I)Ltd.	Delhi	LloyadSprayFoam

B	BestPlastronicsLtd.	Delhi	BestPlastronics
12.0	**MiscellaneousItems**		
12.1	**WaterProofingCompoundinPlaster**		
A	CicoTechnologiesLtd.	Delhi	CICO o.1
B	PidiliteIndustries	Mumbai	PidiproofLA
C	AmitChemicals(P)Ltd.	Delhi	CRETOADMIX
12.2	**CPRXBitumanMastic**		
A	ShaiImarTarProducts	Delhi	ShalimarTar
13.0	**ConcreteAdmixtures**		
13.1	**WaterProofingCompound**		
A	CicoTechnologiesLtd.	NewDelhi	CICO o.1
			CICOSuper
			CICOAcry
B	KrytonBuildmatCoPvt.Ltd.	Delhi	KIM
C	SikaIndiaPvt.Ltd.	Kolkata	PlastocretePlus
			Noleek
13.2	**WaterReducingCompounds**		
A	CICOTechnologiesLtd.	Delhi	CICOPLASTSuper
B	FairmatfChemicalsPvt.Ltd.	Vadodara	FaircreteNFairflo
			FairfLOS

Sl. No.	Item/Name of Manufacturer	Place	Brand Name
C	SikaIndiaPvt.Ltd.	Kolkata	PlastimentBVPlastimen 81 Plastiment70 SikamentFFSikamentNNSikament NN(BWS) SikamentNNSP1Skamen1 Sikarapid1 Sikaviscocrl:L20HE SikaviscocreTER550(I) SikaAER
14.0	**ConstructionChemicals**		
14.1	**PolysulphideSealant**		
A	CnowksfyChemicalsPvt.Ltd.	Mumbai	Techseal
B	CicoTechnologiesLtd.	Delhi	CICOSEALANIT580
C	FosrocChemical	Delhi	Thioflex660
D	PidiliteIndustries	Mumbai	PidisealPS42P
E	SikaIndiaPvt.Ltd.	Kolkata	SIKAPolysulPH: DE(SikaAST:C) Construction
14.2	**SiliconSealants**		
A	PidiliteIndustriesLtd.	Mumbai	Dr.FixitSilic onSealantW X
15.0	**AnchorFasteners**		

15.1	**Mechanical AnchorFasteners**		
A	HiltiIndiaPvt.Ltd.	Delhi	
B	FischerFixingSystems(MICO)Ltd.	Bangalore	
15.2	**ChemicalAnchorFasteners**		
A	HiltiIndiaPvt.Ltd.	Delhi	
B	FischerFixingSystems(MICO)Ltd.	Bangalore	
16.0	**Electro-ForgedGratings**		
A	GreatweldSteelGratingsPvt.Ltd.	Pune	
B	IndianaGratingsPvt.Ltd.	Mumbai	
17	**ModularPartitions/Furniture**		
A	Godrej,Blowplast,Featherlire,Duriar		
18.0	**WallCarePuttyforBasePreparation(1stQualityOnly)**		
A	BirlaWallCarePutty		
B	M/sSahlimarHardware		
C	Berger	delhi	
D	Jenson&Nichoison	Gurgaon	
E	JKWhite	Udaipur	
19.0	**WhiteCement(1stQualityOnly)**		
A	Birla,JK		
20.0	**SheetGlass/StructuralGlazing**		
A	HindustanPilkingtonGlassWorks	Chennai	

Sl. No.	**Item/NameofManufacturer**	**Place**	**BrandName**
B	SaintGobain	Chennai	
C	ModiFloat	Delhi	

D	TriveniFloatGlass	Allahabad	
F	ASI		
G	Fresca		
H	Emirates		
21.0	**PolycorbonateSheet**		
A	GEPlastic,Everest		
22.0	**Multiiell/MultiwallPolycorbonatePanel**		
A	M/sCoxwellDomesEngineering,Delhi	Delhi	
B	M/sLexan,M/sGalinaIndiaPvt.Ltd.	NewDelhi	
C	M/sVijaynathInteriors&ExteriorsProducts	Mumbai	

23.0	**StainlessSteelRailing**		
A	Jindal		
24.0	**PunchTapeConcetinaCoil**		
A	GlobalTechnocrat,S.G.Engineers	Delhi	
25.0	**PunchTapeInPlasticSpool**		
A	GlobalTechnocrat,S.G.Engineers	Delhi	
26.0	**StainlessSteelRailing**		
A	Jindal	NewDelhi	
27.0	**SGSWPipes(IS-651)ISImarked**		
A	PerfectAgra,DevrajInd.Gaziabad,Buran ,RK,Prince,SupremePipeandFittings		
28.0	**CI(CentrifugallyCast)PipesforSewageDisposalISIMarked**		
A	NICCO,SRIF,A-1SinghalCastingCoAgra,JindalSaw,Kesora m		
29.0	**PVCRainWater/SewagePipes(IS-4985)**		
A	Reliance,Finolex,Supreme,Kisan,Prince		
30.0	**HDPEWater/SewagePipes(RotationalMoulded)**		
A	Sintex,Swift,Nutech,Sheetal		
31.0	**AsbestosCementPipesandFittings**		
A	GangaAsbestosLimited	U.P	
B	HyderabadAsbestosCementProductsLimited		
C	J.K.SuperPipesIndustries	Nanded	
D	KonarkCementandAsbestosLimited	Orissa	
E	MaharashtraAsbestosLmited	Bombay	
F	PoddarIndustrialCorporation	Patna	
G	SarbamangalaMfg.Company	Calcutta	
32.0	**WindDriyenAirVentilators**		

A	MultiColour		
	AnchitIspatPvt.Ltd.	Faridabad	
	ApurvaEnterprises	Mumbai	
	SVSWindDrivenTurboVentilator	Ahmadnagar	
	RealGreenEngineersPvt.Ltd.Bagalores	Bangalore	
	SunGreenVentilationSystemPvt.Ltd	Mylapore	

C) Electrical

AirConditioner

1. O General
2. Daikin

Hitachi Batteries(LeadAcid)

1. Amco Batteries Ltd.
2. Exide IndustriesLtd.
3. HBLNIFEPower SystemLtd.
4. Amara Raja Batteries Ltd.

Batteries(NickelCadmium)

1. Amco Batteries Ltd.

HBLNIFEPower Systems Ltd. BatteriesCharger/DC-DCConverter

1. Amara Raja Power System(P)Ltd.
2. BCH.
3. Chhabi Electricals Pvt.Ltd.
4. Caldyne AutomaticsLimited
5. Dubas
6. HBLNifePower SystemsLtd.
7. Universal Industries Products
8. Universal Ins rumentMfg

CoPvtLtd Cable–
FireAlarm&CommunicationCables

1. Co ds Cable Industries Ltd.
2. CMI
3. Deltoncables Ltd.
4. ELKAYTelelinks
5. KEI IndustriesLtd.
6. RelianceEngineers Ltd.

Cable–HT(XLPE)

1. Universal CableLtd.
2. KEI IndustriesLtd.
3. IndustrialCables
4. NICCOCorporationLtd.
5. Uniflex
6. Polycab.
7. Torrentcables Ltd.

Cable–LTPowerandControl

1. Cords Cable Industries Ltd.
2. Universal CableLtd.
3. KEI IndustriesLtd.
4. Havells.
5. Delton
6. ElkayTelelinks
7. EvershineElectricals
8. Ecko
9. Ravin
10. Rallison.
11. Suyog
12. Netco
13. Uniflex
14. Paramount
15. Gloster
16. Associated cables PvtLtd.
17. CMI
18. Gemscab
19. Industrial cables
20. NICCO
21. Polycab

22. Torrent Cable–
Gland

1. Baliga
2. Comet
3. Flexpro
4. Flameproof
5. FCG
6. Electro Werke
7. Dowels
8. CCI

Cable–Lugs

1. Dowels
2. Jainson
3. Ismal

Cable–Tray

1. Ercon Composites
2. Yamuna Power &InfrastructureLtd.

CableTerminationandJointingKit

1. CCI
2. Raychem
3. M-Seal

Ceiling/Exhaust/PedestalFans&Circulators

1. Bajaj Electricals Ltd.
2. Crompton GreavesLtd.
3. KhaitanElectricals Ltd.
4. Havell‘s

Contractors- ACPower

1 Andrew Yule
2 ABB
3 BHEL
4 C&S
5 Havell‘s
6 L&T
7 Schneider
8 Siemens Ltd.
9 Telemechanique

ControlTransformer

1. AE
2. Indushree
3. Intra Vidyut
4. Kalpa Electrikals
5. Transpower IndustriesLtd.
6. Siemens

EarthingMaterials

1. Rukmani Electrical &Components PvtLtd.
2. Indiana Grating PvtLtd.

FlameproofLDB‘s/JB,s/ControlStation/switches

1. FCG
2. Sudhir
3. PromptEngineering Works
4. FlameProof equipmentspvt.Ltd.
5. Baliga LightingEquipments Pvt.Ltd.
6. FlexproElectricals Pvt.Ltd.

HighMast

1. BajajElectricalsLimited
2. CromptonGreaves Limited.
3. PhilipsIndia Limited
4. SuryaRoshani

HighVoltagePCC/MCCpanels

1. BHEL
2. Control and Switchgear
3. Siemens
4. TricoliteElectrical Industries
5. Schneider
6. CGL
7. L&T

IndicatingLamps

1. Alstom Ltd.
2. BCH
3. L&TLtd.
4. Siemens Ltd.
5. Vaishno Electricals

IndicatingMeters

1. ABB
2. AMCO
3. AE
4. AlstomLtd. (EE)
5. Conzerv/Schneider
6. EleconMeasurementPvt. Ltd.
7. HPLElectric&PowerPvt. Ltd.
8. MECOInstruments Ltd.

9. Minilec
10. Rishabh InstrumentsPvt. Ltd.
11. Trinityenergysystem
12. kaycee
13. Salzer

LightingFixtures

1. GELightingPvt. Ltd.
2. Bajaj Electricals Ltd.
3. Crompton GreavesLtd.
4. Philips IndiaLtd.

LightingFixtures–Flameproof

1. Bajaj Electricals Ltd.
2. Baliga LightingEquipmentPvt.Ltd.
3. Crompton GreavesLtd.
4. CEAGFlameproof Controlgear Pvt. Ltd.
5. FlexproElectricals Pvt.Ltd.
6. Philips IndiaLtd.
7. Sudhir Switchgears Pvt.Ltd.
8. FCG.

MiniatureCir uitBreakers(MCBs)andLightingDB

1. ABB
2. Hagger
3. Havell‘s India Ltd.
4. Indo AsianFusegear Ltd.
5. Legrand
6. MDS Switchgear Ltd.
7. Schneider
8. Siemens Ltd.

9. HPL

MouldedCaseCircuitBreaker(MCCBs)

1. ABB
2. Andrew yule
3. Larsen&Toubro
4. Schneider
5. Siemens
6. Control and Switchgear

ProtectionRelays–Thermal

1. BCH
2. L&TLtd.
3. Siemens Ltd.
4. Telemenchanique&Controls (India) Ltd.

LowVoltagePowerControlCenter(PCC)/MCC/PDB/MLDB/LDB

1. ABB
2. BCH
3. C & S
4. Elecmech Switchgear &Instrumentation
5. KMG ATOZ
6. L&T
7. PyrotechElectronics Pvt.Ltd.
8. Risha controlEngineersPvt.Ltd.
9. Siemens
10. TricoliteElectrical Industries
11. UnilecEngineers ltd.
12. VidyutControlIndia Pvt.Ltd.
13. Control and Schematic
14. ZenithEngineering

PushButtons

1. BCH
2. Alstom Ltd.
3. L&T
4. Siemens Ltd.
5. Telemenchanique&Controls (India) Ltd.
6. Vaishno Electricals

Switches-Control

1. BCH
2. Easum Reyrolle Relays &Devices Ltd.
3. Alstom
4. Kaycee Industries Ltd.
5. L&T
6. Siemens Ltd.

Switches–5/15APiano/Plate,SwitchSocket

1. Anchor Electronics &Electricals Pvt. Ltd.
2. Kingal ElectricalsPvt. Ltd.
3. North-WestSwitchgear Ltd.

SwitchSocketOutlets(Industrial)

1. Alstom Ltd.
2. Best&CromptionEngineering Ltd.
3. BCH
4. Crompton GreavesLtd.
5. EssenEngineeringCompanyPvt.Ltd.

SolarModules

1. Tata BPSolar (I) Ltd.
2. REIL, Jaipur.
3. CEIL, Sahibabad.

SolarStreetLighting

1. Tata BPSolar (I)Ltd.
2. REIL,Jaipur.
3. CEIL,Sahibabad.

TerminalsBlocks

1. Connectwell
2. Controls &Switchgear Co. Ltd.
3. ElmexControlsPvt.Ltd.
4. EssenEngineering Co. Pvt.Ltd.

Transformers

1. ABB
2. Andrew Yule
3. Areva
4. BHEL
5. BharatBijlee
6. Crompton Greaves
7. EMCOLtd.
8. Intra Vidyut
9. Indushree
10. Indcoil
11. Kirloskar
12. SkippersElectricals
13. Transformers &Rectifiers (I) Ltd.
14. Voltamp

UPSSystemandInverter

1. DB POWER

2. APLAB
3. KELTRON
4. HI-REL
5. DUBAS
6. Toshiba Corporation
7. Fuzi Electric CoLtd

SolarStreetLighting

1) Tata BPSolar (I) Ltd.
2) REIL, Jaipur
3) CEIL, Sahibabad

D) Instrumentation

I) PRESSUREREGULATOR AND SLAM SHUT VALVE

1) M/s Pietro Fiorentini S.P.A.(Italy)
2) M/sEmersonProcessManagement(Singapore)
3) M/s RMG-RegelMesstechnik(Germany)
4) M/sNirmalIndustrialControls(India)-formaximum300#andsizeφ8‖
5) M/s Gorter Controls (Netherlands)
6) M/s Dresser

II) FLOWCONTROLVALVE

1) M/s ForbesMarshall (Pune)
2) M/s ABB Ltd.(Nashik)
3) M/s Fisher Xomox(NewDelhi)
4) M/s FouressEngg.(NewDelhi)
5) M/s InstrumentationLtd.(Palghat)
6) M/s MILControlsLtd. (Noida)
7) M/s Samson Control (Thane)
8) M/s Dresser

III) A) ULTRASONICFLOWMETER

1) M/s EmersonProcess (represented byM/s DanielMeasurement&Control)
2) M/s InstrometInternational, Belgium (represented byM/s SiddhaGas Instromet(I) Ltd.)
3) M/s FMCMeasurementSolution,UK(representedbyM/sTrimax Engg., Mumbai)
4) RMGMesstechnikGMBH
5) M/s SICK MAHAIK, (RepresentedbyChemtrolsIndustries,Mumbai)

IIIB) TURBINE METER

1) M/s Instromet(Belgium)
2) M/s RMG (Germany)
3) M/s Elster (Germany)
4) M/s FluidComponents(USA)
5) M/s Barton Instruments(UK)
6) M/s Bopp &Reuther (Germany)
7) M/s Daniel Industries (USA)
8) M/s Hoffer Flow(USA)
9) M/s RockwinFlowMeters

IVA) PANELMOUNTED FLOWCOMPUTERS

1) M/s Barton InstrumentsSystem Ltd. (UK)
2) M/s Daniel Measurementand Controls (M/sEmerson Group)
3) M/s InstrometInternational, Belgium (M/sEster-Instromet,India)
4) M/s RMGMesstechnikGmbH (Germany)
5) M/s Omni Flow Computers Inc. (USA)/(RockwinFlow MeterIndia)

IVB) FIELD MOUNTED FLOWCOMPUTER

1) M/s Barton InstrumentsSystem LLC (UK)

2) M/s Daniel Measurementand Controls (M/sEmerson Group)

3) M/s BristolBabcock(USA)

V) GAS CHROMATOGRA H

1) ABB Ltd, India
2) Daniel Measurement&Control AsiaPacific, India
3) InstrometInternationa,NV
4) RMG Regal+MesstechnikGmbH

VI) L.E.L DETECT ON SYSTEM

1) Crowcon Detection Instruments Ltd
2) Detection Instruments (I) PvtLtd
3) Detector Electronics Corporation
4) MSA – Minessafetyappliances.
5) Oldham France S.A.
6) Chemtrols EngineeringLtd., India
7) Drager SafetyAG&Co.KGAA
8) General Monitors IrelandLtd
9) Riken Keiki CoLtd
10) Simrad Optronics Icare

VII) CONTROL AND SIGNAL CABLES

1. M/s ASSOCIATED CABLES
2. M/s ASSOCIATEDFLEXIBLES
3. M/s DELTON Cables Ltd,India
4. M/s BROOK
5. M/s KEIIndustries LtdINDIA
6. M/s SuyogElectricals Ltd, India
7. M/sThermo CablesLtd

8. M/s Udey Pyrocables PvtLtd, India
9. M/s UNIVERSALCables Ltd,India
10. M/s CMILimited
11. M/s - CordsCable Industries Ltd, India
12. M/s ElkayTelelinks (P)Ltd., India
13. M/s Fine Core CablesPvtLtd, India
14. M/s GoyoleneFibres (I)PvtLtd, India
15. M/s Netco CableIndustries PvtLtd, India
16. M/s NICCO CorporationLtd,India
17. M/sParamountCommunications Ltd, India
18. M/sPolycabWires Pvt Ltd, India
19. M/s RadiantCablesPvtLtd,India
20. M/s RelianceEngineersLtd., India

VIII) ZENER BARRIERS/ISOLATORS

1) M/s MTL
2) M/s P& F

IX) RTDs

1) M/s General Instruments Ltd.,Mumbai
2) M/s Nagman Sensors (Pvt.) Ltd.
3) M/s PyroElectric, Goa

X) PRESSURE TRANSMITTERS, TEMP. TRANSMITTERS & DIFF.PRESSURE TRANSMITTER

1) M/s Fisher Rosemount(Emerson)
2) M/s Yokogawa
3) M/s Fuji
4) M/s Honeywell

XI) PRESSUREGAUGES. D. P. GAUGES&TEMPERATURESGAUGES

1) M/s AN InstrumentsPvt.Ltd., New Delhi

2) M/s General Instruments Ltd.,Mumbai

3) M/s WIKA

XIIA) SS TUBEFITTINGS

1) M/s Swagelok(USA)

2) M/s Parker (USA)

3) M/s Excellsior

4) M/s Reliance

5) M/s Multimetal

6) M/s Aura Inc

7) M/s Arya Crafts&Engineering Pvt. Ltd.

8) M/s Excel HydroPneumatics Pvt.Ltd.

9) M/s FluidControlsP t.Ltd.

10) M/s SwasticEngineeringWorks

11) M/s PanamEngineers

XII B) SSTUBE

1) M/s Sandvik, Sweden
2) M/s Ratnamani metals&tubes
3) M/s NFC
4) M/s HeavyMetals& TubeLimited (Mehasana)

XII C) SSVALVES&MANIFOLDS

1) M/s Swagelok(USA)
2) M/s Parker (USA)
3) M/s Excellsior
4) M/s Micro-Precision

5) M/s Technomatic India
6) M/s Aura Inc
7) M/s Arya Crafts&Engineering Pvt. Ltd.
8) M/s Excel HydroPneumatics Pvt.Ltd.
9) M/s SwasticEngineeringWorks
10) M/s PanamEngineers

XIII) JUNCTION BOXESAND CABLESGLANDS

1) M/s EX-PROTECTA
2) M/s FLAMEPROOFCONTROLGEARS
3) M/s BALIGA
4) M/s FLEXPRO ELECTRICALS

XIV) PUSHBUTTONS/LAMPS:

1) L&T
2) SIEMENS

XV) MCB"S:

1) HAVELL'S
2) INDO ASIAN
3) MDS

XVI) RELAYS:

1) OEN
2) JYOTI

XVII) POWER SUPPLY UNIT:

1) ELNOVA
2) APLAB

XVIII) CONTROLROOMEQUIPMENTCONTROL PANEL &ACCESSORIES

1) M/s KeltronControlsLtd., Kerala
2) M/s RITTAL
3) M/s Pyrotech
4) M/s PositronicsPvt. Ltd.
5) M/s ABB InstrumentsLtd., New Delhi
6) M/s EmersonProcessManagement(I) Pvt. Ltd.
7) M/s Rockwell Automation(I) Ltd.,Ghaziabad
8) M/s Siemens Ltd.
9) M/s TataHoneywellLtd.

XIX) INDICATORS/CONTROLLERS/RECORD RS

1) M/s ABB
2) M/s YBL
3) M/s EUROTHERN
4) M/s TATA HONEYWELL
5) M/s MASIBUS

XX) HDPEDUCT

1. M/s KirtiIndustries (India) Ltd., Indore.
2. M/s Kulja Industries., Solan
3. M/s VeekayPlast, Jaipur
5. M/s Jain IrrigationSystems Ltd. Jalgoan
6. M/s ShreeMohitIndustries, Burhanpur
7. M/s Duraline India Pvt. Ltd.,New Delhi

Note-1

For procuring bought out items from vendors other than those listed above,the samemaybe acceptable subject to the following: -

a) The vendor/ supplier of bought out item(s) is a regular andreputedmanufacturer/supplier of said item(s) for intended services and the sizes beingoffered is in their regular manufacturing/ supply range.

b) The vendor/ supplier should not be in the Holiday list of Owner.

c) Should have supplied at least 50% of required quantity or minimum 1number whichever is higher of maximum size and rating of item(s) as Required for intended services.

The biddershould enclose documentary evidences i.e. PO copies, InspectionCertificate etc. for the above, alongwiththeir bids.

Note-2

For any otheritem(s)for whichthevendor listis not provided, bidders can supply thoseitem(s) from reputed vendors/suppliers who have earlier supplied same item(s) forthe intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supplyrange.

The bidder is not required to enclose documentary evidences (POcopies, InspectionCertificateetc.) along with their offer, however in case of successful bidder these documents shall be required to be submitted by them within 30days from date of Placement ofOrder.

Note-3

In addition to above, preferred makes as specified in Gujarat Gas Limitedvendor"s list shall also be considered.

APPENDIX - IIDATA SHEETS

CONTENTS

LIST OF DATA SHEETS

LIST OF QAP

DATA SHEET FOR BW BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB), mm (inch) : 8",

3.0 REPL's Technical Specification No. : **REPL/TS/05/21/002, Rev-1, Ed-1**

4.0 Connecting Pipeline Design Pressure, bar **:** Design Temperature, °C :

5.0 Connecting Pipe Specification : **For 8" API 5L X-42/ X-52/ X-**

5.1 Material **56,**

5.2 Diameter (OD), mm (inch) **219.1**

5.3 Thickness, mm **6.4**

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore Full Bore

6.2. End Connections : Flanged as per ASME B16.5 Butt Welded as per ASME B16.25

6.3. Flanges (wherever applicable) : a) RF RT NA

b) Serrated Smooth (125 to 200 microinches AARH) NA

6.4 Ball Mounting **: Floating Ball type (for 2" & 4" Valves) and Trunion Mounted type (for6" & 8" Valves)**

6.5 Valve body type : Fully Welded Two/Three Piece Bolted Either

7.0 Valve Material Specification

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB)+75 µENP coating/AISI410**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating/AISI 410**	
7.4	Seat Seal	**VITON/DEVLON**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating/AISI 410**	
7.6	Stem Seals	**VITON/PTFE**	
7.7	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **1.5 mm** Service : **Natural Gas**

9.0 Location : Above Ground Buried

10.0 Stem Extension Requirement: Ye s No Length of Stem Extension, m : NA

11.0 Gear Operator Requirement : Yes √ (8"Valves) No (for 2" & 4" Valves)

12.0 Actuator Requirement : Ye s No

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/ API 607**

14.0 Valve Testing Requirement

		Test Pressure (min.), kg/cm^2(g)	Minimum Duration, minutes For 8"
14.1 Hydrostatic Test	Body	**76**	
	Seat	**57**	
14.2 Air Test		**5.6-7**	

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 Valve Painting Specification

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.

16.2 For under ground installation-Three coats of corrosion resistant high build epoxy paint (R-95) shall be applied with minimum thickness of 600 micron

17.0 Lock Open/ Lock Close/Normally Close Requirement : **N. A.**

Notes:

1. This Valve Data Sheet shall be read in conjunction with REPL's Technical Specification No. REPL/TS/05/21/002,Rev 1 ,Ed. 1
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, REPL's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
4. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
5. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
6. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
7. Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall

   be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. - N.A.
8. For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
9. Valves shall be inspected and approved by Purchaser before despatch.

10 Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	
REVISIONS						REFERENCES DRG NO.

SECTION	PROCESS & PIPING				**CLIENT** :		
	NAME	DATE	CHKD	DATE	SUPPLIER :		
DSGN					SUB SUPPLIER :		**REPL LIMITED**
					PROJECT : CNG & CITY GAS		

DRWN					DISTRIBUTION		
APPROVED					**DATA SHEET FOR BALL VALVES (NB ≥ 2")**	SCALE : DATA SHEET NO.: REPL/U999/05/28/M/001/DS/BV/76	REV 0

		5			
		5			
		2			

DATA SHEET FOR FE
BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB), mm (inch): 8" NB ANSI Rating : Design Standard : **API 6D**

3.0 REPL's Technical Specification No. : **REPL/TS/05/21/002, Rev-1, Ed-1**

4.0 Connecting Pipeline Design Pressure, bar **: 49** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting PipeSpecification : N. A.

5.1 Material

5.2 Diameter (OD), mm (inch)

5.3 Thickness, mm

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore Full Bore

6.2. End Connections : Flanged as perASME B16.5 Butt Welded as per ASME B16.25

6.3. Flanges (wherever applicable) : a) RF FF RTNA

b) Serrated S mooth (125 to 200 microinches AARH) NA

6.4 Ball Mounting : Floating Ball type (for 2" & 4" Valves) and Trunion Mounted type (for6" & 8" Valves)

6.5 Valve body type : Fully Welded Two/Three Piece Bolted Either

7.0 Valve Material Specification

7.1 Body **A 216 Gr. WCB/A 234 Gr. WPB**

7.2 Ball **(A 216 Gr.WCB/A 234 Gr.WPB)+75 µENP coating/AISI410**

Body Seat Rings

7.3 (No Casting)

7.4 Seat Seal

7.5 Stem (No casting) **AISI 4140 + 75 micron ENP coating/AISI 410**

7.6 Stem Seals

7.7 Stud Bolts/ Nuts

8.0 Corrosion Allowance : **1.5 mm** Service : **Natural Gas**

9.0 Location : Above Ground Buried

10.0 Stem Extension Requirement : Yes No Length of Stem Extension, m : NA

11.0 Gear Operator Requirement : Yes (for 6" & 8"Valves) No (for 2" & 4" Valves)

12.0 Actuator Requirement : Yes No

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/ API 607**

14.0 Valve Testing Requirement

14.1 Body
Seat

14.2

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 Valve Painting Specification

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.

16.2 For under ground installation-Three coats of corrosion resistant high build epoxy paint (R-95) shall be applied with minimum thickness of 600 micron

17.0 Lock Open/ Lock Close/Normally Close Requirement : **N. A.**

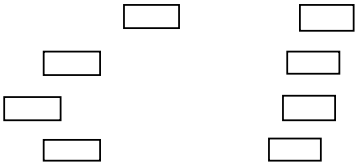
Notes:

1. This Valve Data Sheet shall be read in conjunction with REPL's Technical Specification No. REPL/TS/05/21/002,Rev 1 ,Ed. 1
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, REPL's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
4. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
5. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
6. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
7. Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall

   be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. - N.A.
8. For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves

S						
SECTION PIPING	PROCESS &		**CLIENT** : SUPPLIER : SUB SUPPLIER: **PROJECT :** CNG & CITY GAS DISTRIBUTION			
	NAME	DATE	CHKD	DATE		**REPL LIMITED**
DSGN						
DRWN						
APPROVED			**DATA SHEET FOR BALL VALVES (NB ≥ 2")**		SCALE : DATA SHEET NO.: REPL/U999/05/28/M/001/DS/BV/77	REV 0

Part	Specified Material	Material Offered (Equivalent or superior)
	AISI 4140 + 75 micron ENP coating/AISI 410	
	VITON/DEVLON	
	VITON/PTFE	
	ASTM A 193 Gr. B7/ A194 Gr. 2H	



	Minimum Duration, minutes			
	For 8"			
Hydrostatic Test	5			
	5			
Air Test	2			

DATA SHEET FOR FLANGED END PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size (NB), mm (inch) **: 8"** **ANSI Rating :** Design Standard : **API 6D**

3.0 REPL's Technical Specification No. : **REPL/TS/05/62/003, Rev-2**

4.0 Connecting Pipeline Design Pressure, Bar : **Design Temperature, °C :**

5.0 Connecting Pipe Specification

5.1 Material **: ASTM A106 Gr.B**

5.2 Diameter (OD), mm (inch) **: 60.3**

5.3 Thickness, mm **: 5.54**

6.0 **Valve Construction Design**

6.1. Pattern : Short Regular Venturi

6.2. End Connections : **Flanged both ends** Flanged as per ASME B 16.5

: **Butt Weld both ends** Butt Weld as per ASME B16.25

: **Flanged one end, butt weld other end**

6.3. Flanges (wherever applicable) : a) RF FF RTJ NA

b) Serrated Smooth (125 to 200 microinches AARH) NA

7.0 **Valve Material Specification**

Part	Material	Material Offered (Equivalent or Superior)
7.1		
7.2		
7.3		
7.4		
7.5		
7.6		

8.0 Corrosion Allowance : **1.5 mm** Service : **Natural Gas**

9.0 Location : Above Ground ☐ Buried ☐

10.0 Stem Extension Requirement : Yes No ☐

11.0 Gear Operator Requirement : Yes No

12.0 Gas Powered Actuator Requirement : Yes No

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ BS EN: 10497**

14.0 **Valve Testing Requirement** Test Pressure (min.), kg/cm2(g)

	Minimum Duration, minutes	Hydrostatic
Test		**76**
14.1		**57**
Air Test		**5.6 - 7**
14.2		

15.0 Valve Painting Specification

15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.

15.2 For under ground installation-Three coats of corrosion resistant high build epoxy paint (R-95) shall be applied with minimum thickness of 600 micron

16.0 Lock Open/ Lock Close Requirement : **As indicated in P&ID / Schedule of Rates (SOR).**

Notes:

1. This Valve Data Sheet shall be read in conjunction with REPL's Technical Specification No. REPL/TS/05/62/003, Rev2
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, REPL's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
4. Charpy V- notch & Hardness test for body, plug, cover, stem & studs/nuts shall be conducted as per Clause No.: 3.4 & 3.5 of TS respectively.
5. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
6. Attached generic QAP shall be submitted for approval after making necessary changes considering 3.2 certification aspect.
7. Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall

   be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. **- N.A.**
8. For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
9. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in REPL's data sheet, bidder

   shall clearly indicate **"AGREED".**

	NAME	DATE	CHKD	DATE	CLIENT : SUPPLIER : SUB SUPPLIER : **PROJECT :** CNG & CITY GAS DISTRIBUTION		
DSGN							**REPL LIMITED**
DRWN							
APPROVED					**DATA SHEET FOR RF PLUG VALVES (NB ≥ 2")**	SCALE : DATA SHEET NO.:REPL/U999/05/28/M/001/DS/PV/76	REV 0

Body	ASTM A216 Gr. WCB/ A234 Gr. WPB	
Plug	(ASTM A216 Gr. WCB/ A234 Gr. WPB) + 75 microns ENP Coating	
Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
Stem (No Casting)	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
Stem Seal	PTFE/Graphite	
Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

Body		2
Seat		2
		2

DATA SHEET FOR GLOBE VALVES

1. Valve Manufacturer :

2. Size DN (inch) : (8") Rating :

3. Purchaser's Specification : Refer Technical notes for Gate & Globe Valves Design Standard :

4. Design Pressure : 49 kg/cm^2(g) Design Temperature : -29°C to + 65°C

5. Corrosion Allowance : 1.5mm Service : Natural Gas

6. End Connections : Flanged both ends as per ASME B 16.5 Butt Weld both ends as A-16.25 Flanged one end butt weld other end √

   Socket weld both ends as per ASME B16.11 ☐

7. Flanges (where applicable) : a) RF FF RTJ

   b) Serrated Smooth (125 to 200 AARH)

8. Connecting Pipe Specification : 2", ASTM A106 Gr.B, Sch. XS

9. Valve Material Specification :

	Part	Material	Material Offered (Equivalent or Superior)
9.1	Body	ASTM A 216 Gr.WCB	
9.2	Bonnet (Bolted)	ASTM A 216 Gr.WCB	
9.3	Stem (Rising)	13% Cr. Steel (No Casting)	
9.4	Disc(Loose Plug/Ball Type)	(ASTM A 216 Gr. WCB + 13% Cr Steel Facing) / 13% Cr Steel	
9.5	Body Seat Ring	ASTM A 216 Gr. WCB+13% Cr Steel Facing (Stellited)	

9.6	Stem Packing (Renewable with valve open on stream)	Corrosion inhibited die formed flexible graphite with braided anti extrusion rings	
9.7	Hand Wheel (Rising)	Malleable Iron/ Cast Steel/ Fab. Steel	
9.8	Bonnet Bolts	A 193 Gr. B7	
9.9	Bonnet Nuts	A194 Gr. 2H	
9.10	Bonnet Gasket	Spiral Wound SS 316 + Grafoil	

10. Hydrostatic Test Pressure

    a) Body : 76 kg/cm^2(g)

    b) Seat & Back seat : 57 kg/cm^2(g) Test duration shall be as per BS:1873

11. PnuematicTest Pressure with : 5.6 - 7 kg/cm2 (g). Air

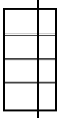
12. Painting Specifications:

i) Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.

ii) For under ground installation-Three coats of corrosion resistant high build epoxy paint (R-95) shall be applied with minimum thickness of 600 micron

Notes:

1. Valve specification sheet shall be read in conjunction with technical notes for Gate and Globe valves.
2. Valve shall be designed for intrinsically fire safe.
3. Testing shall be as per BS EN 12266-1,approved QAP,this specification and other relevant standards.
4. Bidder shall clearly write all/ any deviation against each part/ material of valve in the space provided for . Wherever bidder agrees with REPL's data sheet, bidder shall clearly indicate "agreed".
5. Charpy 'V' notch test on each heat of base material shall be conducted for all pressure containing parts such as body, endflange, welding ends as well as the bolting material as per ASTM A370. The test shall be conducted at 0°C. The minimum average absorbed energy per set of three specimen shall be 27 J with an individual minimum per specimen of 22 J.
6. Hardness test shall be carried out on each heat of base material for all pressure containing parts of the valve. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10 based on minimum four measurements representing the entire thickness.
7. Stem packing shall be renewable with valve open on stream .
8. Painting procedure of the valves shall be as per Manufacturer's Standard.
9. Material Test Certificates and Hydro Test Reports shall be furnished prior to dispatch.

<table>
<tr><td colspan="5">REVISIONS</td><td colspan="2">REFERENCES</td><td>DRG. NO.</td></tr>
<tr><td colspan="5">SECTION OIL & GAS</td><td colspan="2" rowspan="2">  </td><td></td></tr>
<tr><td></td><td>NAME</td><td>DATE</td><td>CHKD</td><td>DATE</td><td rowspan="3">  </td><td rowspan="3">REPL LIMITED</td></tr>
<tr><td>DSGN</td><td></td><td></td><td></td><td></td></tr>
<tr><td>DRWN</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">APPROVED</td><td colspan="2">DATA SHEET FOR GLOBE VALVES(NB ≥ 2")</td><td>DATA SHEET NO.:
REPL/U999/05/28/M/001/DS/GV/02</td><td>REV
0</td></tr>
</table>

DATA SHEET FOR GLOBE VALVES

1. Valve Manufacturer :

2. Size DN (inch) : (8") Rating : Design Standard :ISO 15761/BS:1873

3. Purchaser's Specification : Refer Technical notes for Gate & Globe Valves

4. Design Pressure : 49 kg/cm^2(g) Design Temperature : -29^{o}C to + 65°C

5. Corrosion Allowance : 1.5mm Service : Natural Gas

6. End Connections : Flanged both ends as per ASME B 16.5 Butt Weld both ends as A-16.25 Flanged one end butt weld other end

7. Flanges (where applicable) Socket weld both ends as per ASME B16.11

8. Connecting Pipe Specification : a) RF [√] FF RTJ

b) Serrated Smooth (125 to 200 AARH) [√] N.A.

9. Valve Material Specification :

	Part	Material	Material Offered (Equivalent or Superior)
9.1	Body	ASTM A 216 Gr.WCB	
9.2	Bonnet (Bolted)	ASTM A 216 Gr.WCB	
9.3	Stem (Rising)	13% Cr. Steel (No Casting)	
9.4	Disc(Loose Plug/Ball Type)	(ASTM A 216 Gr. WCB + 13% Cr Steel Facing) / 13% Cr Steel	
9.5	Body Seat Ring	ASTM A 216 Gr. WCB+13% Cr Steel Facing (Stellited)	
9.6	Stem Packing(Renewable with valve open on stream)	Corrosion inhibited die formed flexible graphite with braided anti extrusion rings	
9.7	Hand Wheel (Rising)	Malleable Iron/ Cast Steel/ Fab. Steel	

9.8	Bonnet Bolts	A 193 Gr. B7	
9.9	Bonnet Nuts	A194 Gr. 2H	
9.10	Bonnet Gasket	Spiral Wound SS 316 + Grafoil	

11. Hydrostatic Test Pressure

a) Body : 76 kg/cm^2(g)

b) Seat & Back seat

: 57 kg/cm^2(g) Test

duration shall be as per BS:1873

12. PnuematicTest Pressure with : 5.6 - 7 kg/cm2 (g). Air

13. Painting Specifications:

i) Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.

ii) For under ground installation-Three coats of corrosion resistant high build epoxy paint (R-95) shall be applied with minimum thickness of 600 micron

Notes:

1. Valve specification sheet shall be read in conjunction with technical notes for Gate and Globe valves.
2. Valve shall be designed for intrinsically fire safe.
3. Testing shall be as per BS EN 12266-1,approved QAP,this specification and other relevant standards.
4. Bidder shall clearly write all/ any deviation against each part/ material of valve in the space provided for . Wherever bidder agrees with REPL's data sheet, bidder shall clearly indicate "agreed".
5. Charpy 'V' notch test on each heat of base material shall be conducted for all pressure containing parts such as body, end flange, welding ends as well as the bolting material as per ASTM A370. The test shall be conducted at 0°C. The minimum average absorbed energy per set of three specimen shall be 27 J with an individual minimum per specimen of 22 J.
6. Hardness test shall be carried out on each heat of base material for all pressure containing parts of the valve. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10 based on minimum four measurements representing the entire thickness.
7. Stem packing shall be renewable with valve open on stream.
8. Painting procedure of the valves shall be as per Manufacturer's Standard.
9. Material Test Certificates and Hydro Test Reports shall be furnished prior todispatch.

DSGN					SUPPLIER : SUB SUPPLIER : **PROJECT** : CNG & CITY GAS DISTRIBUTION		**REPL LIMITED**
DRWN							
APPROVED					**DATA SHEET FOR GLOBE VALVES (NB ≥ 2")**	DATA SHEET NO.: REPL/U999/05/28/M/001/DS/GV/02	REV 0

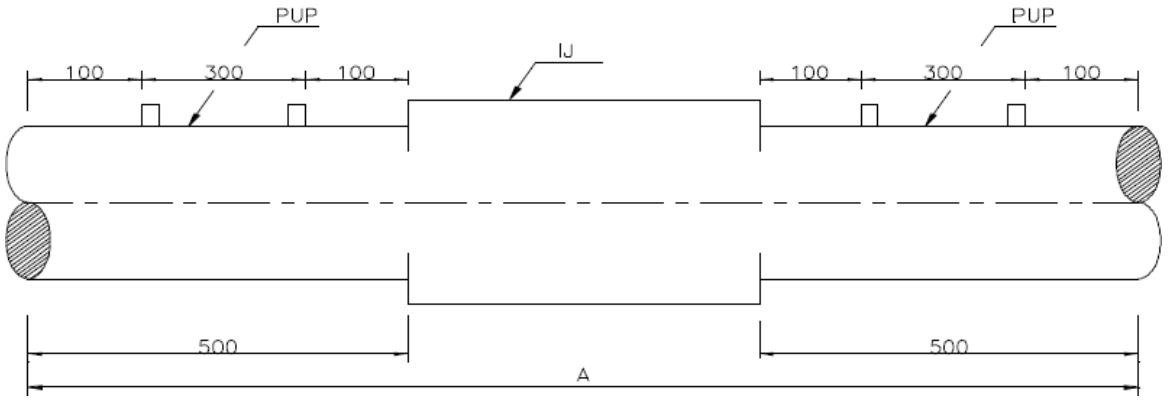
Sabarmati Gas	**LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK**	Resonance Energy
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		**Date: -28/12/2021**

SECTION III

DATASHEETS OF INSULATINGJOINT

Sabarmati Gas	**LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK**	Resonance Energy
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		**Date: -28/12/2021**

DATA SHEET FOR INSULATING JOINTS



A = OVERALL LENGTH OF IJ TO BE CONFIRMED BY MANUFACTURER.

1. INSULATING JOINTS MFR. :
2. PURCHASER'S SPECIFICATION NO. : REPL/TS/05/21/009
3. RATING : 300#
4. DESIGN PRESSURE : 49 Kg/cm2(g)
5. DESIGN TEMPERATURE : 0°C to 65°C
6. SERVICE : NATURAL GAS
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM (INCHES) : 200 (8Ⅱ),
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME SECTION-VIII DIV-I
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 76 $Kg/cm^2(g)$
13. CHARPY TEST(BODY, WELDING ENDS) : As per ASTM A 370
14. HARDNESS TEST : REQUIRED AS PER SPEC.
15. MATERIALS SPECIFICATION
    (EQUIVALENT OR SUPERIOR) (For all sizes)
    A) BODY : ASTM A-694, F-42

B) PUPS : API 5L GR. X-42, 6.4 mm THK.(MIN.)

C) INSULATING MATERIAL : AS PER MANUFACTURER'S STANDARD

16. CONNECTING PIPE SPECIFICATION

SIZE, NB, MM (INCHES)	219.1 (8″)		
WALL THICKNESS, MM(MIN.)	6.4		
GRADE	API 5L Gr. X-42/ X-52/ X-56		

17. SPECIAL REQUIREMENTS : INSULATION JOINT SHALL BE SUITABLE FOR ABOVEGROUND INSTALLATION

18. QUANTITY : As per SOR

19. TAG NOS. : N.A.

Note: Manufacturer shall ensure that the wall thickness (W.T.) of all parts of insulating joint shall be adequate to sustain design pressure and selected W.T. shall be suitable for welding with W.T. of connected pipeline.

1. **Material Delivery Requirements:** The finished materials are to be deliveredby the Vendor at the designated store.

2. **Compliance with Specification:** The Vendor shall be completely responsiblefor the design, materials, manufacture & fabrication, testing, inspection, preparation for shipment and transport of the above equipment strictly in accordance with the Tender and all attachment thereto. All items shall be provided with EN 10204-3.2 certificates.

3. **Vendor"s Scope:** Vendor scope of work includes t he equipment with all internals and accessories shown on the datasheets, specifications and all unmentioned parts necessary for a satisfactory operation and testing except those which are indicated to be out of the vendor's supply.

4. **Inspection:** Vendor shall appoint the TPIA for inspection purpose in a manner described hereunder-

   —The Vendor shall propose minimum four (4) nos. of TPIA 's from the below listed TPIA's along with Q AP submission. OWNER/REPL shall approve any one TPIA out of the four (4) nos. proposed TPIA's. The Vendor shall appoint the approved TPIA for i nspection purpose and m ention name of the approved TPIA in QAP."

   a. Det Norske Veritas (DNV)
   b. Germanischer Lloyd
   c. Bureau Veritas *
   d. Moody International
   e. SGS
   f. Certification Engineer International Ltd(CEIL)
   g. Technische Ulierwachungs Verein (TUV)
   h. Velosi
   i. American Bureau Services(ABS)*
   j. AB-Vincotee
   k. LIoyd Register of Industrial Services
   l. VCS Quality Services Private Limited
   m. Meenar Global

Apart from inspection by TPIA, inspection shall also be performed by REPL /Owner's delegate.

5.0 DOCUMENTS & DATA REQUIREMENTS

5.1 The table hereunder specifies the quan tities and the nature of the documents tobe submitted by the Vendor to Purchaser.

5.1.1 The documents required after award of the Contract are listed under column A of table below under note no. 5.6.

5.1.2 The final and certified doc uments are listed under c olumn B of table bel ow under note no. 5.6.

5.2 Any document, even when preliminar y, shall be binding and therefore dul y identified and signed by the V endor. It shall bear the Purc haser's Project reference and the identification number.

5.3 The drawings/documents shall be re viewed, checked, approved and duly signed/stamped by contractor & Vendor before subm ission. Revision number shall be changed during submission of the revised Vendor documents and all revisions shall be highlighted by clouds. Whenever the Vendor require any sub-Vendor drawings to be reviewed by REPL, the sa me shall be submitted by the Vendor after duly reviewed, a pproved and stamped by the Vendor. Direct submission of the sub-supplier's drawings without contractor's appr oval shall not be entertained.

5.4 Review/Approval of the Vendor drawings by REPL would be only to review the compatibility with basic designs and concepts and in no way absolve the contractor/Vendor of his respons ibility/contractual obligation t o comply with Tender requirements, applicable codes, specifications a nd statutory rules/regulations. Any error/deficien cy noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the Vendorwithout any extra cost ortime, whethe r or not comments on the same wer e received from REPL during the drawing review stage.

5.5 The Contractor / Vendor shall submit a prerecorded Training CDs/DVDs and it shall comprise the basic theories and fu ndamentals, related standards, design parameters, manufacturing & ins pection methods, operating & m aintenance instructions and other rele vant details. The CDs/D VDs shall have to be self- contained, user-friendly using anima tion/videos and other multimedia techniques.

5.6 THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTSCOMPLYING FULLY WITH THE TENDER REQUIREMENTS ARERECEIVED BY THE PURCHASER.

Item	Documents & Data	A		B	
		No. of Copies	Required Date (from Order Placement)	No. of Copies	Required Date (before Despatch)
1.	Completed Data Sheets	3	1 Week	3	2 Weeks (with final technical file)
2.	Drawing / Data Submittal list / schedule	3	2 Weeks + monthly	3	2 Weeks
3.	Fabrication, test and delivery schedule (per item)	3	2 Weeks + monthly	3	2 Weeks
4.	Progress Report	3	2 Weeks + monthly	3	2 Weeks
5.	Catalogues / References	-	-	3	With final technical file
6.	GA drawings + Sectional drawings + Material specification + Unit weight. + Unit volume + Package dimensions per unit	3	2 Weeks	3	With final technicalfile
7.	Design calculations for pressure containing parts	3	1 Week	3	2 Weeks (with final technical file)

8.	Bill of materials (on drawings)	3	1 Week	3	2 Weeks (with final technical file)
9.	Recommended spare parts list (for erection and commissioning)	-	-	3	2 Weeks (with final technical file)

Item	**Documents & Data**	**A**		**B**	
		No. of Copies	**Required Date (from Order Placement)**	**No. of Copies**	**Required Date (before Despatch)**
10.	Recommended spares parts list (for2 years operation)	-	-	3	2 Weeks (with final technical file)
11.	Welding procedure specification and records WPS / PQR	3	1 Week	3	2 Weeks (with final technical file)
12.	QA / QC program	3	1 Week	3	2 Weeks (with final technical file)
13.	Inspection and Test Procedures along with Quality Assurance Plan	3	1 Week	3	2 Weeks (with final technical file)
14.	Test Reports	-	-	3	2 Weeks (with final technical file)
15.	NDE / NDT Reports	-	-	3	2 Weeks (with final technical file)

16.	Heat Treatment Reports	-	-	3	2 Weeks (with final technical file)
17.	Hydrotest and air test report	-	-	3	2 Weeks (with final technical file)
18.	Maintenance and operating manuals	-	-	3	2 Weeks (with final technical file)
19.	Installation instructions & Site inspection procedure	-	-	3	2 Weeks (with final technical file)
20.	Material certificateas per EN 10204 - 3.2	-	-	3	2 Weeks (with final technical file)

Item	**Documents & Data**	**A**		**B**	
		No. of Copies	**Required Date (from Order Placement)**	**No. of Copies**	**Required Date (before Despatch)**
21.	Painting system description & procedure	3	1 week	3	2 Weeks (with final technical file)
22.	List of sub-vendors with their scope	3	1 week	-	-
23.	Training CDs/DVDs covering design, operation & maintenance	-	-	3	2 Weeks (with final technical file)

24.	Final technical file, preliminary copy for approval (in soft & hardcopy)	3	2 weeks before Dispatch/ shipping	-	-
25.	Final technical file (in soft & hardcopy)	-	-	3	Before shipping

6. Vendor shall establish the equivalence/ superiority of any m aterial proposed (With justification of material properties and availability) other than that specified in Datasheet. Vendor s hall also indicate the ASTM equivalent of hisproposed material as well as of all the AISI designated materials specified indatasheets.

7. Vendors to no te that for minimum inspection and testing re quirement of the supplied item shall be govern ed by attached QAP wit h this Tender. However, Vendor shall submit their QAP for Approval covering the requirem ent specified in attached QAP.

8. In the event of Conflict/inconsistency among the documents attached/ referred, the following order of precedence generally shall govern in interpretation of various requirements / data.

- SOR
- Datasheets
- Technical Specification
- Codes and Standards
- Vendor‘s Standards

However, Owner/Consultant reserves the right to consider most stringent requirement among the document attached / referred.

9. Contractor / Vendor shall submit hard copies of all documents / drawings to REPL as listed in column A & B of table for document and data requirement under clause 5.0 of Notes and al so in a ll technical specifications. The date of receipt of these documents / drawings at REPL shall be deemed as the date of submission. If any documents/ drawings require re-submission due to error / deficiency noticed during re view / approval stage, in that event the additional time required by the Contractor/Vendor to get the revised document/drawingreviewed / approve d by M ECON shall be solely to Contractor‘s/ Vendor‘s account and in no case the Contractor / Vendor shall be entitled for any time orcost benefit.

10. Contractor / Vendor to note that the Flow Tees supplied by t hem shall be capable to withstand the field hydro test pressure (i.e., 1.4 times of design pressure) for 6 to 24 hours test holding duration under field / site conditions. The Flow Tees shall be kept for entire test duration and test medium will be non-corrosive water. The vendor shall be liable for replacement of Flow Tees iffound faulty during si te hydro te st at his risk & cost. All cost for associated activities like packaging, trans portation, etc. in connection to replacement of Flow Tees shall be borne by the bidder. No claim sh all be entertained by t he Owner/Purchaser in this regard.

1. **Material Delivery Requirements:** The finished materials are to be deliveredby the Vendor at the designated store.

2. **Compliance with Specification:** The Vendor shall be completely responsiblefor the de sign, materials, manufacture & fabrication, testing, inspection, preparation for shipm ent and tr ansport of the above equipment strictly in accordance with the Tender and all attachment thereto. A ll items shall be provided with EN 10204-3.2 certificates.

3. **Vendor"s Scope:** Vendor scope of w ork includes t he equipment with all internals and accessories shown on the datasheets, specifications and all unmentioned parts ne cessary for a satis factory operation a nd testing e xcept those which are indicated to be out of the vendor's supply.

4. **Inspection:** Vendor shall appoint the TPIA for inspection purpose in a mannerdescribed hereunder-

—The Vendor shall pr opose minimum four (4) nos. of TPIA's from the below listed TPIA's along with QAP subm ission. OWNER/REPL shall approve anyone TPIA out of the four (4) nos. pr oposed TPIA's. The Vendor s hall appoint the approved TPIA for inspection purpose and m ention name of the approved TPIA in QAP."

a. Det Norske Veritas (DNV)

b. Germanischer Lloyd

c. Bureau Veritas *

d. Moody International

e. SGS

f. Certification Engineer International Ltd(CEIL)

g. Technische Ulierwachungs Verein (TUV)

h. Velosi

i. American Bureau Services(ABS)*

j. AB-Vincotee

k. LIoyd Register of Industrial Services

l. VCS Quality Services Private Limited

m. Meenar Global

Apart from inspection by TPIA, inspection shall also be performed by REPL /Owner's delegate.

5.0 DOCUMENTS & DATA REQUIREMENTS

5.1 The table hereunder specifies the quantities and the nature of the documents tobe submitted by the Vendor to Purchaser.

5.1.1 The documents required after award of the Contract are listed under column A of table below under note no. 5.6.

5.1.2 The final and certified documents are listed under column B of table bel ow under note no. 5.6.

5.2 Any document, even when preliminary, shall be binding and therefore dul y identified and signed by the Vendor. It shall bear the Purchaser's Project reference and the identification number.

5.3 The drawings/documents shall be re viewed, checked, approved and duly signed/stamped by contractor & Vendor before submission. Revision number shall be changed during submission of the revised Vendor documents and all revisions shall be highlighted by clouds. Whenever the Vendor require any sub-Vendor drawings to be reviewed by REPL, the same shall be submitted by the Vendor after duly reviewed, approved and stamped by the Vendor. Direct submission of the sub-supplier's drawings without contractor's appr oval shall not be entertained.

5.4 Review/Approval of the Vendor drawings by REPL would be only to review the compatibility with basic designs and concepts and in no way absolve the contractor/Vendor of his responsibility/contractual obligation to comply with Tender requirements, applicable codes, specifications and statutoryrules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the Vendorwithout any extra costortime, whether or not comments on the same were received from REPL during the drawing review stage.

5.5 The Contractor / Vendor shall submit a prerecorded Training CDs/DVDs and it shall comprise the basic theories and fu ndamentals, related standards, design parameters, manufacturing & ins pection methods, operating & m aintenance instructions and other rele vant details. The CDs/D VDs shall have to be self- contained, user-friendly using anima tion/videos and other

multimedia techniques.

5.6 THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTSCOMPLYING FULLY WITH THE TENDER REQUIREMENTS ARERECEIVED BY THE PURCHASER.

Item	Documents & Data	A		B	
		No. of Copies	Required Date (from Order Placement)	No. of Copies	Required Date (before Despatch)
1.	Completed Data Sheets	3	1 Week	3	2 Weeks (with final technical file)
2.	Drawing / Data Submittal list / schedule	3	2 Weeks + monthly	3	2 Weeks
3.	Fabrication, test and delivery schedule (per item)	3	2 Weeks + monthly	3	2 Weeks
4.	Progress Report	3	2 Weeks + monthly	3	2 Weeks
5.	Catalogues / References	-	-	3	With final technical file
6.	GA drawings + Sectional drawings + Material specification + Unit weight. + Unit volume + Package dimensions per unit	3	2 Weeks	3	With final technicalfile
7.	Design calculations for pressure containing parts	3	1 Week	3	2 Weeks (with final technical file)

8.	Bill of materials (on drawings)	3	1 Week	3	2 Weeks (with final technical file)
9.	Recommended spare parts list (for erection and commissioning)	-	-	3	2 Weeks (with final technical file)

Item	**Documents & Data**	**A**		**B**	
		No. of Copies	**Required Date (from Order Placement)**	**No. of Copies**	**Required Date (before Despatch)**
10.	Recommended spares parts list (for2 years operation)	-	-	3	2 Weeks (with final technical file)
11.	Welding procedure specification and records WPS / PQR	3	1 Week	3	2 Weeks (with final technical file)
12.	QA / QC program	3	1 Week	3	2 Weeks (with final technical file)
13.	Inspection and Test Procedures along with Quality Assurance Plan	3	1 Week	3	2 Weeks (with final technical file)
14.	Test Reports	-	-	3	2 Weeks (with final technical file)
15.	NDE / NDT Reports	-	-	3	2 Weeks (with final technical file)

16.	Heat Treatment Reports	-	-	3	2 Weeks (with final technical file)
17.	Hydrotest and air test report	-	-	3	2 Weeks (with final technical file)
18.	Maintenance and operating manuals	-	-	3	2 Weeks (with final technical file)
19.	Installation instructions & Site inspection procedure	-	-	3	2 Weeks (with final technical file)
20.	Material certificateas per EN 10204 - 3.2	-	-	3	2 Weeks (with final technical file)

Item	**Documents & Data**	**A**		**B**	
		No. of Copies	**Required Date (from Order Placement)**	**No. of Copies**	**Required Date (before Despatch)**
21.	Painting system description & procedure	3	1 week	3	2 Weeks (with final technical file)
22.	List of sub-vendors with their scope	3	1 week	-	-
23.	Training CDs/DVDs covering design, operation & maintenance	-	-	3	2 Weeks (with final technical file)

24.	Final technical file, preliminary copy for approval (in soft & hardcopy)	3	2 weeks before Dispatch/ shipping	-	-
25.	Final technical file (in soft & hardcopy)	-	-	3	Before shipping

6. Vendor shall establish the equivalence/ superiority of any material proposed (With justification of material properties and availability) other than that specified in Datasheet. Vendor s hall also indicate the ASTM equivalent of hisproposed material as well as of all theAISI designated materials specified indatasheets.

7. Vendors to no te that for minimum inspection and testing re uirement of the supplied item shall be govern ed by attached QAP wit this Tender. However, Vendor shall submit their QAP for Approval covering the requirement specified in attached QAP.

8. In the event of Conflict/inconsistency among the documents attached/ referred, the f llowing order of precedence generally shall govern in interpretation of various requirements / data.

- SOR
- Datasheets
- Technical Specification
- Codes and Standards
- Vendor‘s Standards

However, Owner/Consultant reserves the right to consider most stringentrequirement among the document attached / referred.

9. Contractor / Vendor shall subm it hard c opies of all docum ents / drawings to REPL as listed in column A & B of table for document and data requirement under clause 5.0 of N otes and al so in a ll technical specifications. The date of receipt of these documents / drawings at REPL shall be d eemed as the date of submission. If any documents/ drawings require re-submission due to error / deficiency noticed during re view / approval stage, in that event the additional time required by the Contractor/Vendor to get the revised docum ent/drawing reviewed / approve d by M ECON shall be solely to Contractor‘s/ Vendor‘s account and in no case the Contractor / Vendor shall be entitled for any time orcost benefit.

10. Contractor / Vendor to note that the In sulating Joints supplied by them shall becapable to withstand the field hydro test pressure (i.e., 1.4 times of design pressure) for 6 to 24 hours test holding duration under field / site conditions. The Insulating Joints shall be kept for entire test duration and test m edium willbe non-corrosive water. The vendor shall be liable for replacement of InsulatingJoints if found fault y during site hydro test at his risk & cost. All cost for associated activities like packaging, transportation, etc. in connection to replacement of Insulating Joints shall be borne by the bidder. No claim shall be entertained by the Owner/Purchaser in this regard.

11. Following clauses, in addition to requirement specified in the TS shall also becomplied to. Reference clause no .of TS and corresponding sl. No. of notes are mentioned below.

Sl. No. 1,2 & 4 mentioned below shall be complied in addition to requirement specified in Cl. 3.0 ofT.S. No. ME C/TS/05/21/009, Rev.0under the heading ―Materials‖

Sl. No. 2, 3, 5 & 6 mentioned below shall be complied i n addition torequirement specified in Cl. 4.0 of T.S. No. ME C/TS/05/21/009, Rev.0 under the heading ―Design & Construction‖

Sl. No. 7 & 8 mentioned below shall be complied in addition to requirement specified in Cl. 5.0 of T.S. No. ME C/TS/05/21/009, Rev.0under the heading ―Inspection‖

I. The insulating material shall be non-hygroscopic and shall be capable of sustaining high compressive stresses. Th e material shall have good long-term stability, excellent dielectric strength, and thermal properties without cracking,distorting, or a loss of insulating properties. The material shall be flame resistant, and resistant to hydrocarbons, sulphides, bacteria and the climatic conditions as specified for pa inting requirements. The spacing ring shall be made of an age resistant mate rial as per ASTM D709 t ype IV Group G.10, 11 having aminimum compressive strength of 400Mpa. Manufacturer shall submit calculations for selection of thic kness of insulating rings.However, minimum thickness shall be 20mm.

II. Central insulating ring shall be accompanied with a gasket. Sealing Gasket shall be designed suc h that the joint assembly complies with the Mechanical and electrical requirements specified in this specification. Part of Central insulating ring shall be in direct contact of forged rings providing primary insulation. The remaining part of insula ting ring shall be encapsulated by seal gasket. The geometrical shape of sealing gasket shall be chosen accordingly. The gasket shall be obtained from moulds and of age resisting rubber material.Only high dielectric characteristics N BR (Nytrile butadiene rubber)/ HNBR or Viton can be used. It shall resist explosive decompression, and shall be suitablefor long-term exposure to GA S at th e design pressure and temperature.Properties of gasket shall be governed by ASTM D2000. Sealing gasket shall be made in one piece.

III. Sealing Systems with O-rings are not acceptable.

IV. Filling material shall be an adhesive s ealant elastomer or a low viscosity, cold curing thermosetting resin. Minimum compressive strength of fill ing material shall be 150MPa.

V. Post Weld Heat Treatment shall not be carried out on final closure weld.

VI. Recesses and protrusions in the bore of assembly shall not be permitted. Compliance with this requirement shall not be achieved by the use of additionalfillers. Central insulating ring should always be in direct contact of process fluid.

VII. Upon successful completion of hydrotest, Insulating joint shall be subjectedFatigue test in a manner described below.

Each Insulating Joint shall be subjected to a minimum of 40 pressure cycles from 10 bars to 85% of hydrostatic test pressure. After cycling, the pressure shall be raised to hydrostatic test pressure and shall be maintained for 30 minutes. No leaks or unacceptable deformation shall occur during this test. Fatigue and hydrostatic tests shall be carried out in unrestrained conditions.

VIII. The internal and external co atings shall be subjected to holiday detection testduring final inspection.

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.01	Body	Material As per MR/ Alternate Material accepted by REPL			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

					6 **	6 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. REPL's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. REPL's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8 **	8 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. REPL's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. REPL's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard	H	H	R	

												2. REPL's T.S. 3. REPL's D.S.				

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.02	Closure/ Body Adapter/ Tail Piece	Material Manufacturer to indicate (to be approved by REPL)			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. REPL's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. REPL's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. REPL's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. REPL's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENTS DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.03	Top Cover/ Bonnet	Material Manufacturer to indicate (to be approved by REPL)			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

					6 **	6 **	-	-	-	-	Test Report	1. ASME B16.34, Annex-E 2. REPL's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	-	-	-	-	Test Report	1. ASME B16.34, Annex-C 2. REPL's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8 **	8 **	-	-	-	-	Test Report	1. ASME B16.34 Annex-B 2. REPL's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	R	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	R	H	R	

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.04	Trunnion (for Trunnion Mounted Valves)	Material Manufacturer to indicate (to be approved by REPL)			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					43 **	43 **	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. REPL's T.S. 2. REPL's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.05	Ball /Plug/Disc	Material As per MR/ Alternate Material accepted by REPL			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-	H	W	R	Forgings, welds, wrought

												IV 2. REPL's T.S.				weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Append ix-II 2. REPL's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by					MFR/ SV	TPI	REPL	
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL						
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. REPL's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. REPL's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. REPL's T.S. 2. REPL's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.06	Stem	Material As per MR/ Alternate Material accepted by REPL			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. REPL's T.S.	H	W	R	Forgings, welds, wrought weld ends

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			16A	16B	16C	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. REPL's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. REPL's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. REPL's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test	1. Relevant Material	H	R	R	

											Certificates	Standard				
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. REPL's T.S. 2. REPL's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.07	Seats	Material As per MR/ Alternate Material accepted by REPL			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard	H	H	R	

												2. REPL's D.S.				
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. REPL's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. REPL's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. REPL's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves

					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. REPL's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. REPL's T.S. 2. REPL's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.08	Bolting Material (Studs & Nuts)	Material As per MR/ Alterna			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufact	H	R	R	Alongwith thickness measurement for ENP Coating.

		te Material accepted by REPL										urer's Specification				
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's D.S.	H	H	R	

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. REPL's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. REPL's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)

					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. REPL's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. REPL's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. REPL's T.S. 3. REPL's D.S.	H	H	R	
1.09	Assembled Valves				-	-	-	1,2	1,2	1,2	Report	1. D1 2. REPL's T.S.	H	H	W	
					-	-	-	3	3	3	Report		H	H	W	
					-	-	-	14	14	14	1. Report 2. Test Certificates	1. D1 2. REPL's T.S. 3. REPL's D.S. 4. API 6D Std./BS EN 12266	H	H	W	

QAP No.: REPL/U999/05/28/M/001/QAP-002 FORM NO. 11.20(4.4)F-09 REV-0

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					-	-	-	15	15	15	1. Report 2. Test Certificates	1. D1 2. REPL's T.S. 3. REPL's D.S. 4. API 6D Std./BS EN 12266	H	H	W	
								40	40	40	1. Report 2. Test Certificates	1. API 607/ API 6FA / BS EN ISO 10497 (as applicable) 2. REPL's T.S. 3. REPL's D.S.	R	R	R	

			42	42	42	1. Report 2. Test Certificates	1. REPL's T.S. 2. REPL's D.S. 3. API 6D Std. (as applicable)	H	H	W	
-	-	-	37	37	37	Certificates		-	R	R	
-	-	-	44	44	44	1. Report 2. Test Certificates	1. REPL's T.S. 2. REPL's D.S. 3. Manufacturer's Specification	H	W	R & W	Inspection & test to be witnessed by REPL for buried valve surface paint integrity & thickness
-	-	-	45	45	45	1. Report 2. Test Certificates	1. REPL's T.S. 2. REPL's D.S. 3. API 6D Std. / BS EN ISO 17292	H	H	R	
-	-	-	46	46	46	1. Report 2. Test Certificates	1. REPL's T.S. 2. API 6D Std. (as applicable)	H	H	W	
-	-	-	47	47	47	1. Report 2. Test Certificates	1. REPL's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	W	
-	-	-	48	48	48	1. Report 2. Test	1. REPL's T.S. 2. API 6D Std. (as	H	H	W	

						Certificates	applicable)				
-	-	-	49	49	49	1. Report 2. Test Certificates	1. REPL's T.S. 2. REPL's D.S.	H	H	W	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./ M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/ SV	TPI	REPL	MFR/ SV	TPI	REPL			MFR/ SV	TPI	REPL	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.10	Complete documentation check and compilation							3	3	3	1. Final Report 2. Final Certificates	1. REPL's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	-	
1.11	Complete and compiled documentation check and despatch clearance				-	-	-	3	3	3	1. Final Report 2. Final Certificates	1. REPL's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	-	H	
1.12	Actuator Tests					**As per Actuator Quality Assurance Plan (to be submitted by vendor for approval)**										

For REPL (Stamp& Signature) For CONTRACTOR/ SUB-CONTRACTOR	QAP NO.: REPL/Q7AU/05/28/M/001/QAP-002	REV **0**

	CONTRACTOR		**QUALITY ASSURANCE PLAN FOR** STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT : CNG & CITY GAS DISTRIBUTION
	ORDER NO. & DATE			PACKAGE NO.:
	SUB-CONTRACTOR			PACKAGE NAME : **BALL VALVES, PLUG VALVES & GLOBE VALVES**
	ORDER NO. & DATE			

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*	*Code*	*Description*	*Code*	*Description*	*Code*	*DOCUMENTS:*
1.	Visual	18.	Amplitude Test Sponge	34.	Internal Inspection Report by	D1.	Approved GA drawings
2.	Dimensional other	19.	Test		Contractor	D2.	Information and
3.	Fitment & Alignment Physical reference drg/ stamped	20.	Dust/ Water Ingress Test	35.	Hardness Test		
4.	Test (Sample) Chemical Test Lining	21.	Friction Factor Test Adhesion drgs released for mfg.	36.	Spark Test for		
5.	(Sample) Ultrasonic Test	22.	Test	37.	Calibration	D3.	Relevant catalogues Bill
6.	Magnetic Particle Test (MPI) Device Test	23.	Performance Test/Characteristic	38.	Safety	D4.	of matl./Item no./
7.	Radiography Test		Curve	39.	Ease of Maintenance		Identification
8.	Dye Penetration Test	24.	No Load/ Free Running Test	40.	Fire Test (Type Test)	D5.	Matchmarks details Line/

weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :KEY TO SYMBOLS :

SV : SUB VENDOR * : TO BE FILLED BY VENDOR

MFR : MANUFACTURER ** : TEST TO BE PERFORMED, IF APPLICABLE

TPI : DESIGNATED THIRD PARTY INSPECTION AGENCY H: HOLD

R : REVIEW

W : WITNESS

9. Metallographic Exam.
10. Welder‘s Qualification &
11. Weld Procedure Test Approval (Electroless Nickel Plating) of Test and Repair Procedure Unpriced sub P.O. with
12. Heat Treatment specification and amend- Static Test Hydrostatic
13. Leakage Test Certificate of all
14. Balancing and
15. Vibration Test Bleed Test
16.
17.

25. Load/ Overload Test
26. Measurement of Speeds
27. Accoustical Test Geometrical procedures
28. Accuracy Execution
29. Repeatability and Positioning ments, if Pressure Test any
30. Proving Test Surface
31. Preparation Functional Test Pneumatic
32. Manufacturer's Test Certificates for gauges bought-out items
33. IBR/ Other Statutory agencies compliance certificate

41. Charpy V-Notch Test
42. Operational Torque Test
43. ENP
44. Painting Accuracy
45. Anti-measuring instruments
46. Double Block & Bleed Test
47. Double Block & 48. Cyclic Test
49.

D6. Layout diagram
D7. Approved erection D8.
D9. Calibration
D10. X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS						Test Certificates & Documents to be submitted to REPL	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (MR Item No.)	Quantity No./ M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage Inspection			Final Inspection/ Test by					
							MFR/SV	TPI	REPL	MFR/SV	TPI	REPL			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1.0	Ball Valves: 8", 6" ,4" & 2" for 300# rating Plug Valves: 2" for 300# rating GlobeValves: 2" for 300# rating **Vendor has to submit QAP with inspection and tests as applicable for individual type of valves.**			*	*	*	As per attached sheet 2 to 10						
	For REPL (Stamp & Signature)			For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)						QAP NO. REPL/Q7AU/05/28/M/001/QAP-002 **SHEET 1 OF 10**		REV **0**

QUALITY ASSURANCE PLANFOR

BARRED TEE

APPLICABLE CODES AND SPECIFICATIONS : REPL/TS/05/21/025, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERI-STICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor**	**TPI**	**REPL**
1.	Material	FITTINGS	Fully killed steel	MTC	100%	PO & Std. Spec.	PO QAP & Std. Spec.	MTC	W	R	R
2.	Inspection	FITTINGS									
i)	Visual Inspection	FITTINGS	Visual Imp.	Visual Internal & External Surface	100%			Inspection Report	W	W	R
ii)	NDT	FITTINGS	Soundness of Tee& Butt Welds	UT, RT & MPI	100%	PO & Std. Spec.	PO QAP & Std. Spec.	Inspection Report	W	W & Evaluation of RT Films	R
iii)	NDT	FITTINGS	Forgings	WET MPI	100%	PO & Std. Spec.	To comply with MSS-SP-53	Inspection Report	W	W	R
iv)	NDT	FITTINGS	End Laminations	UT for Distance of 25 mm on ends.	100%	PO & Std. Spec.	Any lamination than 6.35 mm not accepted	Inspection Report	W	W	R
v)	Testing Destructive	FITTINGS	Properties of REPLh. / Chemica	Chemical by Spectro and other test as per ASTM A -	As per Heat / Lot	PO & Spec.	MSS-SP-75	IMP Lab Report	W	W	R

			l & Impact Test	370							
3.	Final Inspection	FITTINGS	Dimensional	-	As per lot	PO & Spec.	PO & Spec.	Inspection Report	W	W	W/R
4.	Marking	FITTINGS	Identification manufacturer‘s Name, nominal diameter end thickness malts	By painting	100%	PO & Spec.	-	-	W	W	W/R

	LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK	
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		

APPLICABLE CODES AND SPECIFICATIONS : REPL/TS/05/21/025, R-0 WITH AMENDMENTS									**SCOPE OF INSPECTION**		
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERI-STICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor**	**TPI**	**REPL**
			& Tag No.								
5.	Certification	FITTINGS	As per EN 10204 Type 3.2	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / REPL Std	TC & Reports	W	C	R
6.	Release Notes	FITTINGS	Inspection Release Note	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / REPL Std	Release Note	H	-	IR
7.	Shipping	FITTING	Verification of	-	-	As per Tender Doc.	As per Tender	Shipping	H	R	R

		S	surface coating / type of packing			/ Material Specification / STD	Doc. / Material Specification / REPL Std	documents				

Note : All items shall be provided with EN 10204 Type 3.2 certificate.

Legends : H – Hold (Offer for Witness & obtain clearance), W – Witness, R – Review, A – Approval, I – Information, IR – Issue Release Note, C – Certify, X – Submit, PO – Purchase Order, PR – Purchase Requisition, N-Normalizing, N&T – Normalizing & Tempering, SA – Solution annealing, N & SR – Normalizing & Stress relieving.

All the NDT / Leak Testing / Heat Treatment / Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between purchase

specification, contract documents and ITP more stringent conditions shall be applicable. The document describes generally the requirements pertaining to all types of Fittings. Requirements specific to the item are only applicable.

For CONTRACTOR/ SUB-CONTRACTOR

(Stamp & Signature)

	LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK	
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		

QUALITY ASSURANCE PLAN FORINSULATING JOINTS

Sabarmati Gas	**LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK**	Resonance Energy
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		

APPLICABLE CODES AND SPECIFICATIONS : REPL/TS/05/21/009, R-0 WITH AMENDMENTS									**SCOPE OF INSPECTION**			
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Sub Vendor**	**Vendor**	**VENDOR APPOINTED TPI**	**REPL/ CLIENT**
1.	Raw Material Identification	Forged Ring, Pipe	1. Visual 2. Dimensions 3. Finish 4. Bore 5. Marking 6. Mechanical properties (Tensile, Impact, Hardness and others) 7. Chemical properties (CE Value) 8. Supply Condition	Visual Dimensions Verification of markings with TC, TC verification	100%	Material Specification	Technical Specification as per TS and Data Sheet	Mill, Manufacturer's TC	-	P	R/W	R

			(Heat treatment). 9. Deoxidation practice / refining (killed / calcium treated / vacuum degassed etc.) (as per applicable spec.)									
2.	Raw Material Identification	Seal Gasket, Filling Material Insulating Ring	Electrical Resistance & Thickness	Die Electric Test	100%	Material Specification / Data Sheet	Technical Specification as per TS and Data Sheet	Inspection Report	-	P	R/W	R
3.	Manufacturing Welding	-	Approved WPS, PQR, WQT	Welding Parameters	100%	ASME Section-IX	ASME Section IX	WPS, PQR, WPS	-	P	R/W	R
4.	Manufacturing	-	New WPS,	Welding	100%	ASME	ASME Sectio	WPS,	-	P	R/W	R

	Welding		PQR,WQT	Parameters		Section-IX	nIX	PQR, WPS				
5.	Manufacturing Welding	Forged Ring to pipe (Butt & Fillet)	Welding	Welding Parameters	At random	Approved WPS	Approved WPS	Inspection Report	-	P	R/W	R

Sabarmati Gas	**LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK**	Resonance Energy
TENDER DOCUMENT NO **REPL/SGL/STPL/009/22**		

APPLICABLE CODES AND SPECIFICATIONS : REPL/TS/05/21/009, R-0 WITH AMENDMENTS									**SCOPE OF INSPECTION**			
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Sub Vendor**	**Vendor**	**VENDOR APPOINTED TPI**	**REPL/ CLIENT**
6.	Non Destructive Testing	Pipe to Ring (Other than butt welds) Forgings (surface), Finished weldends for lamination, Fillet welds greater 7 mm and above.	Surface & Internal Imperfections	UT, MPI or other as specified	PO, Material Specification	PO, Material Specification	PO, Technical Specification	Inspection Report, Graphical record	-	P	R/W	R
7.	Non Destructive Testing	Pipe to Ring (Butt Welds & Repairs)	Surface & Internal Imperfections	Radiography	PO, Material Specification	API-1104 ASME SEC V	API-1104 PO, Technical Specificati	Inspection Report Film	-	P	R (100% of films)	R

							on					
8.	Hydro testing Air Leak Test, Vacuum Test	Insulating Joint Assembly	Leak Check	Visual	100%	Material Specification	Technical Specification and relevant standards mentioned therein.	Inspection Report, Hydrograph	-	P	W	R
9.	Final Inspection	Pipe	Surface condition, Bevel angle, Root	Visual Dimensional	100% by vendor, At	Material Specification	Technical Specification	Inspection Report	-	P	W(Random)	R
			face, Outer dia., Thickness Length, End finish, Coating, Marking, Colour coding.		random by REPL / TPI		and relevant standards mentioned therein.					
10.	Final Inspection	Assembly	Insulating Resistance	Die Electric Test	All Joints	Technical Specification and relevant standards	No Break down of flash over	Inspection Report	-	P	W	R

						mentioned therein.						

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APPLICABLE CODES AND SPECIFICATIONS : REPL/TS/05/21/009, R-0 WITH AMENDMENTS									**SCOPE OF INSPECTION**			
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Sub Vendor**	**Vendor**	**VENDOR APPOINTED TPI**	**REPL/ CLIENT**
11.	Final Inspection	Assembly	Holiday Detection	Holiday detecting machine	100% quantity		No Holiday	Inspection Report		P	W	R

NOTE: 1.**All items shall be provided with EN 10204-3.2 certificates**

2. **One week advance intimation to be given to the Owner/consultant by the vendor for activity marked at Sl. No. 8 & 10**

3. **In addition to inspection and testing requirement mentioned above, contractor shall witness all the testing under cl. 8 to 11.**

LEGENDS: H – Hold (Offer for Witness & obtain clearance), W – Witness, R – Review, A – Approval, I – Information, X – Submit, PO – Purchase Order, PR – Purchase Requisition, SR

– Stress Relieving, MPI – Magnetic Particle Inspection, DI-Dye Penetrant Test , UT – Ultrasonic examination, TS – Technical Specification, WPS – Welding Procedure Specification, PQR – Procedure Qualification Record,WQT – Welder Qualification Test.

All the NDT / Leak Testing / Heat Treatment / Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between purchase specification, contract documents and ITP more stringent conditions shall be applicable. The document describes generally the requirements pertaining to all types of Insulating Joints. Requirements specific to the item are only applicable.

For CONTRACTOR/ SUB-CONTRACTOR

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(Stamp & Signature)

Format No. :

3b) PARTICULAR JOB SPECIFICATION FOR CIVIL & STRUCTURAL WORKS

1.0 CIVIL & STRUCTURAL ORKS

I) GENERAL

The scope of work to be performed under this contract shall include complete civil and steel structural works as per plans, equipment layout, drawings & technical specificationsfor the various SGL terminals and Pipe Line (Dia.8Ⅱ)

Table -1

8" X 9.3 Kms	**Total = 9.3. Kms**

II) SCOPE OF SUPPLY

Contractor shall procure & supply to site all the materials including cement, reinforcing steel, steel sections/plates, pipes, barbed wire, Chain link fencing, chequered plate, mesh and other accessories, other masonry materials, bitumen/asphalt, admixtures & bonding agents, sealants, sand, boulder, etc., and any other construction material / item required to complete the civil & structural works.

All costs towards testing/inspection of materials/goods shall be borne by the Contractor. No materials/items shall be supplied by the Owner (except anchor bolts & base plates for free issue items).

a) **Free issue of Material :** Supply of 2Ⅱ Pipe & below, all ball valves along with all required fittings and IJ supply is in contractor scope

III) SITE WORK

Complete construction work including supply of labour, construction materials, construction equipment, survey, tools & tackles, dismantling &modification/strengthening, supervision, testing etc. required to complete all the structures, foundations, roads, drains, pavements, finishes, supply, fabrication, erection of steel structures, painting, including site grading/earthwork in cutting & filling etc. as specified and required to complete the civil & road works in all respect.

(All enabling works e.g. construction water tank, casting/fabrication yard, electricity, site

stores & office, safety and security measures, coordination with other contractors working at site etc. shall be Contractor's responsibility.

Special permits to such as _Hot Permit‖, ―Fire Safety Permit‖ to work at dispatch terminal shall be contractor's responsibility.)

IV) SCOPE OF WORK

The scope of work shall be broadly, but not limited to, the following:.

1. TERMINAL WORK AND CONSTRUCTION OF VALVE PITS AT VARIOUS LOCATIONS ALONG THE ROUTE AS PER „TABLE-1" ABOVE

a) Site grading of the plot by removing 150 mm top soil, including plot development by filling good quality earth up to 1.0 m approx, as per requirement.

b) Earth filling in embankments for external roads wherever required with provision of RCC Culverts/ Pipe Culvert.

c) Independent RCC foundations for pipe supports, Equipment, Crossovers foundations etc.

d) 150 mm thick RCC pavement in process area with RCC supports for pipe / equipment as per requirement.

e) Laying PCC kerb stones 125mm x 300 mm over 75 thk PCC base as specified.

f) 150 mm thick RCC pavement for all external / internal roads, as perrequirement.

g) RCC cable trenches: complete civil works for cable trench including providing inserts, conduits (GI, PVC or HDPE etc.) and MS Chequred cover plate/ Precast concrete covers as per requirement.

h) Turfing of non paved/constructed areas as specified.

i) Storm water drainage system in RCC/Brick drains with complete civil works as per requirement.

j) 80 mm thick PCC pavior block over sand cushion over ground / on a PCC base at locations as specified.

k) Steel structures Valve Operating Platforms andCrossovers. l)Pipe & Valve support and their foundations.

m) Grouting of all base plates/frames of equipment foundations and structuralbases.

n) Provision of all inserts, conduits, pre-cast covers, fixing of free issue items into permanent works etc.

o) Supply, Fabrication and Erection of Mild Steel Gate in boundary wall.

p) Provisions of approved quality sand for back filling as per requirement. q) Clearing all construction debris and handing overcompleted work site.

r) Any other work not specifically mentioned but required to make the terminal functional.

s) Marking as-built details/drawings on one set of construction drawings and returnto owner.

2.0 PREAMBLE TO SCHEDULE OF QUANTITIES

The Preamble to Schedule of Items is an integral part of the schedule of quantities and rates and this is to be considered incorporated into the description of items themselves. The Contractor's rate for any item of work in the scheduleof item shall, unless stated otherwise be held to include the cost of all materials including wastage, conveyance and delivery, unloading, storing, fabrication, all consumable materials, like MS bolts, washer, electrodes ,putty, gases, splices paints etc.

hoisting, all labour for finishing to required shape and size, tools and plants, power fuel, consumables, all taxes, royalties, other revenue expenses, temporary facilities like roads etc

2.1 EARTHWORK IN SITE GRADING, EXCAVATION & BACKFILLINGFOR PLOT DEVELOPMENT, ETC.

Brief description of major items shall be as follows:

a) Taking pre-work and finished levels.

b) Stripping and grubbing the top soil of 150 mm and preparation of sub-grade.

c) Excavating excess soil and soft rock if any to develop the plot.

d) Backfilling with serviceable earth in layers of 150 mm thickness in controlled way.

e) Watering and compaction up to 95% of its MDD with Mechanical means.

f) Disposal of unserviceable and surplus earth/rock to authorized dumping ground to anylead.

g) Actual work shall be carried out as per certified construction drawings to be issued tosuccessful tenderer.

Note:

i) For all these items only net excavated quantity in Cu.M shall be measured for payment..

ii) No separate payment for excavation for foundation / sewerage / and brickwork (sincecost of earthwork is included in respective items).

2.2 PCC WORK

Providing and laying PCC M 7.5/ M 10 / M15 in all positions, in foundations, substructure, superstructure and under floor, etc. (at locations where the same is not included in respective

RCC / Pavement item) complete in all respects as per scope of work, detailed construction

drawings, technical specifications and direction of Engineer-in-charge.

Following works shall be inclusive in the rate of PCC item:

a) Earth Work in excavation including back filling (including using borrowearth and disposal of surplus earth).

b) Providing shuttering and strutting of all types (If necessary).

Note: For all these items only net PCC concrete quantity in Cu.M shall be measured for payment.

2.3 REINFORCED CEMENT CONCRETE – SUBSTRUCTURE

Brief description of major items shall be as follows:

a) Earth Work in excavation including back filling including using borrow earth / disposal of surplus earth (wherever required), including bailing out water (where ever required), shoring / strutting etc.

b) 100 thk. PCC M-10 in mud mat as required.

c) Providing shuttering and strutting of all types.

d) RCC M25 as per drg. & specification including supply of cement, coarse aggregate, fine aggregate, and placement of concrete at all levels and depths, all inclusive & testing of concrete and other materials).

e) RCC M25 in foundation for pipe supports, pedestals for equipment like scrubber and filter etc..

f) RCC M25 in foundations for temporary partitions,

g) Complete civil works for electrical / pipe trenches as per requirement.

h) Provision of all inserts, conduits, precast covers/chequered plates, fixing of free issueitems into permanent works etc.

i) Grouting of all base plates/frames of equipment foundations and structural bases asper requirement.

j) Application of two coats of hot bitumen on surfaces in contact with soil.

Note: For all these items only net RCC quantity in Cu.M shall be measured for payment

2.4 REINFORCED CEMENT CONCRETE – SUPERSTRUCTURE

Brief description of major items shall be as follows:

a) Providing shuttering and strutting of all types

b) RCC M25 as per drg. & specification including supply of cement, coarse aggregate,fine aggregate, and placement, all inclusive & testing of concrete and other materials).

c) RCC M25 for pedestals for equipment like scrubber, filter, cartridge, other equipments

etc.

d) Complete civil works for pipe supports, sleepers etc.

e) Grouting of all base plates/frames of equipment foundations and structural bases asper requirement.

f) Provision of all inserts, conduits, precast covers/chequered plates, fixing of free issue items into permanent works etc.

Note: For all these items only net RCC quantity in Cu.M shall be measured for payment except in buildings. The RCC quantity of building superstructure is included in the Building Works item.

2.5 REINFORCEMENT STEEL

a) Supplying ,Fabricating and Fixing in position HYSD Steel Reinforcements/ TMT Grade Fe-415 conforming to IS1786-1985 at all levels and positions

b) Straightening, Cutting, Bending, Cranking, Binding, Welding, Provision of necessary Chairs and Spacers for reinforcement bars as per drawing and construction requirements.

c) Preparation of bar bending schedule Drawings and getting the same approved by Site Engineers as directed by EIC.

Note:

1. Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply ofall materials such as steel Reinforcement, binding wire and other minor construction materials, testing etc. all bye works and sundry works complete in all respects..
2. Chairs, laps, spacers, wastage etc. shall be to contractor's account.
3. Only net Reinforcement bars as per approved BBS / as laid at site shall be considered for payment

2.6 BRICK WORK

Complete works in brick masonry sub & super structure is included in the scope.

Brief description of major civil items shall be as follows:

a) Earth Work in Excavation including back filling.

b) Brick work in sub / superstructure with not less than M-7.5 grade bricks in1:4 cement sand mortar.

c) 15 mm thk plastering in CM (1:4) on exposed brick surfaces.

d) Application of two coats of hot bitumen on surfaces in contact with soil.

e) Applying Lime wash / Cement based paint / Weather proof paint / oil bound distemper on plastered faces in super structure as specified in drawings

Note: Only net brick masonry quantity shall be measured for payment purpose.

The construction of brick work shall be done as per detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based onwork described above and payment will be made on rate (per CuM) of brickworkdone.

2.7 VALVE PIT IN RCC

Brief description of major items shall be as follows:

a) Earth Work in excavation (soil or rock) including back filling upto required level (including using borrow earth and disposal of surplus earth).

b) 100 thk PCC M-10 grade.

c) RCC M25 as per drg & specification along with reinforcement (supply of cement, coarse aggregate, fine aggregate, reinforcement bars), reinforcement bending, placement, binding/welding all inclusive & testing of concrete and other materials.

d) Providing shuttering and strutting of all types

e) Providing 50mm thick high-density rubber pad which shall be wrapped around the pipe incontact with wall.

f) Application of two coats of hot bitumen on wall surfaces in contact with soil.

g) Actual work shall be carried out as per sketch attached with tender.

Note:

1. Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials such as cement, coarse aggregate, fine aggregate, steel Reinforcement, binding wire and other minor construction materials, testing etc. all bye works and sundry works complete in all respects..
2. Only numbers of valve pits as per specified sizes as laid at site shall be considered for payment.

2.8 CONCRETE PAVEMENT

Brief description of major items shall be as follows:

a) Earth Work in excavation including back filling (including using borrow earth anddisposal of surplus earth).

b) 100 Thk. PCC M-10 mud mat.

c) Providing shuttering and strutting of all types.

d) RCC M25 as per drg & specification including reinforcement (supply of cement,coarse aggregate, fine aggregate, reinforcement bending, placement, binding/

welding all inclusive & testing of concrete and other materials).

e) Providing and laying 150 mm thick reinforced cement concrete of (M-25 grade) with 20mm and down grade crushed stone aggregate in pavement, including preparation of base(i.e. compacted subgrade, 200 thk sand and 100 thk PCC M- 10.

f) Providing pockets if necessary, making recess, trenches with covers projections, fixing inserts conduit pipes (GI, PVC, HDPE, etc.) laying in alternate panels, filling the gaps between the panels with bitumen etc.

g) Making slopes, finishing edges, leaving bars for pedestals & sleepers including providing sand fill isolation.

h) Providing and fixing reinforcing steel (in one / two layers), curing, chipping and modification works etc. as specified in any shape, thickness, position and finishing the top surface smooth as per requirement etc. all complete as per drawings, specifications and directions of the Engineer-in-charge.

i) Application of two coats of hot bitumen on surfaces in contact with soil.

j) Actual work shall be carried out as per certified construction drawings to be issuedto successful tenderer.

Note:

Pavement – Completed civil works for pavement including, earth work in excavation, preparation of base i.e., compacted sub grade, 200 mm thk. sand filling and compaction, 100mm thk. PCC of grade M-10, shuttering, providing reinforcement, providing and fixing of inserts plates, conduits etc.

SUPPLY FABRICATION AND ERECTION OF STEEL STRUCTURE

1.0 This Specification shall apply to supply, fabrication and erection of steelstructures in building and general structural work.

The steel structures shall consist of but not limited to columns, column bracing, portals, platforms, walkways, stairs, ladders, handrails, chequered Plate/Grating for platforms, chain link fencing and fencing gate etc.

This Specification covers the structural steel work mainly mentioned below. The structural work shall not be limited to the following description but shall be guided by technical/ technological aspects for the total scope of work.

Brief description of major works under the item is as follows:

1.1 Supply, Fabrication and Erection of Mild Steel Gate

Brief description of major items shall be as follows :

a) Supply, Fabrication and erection of mild steel gate 3.0 m high and 4.0m wide.

b) Painting of MS Gate as per specification and drawing

c) Gate shall be fabricated and erected as per detailed construction drawing to be issued to the successful tenderer.

1.2 Supply, Fabrication and Erection of Miscellaneous steel structural works.

Brief description of major items shall be as follows

a) Supply, Fabrication and erection of crossovers, platform, Structure for maintenance shed, etc. fabrication from rolled Steel section and built up section conforming to IS:2062 Grade-A and pipes conforming to IS:1161,as per requirement.

b) Painting of steel structure as per specification and drawing

c) Crossover, Platform, Pipe and Valve Supports structure shall be fabricated and erected as per detailed construction drawing to be issued to the successful tenderer

1.3 Supply, Fabrication and Erection of Chain Link Fencing and Gate.

Brief description of major items shall be as follows

a) Supply, Fabrication and erection of approx 2 m high chain link with 500 mm at top barbed wire supported on steel posts with other accessories all work as per specification and drawing.

b) Painting of steel structure as per specification and drawing

c) Gate of suitable width shall be provided in the direction of chain link fencing. the mesh and barbed wire used for the fabrication of gate shall be identical in all respects to that of chain link fencing .the door may be single leaf or double leaf depending on the width of the gate.

d) The gate frame shall be an angle frame with stiffeners at mid height and mid width. The mesh shall be welded to the gate frame/stiffeners. all work as per specification and drawing.

e) Painting of steel structure as per specification and drawing

Note: All works shall be considered for payment on MT basis.

The cost of MS bolts (permanent and service), washers, electrodes, putty, gases, cost of

straightening the raw materials, cutting of flats from plates and providing splices, paints, tools, plants, electric power, water. other consumables, as required for the work shall be deemed to be included in the quoted rates

All handling and transport charges of raw materials and fabricated structuresincluding double handling, as required, for completion of work in accordancewith time schedule, are deemed be included in the quoted rates

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SCOPE OF WORKS

FOR

TEMPORARY CATHODIC PROTECTION WORK

Laying and Construction of 8" NB U/G Steel P/L Network andAssociated works at Patan

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CONTENTS

Annexure-A (Format for Daily Progress Report for TCP system)

Annexure-B (Format for TCP system commissioning & Monthly Monitoring of TCP system)

Annexure-C Organogram for the CP work

Annexure-AA Compliance to the Technical Bid (CP Work).

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1.0 GENERAL

1.1 Introduction

Special Condition of Contract shall be read in Conjunction with the General Conditions of Contract, specification of work, Drawing and any other documents forming part of this contract wherever the context so requires.

Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

Where any portion of the General Condition of Contract is repugnant, to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears, the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Condition of Contract and shall to the extent of such repugnancy, or variations, prevail.

The materials, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the TECHNICAL SPECIFICATIONS contained herein and CODES referred to. Where the technical specification stipulate requirements in addition to those contained in the standard codes andspecifications, these additional requirements shall also be satisfied.

Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain work orprovide certain facilities, it is understood that the CONTRACTOR shall do so at his cost and the Value of contract shall be deemed to have included cost of such performance and provisions , so mentioned It will be Contractor's responsibility to bring to the notice of Engineer-in-charge any irreconcilable conflict inthe contract documents before starting the work(s) or making the supply with reference which the conflict exists.

In the absence of any specifications covering any material, design of work(s) the same shall be performed/ supplied/ executed in accordance with Standard Engineering Practice as per the instructions/ directions of the Engineer-in-charge, which will be binding on the Contractor.

2.0 PROJECT DESCRIPTION

SGL Limited is planning to Steel Network for Domestic, Commercial, Industrial & Automobile Sector in Patna GA. Size and other details of pipelines are given below-

2.1 PROJECT DETAIL

The work being tendered is covered asindicated below:

Details of Proposed Pipeline

8" x 9.3 km (approx) long Coatedpipeline

I) 8" X 9.3 km long Coated pipeline

–	Material of Construction	: Carbon Steel
–	Line Size	: 8‖/4‖ NB
–	Length, in km	: ~ 9.3 Approx.
–	Pipe Specification	: Refer P&ID
–	Thickness	: Refer P&ID
–	External Coating	: LPE

3.0 STANDARDS

3.1 The work shall be performed in conformity with this specification, standard specifications and installation standards enclosed elsewhere in this tender and code of practices of the Bureau of

Indian Standards. In case f any conflict, the stipulations under this specification shall govern.

In addition, the work shall also conform to the requirements of the following:

3.2 The Indian Electricity Act, and the rules framed there under.

The regulations laid down by the Chief Electrical Inspector of the state government/ Central Electricity Authority (CEA).

The regulations laid down by the Factory Inspector.

The regulations laid down by the Chief Controller of Explosives.

Any other regulations laid down by the Central, State or Local Authorities from time to time during the execution of this contract.

OISD Standards SGL
Safety Standard

3.3 The design, selection and installation of equipment and materials shall also conform to therequirements of the relevant latest standards of: BS

Specification and codes of practice
OISD Standards

IS: 8437 (Part-II)/ 8062 (Part-I)

NACE Standards
DNV Publications
IEEE Publications
IEC standards

4.0 GUARANTEE

4.1 The contractor shall guarantee the installation against any defects of workmanship and materials (supplied by the contractor) for a period of 12 months after successful commissioning at site. Any damage or defects connected with the erection of materials, equipments, fittings, meters supplied by the contractor that may be undiscovered at the time of issue of thecompletion certificate, or may arise

or come to light thereafter, shall be rectified or replaced by the contractor at his own expense as deemed necessary and as per the instruction of theEngineer-in-charge within the time limit specified y Engineer-in-charge.

4.2 The above guarantee shall be applicable for the quality of work executed as well as for the equipment/cable/ fittings/meters/software's/hardware's other materials etc supplied by the contractor.

Equipments installed or commissioned by others within the battery limit. This is for the purpose of obtaining a comprehensive approval from competent authority.

5.0 SITE CONDITIONS

The equipment offered and the installation shall be suitable for continuous operation under the following siteconditions:

Ambient temperature	:	48°C/ 2˚C (max.)
Max relative humidity	:	95%
Altitude	:	less than 1000 m
Atmosphere	:	To withstand site condition (Dry, Heavy rainfall during monsoon)
Hazardous area Classification	:	Zone-I & II, Gas group IIA & IIB, Temp. Class T3

6.0 Power Supply Parameters-VOID

7.0 Abbreviations

3LPE	-	Three layer Ploy Ethylene
AJB	-	Anode Junction Box
CJB	-	Cathode Junction Box
CPPSM	-	Cathodic protection power supply module
CTSU	-	Computerised Test Station Unit
CAT	-	Current Attenuation Test

DCVG	-	Direct Current Voltage Gradient
D/T	-	Despatch Terminal
ER Probe	-	Electrical Resistance Probe
ICCP	-	Impressed Current Cathodic Protection
IP	-	Intermediate Pigging
PCP	-	Permanent Cathodic Protection
PSP	-	Pipe to Soil Potential
R/T	-	Receiving Terminal
SV	-	Sectionalizing Valve
TCP	-	Temporary Cathodic Protection
TR Unit	-	Transformer Re tifier Unit
TLP	-	Test Location Point (Test Station)
QA/QC	-	Quality Assurance & Quality Control
XLPE	-	Cross Link Poly-Ethylene

8.0 CO-ORDINATION WITH OTHER CONTRACTORS

CP contractor shall entirely responsible for Co-ordination with other contractors & it should be ensured that the CP work should be executed simultaneously with laying of pipeline. Contractor shall mobilize necessary teams in each respective section as per the site organisation chart

(Annexure-C) enclosed with this tender with the key responsibility, education qualification, designation, experience as defined and shall be responsible for the timely execution of CP work.

If the contractor fails to timely execution of the CP work, mobilization of teams as defined in tender and itfounds delay in the pipeline laying due to of CP work & poor co-ordination with laying contractor necessary penalty clause shall be applied as per the direction of the Engineer- in-Charge.

9.0 SCOPE OF WORK (SUPPLY, INSTALLATION, TESTING & COMMISSIONING)

General

Contractor shall execute TCP work simultaneously in coordination with laying contractor when lowering of the -pipeline is going on. Activities like- Cable to pipe connection, installation of R probe, Polarisation cell, Polarisation coupon etc should be completed before the backfilling of the trench.

9.1 Temporary Cathodic Protection System

Corrosion survey, design, detail engineering, fabrication, supply, installation, testing and

commissioning of the temporary cathodic protection system using Mg/ Zn galvanic anodes to protect theexternal surface of 3LPE coated pipeline against corrosion for design life of minimum

2 years or till the commissioning of PCP system, whichever is later. The detailed length of pipeline is as under-

Sl. No.	Spread/Part	Location Description	Pipeline Dia.	Length (KM) (Approx.)
1	Part-A	8'' LPE Coated pipeline	8''	9.3 Km

Maintaining and keeping of PSP value as specified and monitoring at monthly basis of PSP voltage & ACvoltage of the temporary cathodic protection system (As per format Enclosed in Annexure-B) till commissioning of the permanent cathodic protection system. All work shall be carried out conforming to the Scope of work, Design Basis, Data Sheets, national & international standard & as per standard specification No.- REPL/TS/05/E9/016A for temporary cathodic protection system. Scope shall also include but not limited to the following for completion of jobs:-

a) easurement of soil resistivity along the right of way of the main pipeline (At 500mtr Interval) & collectionof soil & water samples along ROW at depth of 1M, 2M & 3M depth at every 5 km interval & at water bodycrossing for its chemical & microbial analysis along the pipeline route as per specification for corrosion survey REPL/TS/05/21/016C & NACE Standard TM0106-2006 for detection of SRB, ARB & Total dissolved H_2Setc.

b) Collection of additional data related to cathodic protection alo g the right of way of pipeline as per standard specifications during the survey. Preparation of TCP design document based on the corrosion survey results & chemical and microbial analysis and pH level of the soil and tender specifications

c) Supply, Installation, Testing & commissioning of Test stations (Big Size & Normal Size) weather proof (IP-55) as per specification & enclosed drawi gs. Selection of TLP size will be as per the nos. of cables terminating at the station.TLP shall be sealed at both ends by means of foamsealing/solid sealing. Termination plate inside the TLP should have high insulation level (FRP or higher grade) to avoid drainage of CP current due to insulation leakage.

d) Supply, installation, testing & commissioning of Mg (Min 5.0 Kg)/ Zn Galvanic anodes with backfill as perthe standard specification- REPL/TS/05/E9/016A. The weight of the Mg Anode & the total nos. of anodesshall be calculated as per the corrosion survey, soil chemical analysis, total weight and current requirement ofthe pipeline section. However, Min one anode is to be installed at every one KM with test station.

e) Supply & installation of Zinc Ribbon Anodes at 4-8 O'clock position in the interval of 2 meter (max.) orDual ribbon 6 O'clock position longitudinal on carrier pipes, for these positions i.e. 6 O'clock Zn ribbon anodes shall be terminated in the TLP box at cased crossing on both side of casing (Longitudinally to pipeline without thermit weld and the end connection of the ribbon anodes to be terminated inthe TLP box through end sealing) where the casing pipe is coated. Zn ribbon anodes shall be provide at coated cased crossings only i.e. railways/ roads etc. In case of bare casing bentonite filling b/w carrier & casing shall be envisaged with no addition ribbon anode protection. Longitudinal installation ribbon anode on pipeline shall be done by sealing at both side on the pipeline withthe end seal by special sealing injection filler (Stopaq-4200 or equivalent) followed by wrapping material.

f) Cable to pipe connection by thermit welding/Pin brazing (for charged pipeline) for 25, 10, 6 sq.mm coppercable including excavation and exposing piping, recoating with epoxy, testingetc.

g) Supply, laying of HDPE sheets (1200mm wide, 6mm thick) between the SGL pipeline and the other CPprotected foreign pipelines at the crossing locations for providing electrical isolation.

h) Earthing of above ground catholically unprotected pipeline at consumer station/DRS station/Metering skid etc, the earth electrode shall be 65 mm dia, 4.5 mm thickness & 3000mm

long. Total grounding resistance shall be limited to 2-3 Ohm max.

i) Supply, installation, testing & commissioning of one set of Explosion proof type solid state spark gap arrestor(100 kA) across each insulating joint provided at dispatch terminal, receiving terminal & various consumerterminals as per P&ID /specification.

j) Supply, installation, testing & commissioning one set of polarization cell (Solid state) with zinc anode at all high tension electrical pow r transmission line/equipments /railway tractions (all 66 KV & above) crossing or running parallel to the pipeline for grounding purpose as per specification (Polarisationcell shall be installed underground in cemented tank to avoid theft).

The rating of the cell shall depend upon anticipated fault current & ground bed resistance at the location ofinstallation and the calculation of the same shall be furnished to REPL for review & selection of rating of thePolarisation Cell. However, the rating of polarisation cell shall not be less than 3.7 KA @ 30 Cycle & number of 20 kg net weight zinc anode shall not be less than two If required Zn Ribbon anode/ (Dia 15mm with back fill trench)/ multi strand cu cable encased with low resistance backfill may also be used for the grounding purpose to get lower grounding resistance as per thedirection of engineer In-charge. The resistance of grounding shall be limited to 2-3 ohms max.

At any location of HT line crossing, max 4 (four) nos. zinc anodes shall be provided to limit the grounding resistance to 2-3 ohms max. Calculation for grounding resistance shall be submitted alongwith design document & if required, Zinc ribbon anodes/ multi strand cu cable encased with low resistance backfill of suitable length in addition to 4 (four) nos. zinc anodes shall be provided to limit the grounding resistance.

If any proposed additional line of voltage rating 66kV & above is envisaged during construction, the sameshall also be considered. Contractor shall supply polarization cell alongwith Zn anode for the same.

k) Supply, installation, testing & commissioning of Polarisation coupons with switch (At every 5.0 km interval)have one side exposed area of 25 mm x 25 mm with permanent reference cell shall be provided along the pipeline to monitor the external corrosion activity on the pipeline as per enclosed standard specification. Location of external Polarisation coupons & Number of magnetic devicesfor operation of magnetic switch shall be decided during detail engineering in as per NACE SP 104 & inconsultation with SGL /REPL.

Permanent Reference cell shall be manufactured & constructed in line with drawing no. REPL/SD/05/E9/E/CP/1610 Rev-0.

Care shall be taken during installation of polarization coupon so that bare face of polarisationcoupon is opposite to pipe & polarisation coupon shall not be installed between TLP & Pipeline.

The works related to collection of approximately 2-5 m of pipeline material (In pieces of 300 to 1000mmlength) for fabrication of Polarisation coupons is in the scope of the Contractor.

l) Supplying, laying, termination, Glanding, ferruling & testing of all the cables of TCP system, Cu-Conductor, XLPE insulated, PVC sheathed, Armd/Unrmd (1Cx6 mm2, 1Cx10 mm2, 1Cx25 mm2, 1Cx35 mm2) as required.

m) Cable coming from 60 Mtr for Current measurement & cables for foreign pipeline crossing shall be provided with black sleeves.

n) PSP Monitoring on monthly basis of the TCP system till commissioning/hook-up of the permanent cathodic protection system.

o) All civil/ structural & other miscellaneous works related to TCP system including supply of bricks, cement &steel etc. required for completion of the system.

Note -

i) Connection scheme of CP system in TLP boxes shall be permanently fixed inside the test station box(TLP Box).

Note-1:- At saline soil Ag/Agcl Permanent Reference electrode shall be used.

Note-2:- Vendor list of Make of CP Materials is enclosed with the tender as appendix-I all CP material shallbe as per the make mentioned in the vendor list.

Note-3: - For chainages refer Pipeline Schematic Route Diagram

Note-4: - Hazardous are electrical equipments should be classified type (Ex-d) as per the areaclassification

9.2 Tentative Bill of Material

Tentative bill of material of TCP shall be prepared by the successful contractor for each section as per theapproved design and the same shall be submitted with the detail engineering package for review.

9.3 Other Miscellaneous Works

i) The job includes all civil works including supply of bricks, cements steel etc. connected with grouting of equipment to be installed. The job includes repairing of all civil works damaged during installation ofelectrical and other facilities.

ii) Preparation of buried cable trenches including excavation, back filling, compacting, providing of brickprotection by second-class bricks, spreading of fine river sand, including allsupplies.

iii) CP contractor shall provide Colour code identification for the various CP System cables used in the systemwith design document for approval.

iv) The scope of work under this contract shall be inclusive of breaking of walls and floors and chipping of concrete foundations necessary for the installation of equipment, materials, and making good ofthe same. Minor modifications wherever required to be done in the owner free supplied equipments ordevices to enable cable entry, termination, etc.

v) Checking of all connections, i.e. power, control, earthing and testing and commissioning of all equipment erected and/or connected under this contract as per testing procedures and instructions of Engineer-in-Charge.

vi) All electrical equipments are to be doubly earthed by connecting two earth wires from the frame of the equipment to be earth grid. The cable armours will be earthed thro'cable glands.

The followingshall be earthed:

- All non-current carrying metallic parts of electrical equipments such as lighting and power panels,push button stations, cable trays etc.

vii) Supply and installation of all other accessories not specifically mentioned herein but nevertheless necessaryfor completion of job.

viii) Engineering and preparation of specifications, data sheets, procedures and drawings etc required for procurement & installation of CP System wherever applicable/required by Owner/ REPL and submit to Owner/ REPL for approval/comments.

ix) Correction and submission of all owners' drawings for as-built tatus.

x) Test certificates, catalogues, vendor drawings, installation, operation and maintenance manuals for all equipment/materials in contractor's scope of supply.

xi) All civil work related to the CP work is in scope of the CP contractor.

xii) Co-ordination with other Contractors/Pipeline contractor.

xiii) Earthing and lightning protection system, including earthing pits, earth electrodes, earthing strips, groundingconductor of various sizes, Cu strip for flange jumper etc is in contractors's scope of work.

No. of earth pit will be provided as per IS: 3043.

All equipment earthing to be carried out as per IS: 3043, minimum size of GI/Copper earth conductor to be used will be as given below.

Equipments	Earthing Conductor size
Utility building PDB, MLDB, Switch Socket DB, UPSDB, Lighting DB etc.	50 x 6 mm GI/16 sq. mm GI rope
FLP – WP lights/control station	6 sq mm solid GI Wire
Product Pipeline	16 sq mm flexible copper wires
Mechanical equipment/ Vessel, Tanks, Pipe/Cable racks, structure, fencing	50x6 mm GI Flat
RTU, Telecom, UPS	25x3 mm copper strip
Field Instruments	2.5 sq mm Cu Wire PVC
Jumper for Flanges	25x3 mm Copper Strip.

Lightening Protection system shall be provided as per IS-2309

9.4 WORK CONTRACT

The entire work as per Scope of Work covered under this contract shall be treated as –Works Contract‖.

All works included in the scope of CP work will be done simultaneously with main pipeline construction by main pipeline Contractor. Bidder will supply all the materials required for completing the system and organise manpower & equipments accordingly to meet the requirement of Cathodic Protection work in time as p r completion schedule given in Volume I of II.

9.5 SCOPE OF SUPPLY

9.5.1 Owner's Supply – NIL

Supply, testing, Packing, Forwarding, Delivery, Installation and commissioning of all the equipment coveredin this package are included in the scope of the contractor. No equipment will be free issued by the owner tothe contractor.

9.5.2 Contractor's scope of supply shall be as mentioned in Cl. No. 9.1 & 9.3.

9.5.3 List of two year operational & maintenance spares is provided in the tender document as

Appendix-II Bidder shall supply these spares to the SGLs designated store which includes O&M CP Spares/Tool / Tackles for CP system like Multimeter, Clamp meter, Portable reference cell, UT meter, Tool box etc.

All commissioning & startup spares are in bidder's scope (Included in this package). Any commissioning & startup spare consumed during the startup & commissioning is included in the supply of thispackage, for which no extra payment is made.

1. Contractor to note that the exact cable routing shall be decided at site based on actual site conditions. Exact cable quantities/sizes shall be based on actual measured route lengths at site by Contractor in coordination with Engineer-in-Charge/Client. Contractor shall ensure that there is no surplus or shortage ofcables at site and procure cables accordingly. No-joint will be permitted in TCP cables.

2. Contractor to note that all cabling (including supply & laying) & other electrics for the CP System shall besupplied along with the package and no separate payment shall be admissible for the same. Owner shall provide only single point power supply for thesame.

3. Job is lump-sump basis, However the work to be carried out & material to be supplied for the project which is not covered under this contract the payment shall be done as per unit price.

10.0 STATUTORY APPROVAL OF WORKS

The submission of application on behalf of the Owner to Govt. Authority/ Central Electricity Authority/State authority/Private bodies, if required along with copies of required certificates complete in all respects, shall be done by the contractor well ahead of time so that the actual commissioning is notdelayed for want of approval from respective authority. The actual inspection of work by the above mentioned authority inspector shall be arranged by the Contractor and necessary coordination and liaison work in this respect shall be the responsibility of the contractor. However any fee paid to these Authorities in this regard shall be reimbursed by the Owner on submission of bills withdocumentary evidence.

The Inspection and acceptance of the work as above shall not absolve the Contractor from any of responsibilitiesunder this contract.

The necessary permissions required for the bonding etc for the interference mitigation (From SEB's, Water works Departments/ Boards, Railways & Other pipeline owners) s all be obtainbefore taking mitigation measures in the scope of contractor & the same will be hand over to SGL after commissioning of CP system. All such correspondence shall be submitted to M/s SGL.

11.0 QUALITY ASSURANCE, INSPECTION AND TESTING

All the equipment supplied by the contractor shall be inspected by the Owner/REPL and/or their approvedinspection agency (TPI) at the manufacturer's works prior to despatch. The equipment will be inspected asper the tests pre-identified in the approved QAP to ensure conformity of the same with relevant approved drawings, data sheets, specifications, National/International standards. The TPI shall be arranged by the CP contractor for the testing of the material/equipments at the vendor works.

11.1 Performance tests of any equipments which cannot be conducted/demonstrated either partially of whollyat the manufacturer's work, shall be conducted after erection at site in the presence of Owner & their inspection agency. In all the cases, prior approval of the approvals shall be obatanedIn case of waiver category of items, the same shall be pre identified. For such items, the contractor shall furnish necessary certificates, test reports etc for Review/Approval to Owner/Inspection agency. The issue of Inspection Certificate/Waiver Certificate for any equipment or component there of does absolve the contractor from his contractual obligations towards subsequent satisfactory performance of the equipment at site. Should any equipment be found defective,In whole or part thereof after receipt at site or during erection/commissioning and testing shall be Rectified/Changed by contractor free of cost.

11.2 Contractor shall submit test plan for the equipments with four week advance notice.

11.3 The following equipment/items shall be tested and inspected by REPL/ owner at manufacturer's works beforedispatch. Test certificates duly signed by REPL/ Owner shall be issued by the contractor as part of the finaldocument.

- Hazardous area equipment

12.0 TESTING & COMMISSIONING

12.1 The successful bidder shall submit detailed installation, site testing & commission procedure with timeschedules for Review/Approval to Owner/REPL.

12.2 The successful tenderer shall provide adequate supervisory/ skilled personnel and all tools and tackles, testing equipment and instruments required for complete checking of installations and testing and commissioning of all equipment and accessories.

12.3 All the tests shall be conducted in the presence of Owner/ REPL/Engineer-in/charge or his authorizedrepresentative unless he waives this requirement in writing.

12.4 The testing and commissioning of all equipment under the scope of the bidder & shall be carried out in accordance with the latest edition of relevant Indian Standards, International Standard NACE standards and IE Rules.

12.5 Test reports shall be submitted in required number of copies duly signed by the *Bidder* to *REPL* and *OWNER.*

12.6 On successful completion of erection of each item /equipment, a final inspection will be carried out at siteby Owner / REPL, for correctness and completeness of erection.

12.7 After the completion of all tests and rectification of all defects pointed out during final inspection, start-uptrials would be commenced. During the start-up trials contractor shall provide skilled / unskilled personnel and supervision round the clock at his cost. The number and category of workmen and duration up to which required, will be decided by the Engineer-in-charge. Any defects noticed during the start-up trial relating to the equipment supplied and work carried out by the Contractor, will be rectified by the contractor at his own cost.

12.8 Any work not conforming to the execution drawings, specifications or codes shall be rejected forthwithand the contractor shall carry out the rectification at his own cost.

12.9 After the operating conditions are fully achieved for CP system and the other requirements as stated in theGeneral Conditions of Contract are fulfilled, the contractor would be eligible for applying for a completion certificate.

13.0 DRAWINGS, STANDARD SPECIFICATION AND INSTALLATION STANDARDS

13.1 The drawings accompanying the tender document are indicative of the nature of work and issued for tendering purposes only. Construction shall be as per drawings/specifications issued/ approved by the Owner/REPL during the course of execution ofwork.

After the job completion, contractor shall prepare _AS-BUILT' drawings, final certified as built drawings vendor drawings for bought out equipments shall be submitted by the contractor to owner in boundvolume with one set of reproducible original sepia plus five sets of prints & one set to REPL.

The equipments/ materials to be supplied by the contractor shall conform to the requirements of the applicable standard specifications. Also the installation of various material/ equipment shall also conform to the standard specification.

The purpose of the pipeline alignment drawings, P&IDs & Plot Plan drawings enclosed with the tender is to enable the tenderer to make an offer in line with the requirements of the Owner. These are indicative of the nature of work and issued for tendering purposes only. The bidders, however, shall visit the site beforebidding for proper information of site conditions. Construction shall be as per drawings/ specifications issued/ approved by the Owner/ Consultant during the course of execution of work.

A) SPECIFICATION

1.	Specification for TCP system	REPL/TS/05/E9/016A
2.	Specification for Corrosion Survey	REPL/TS/05/21/016C

B) DATA SHEETS & QAP

3.	Quality Assurance Plan	**REPL/05/E9/U999 /QAP/082**

C) STANDARD DRAWINGS

1.0	Prepacked Zinc Anode	REPL/SD/05/E9/E/CP/1601
2.0	Prepacked Mg Anode	REPL/SD/05/E9/E/CP/1602
3.0	Mg Ribbon anode for Grounding	REPL/SD/05/E9/E/CP/1603
4.0	Details of Test Station for TCP	REPL/SD/05/E9/E/CP/1604
5.0	Test Station Connection Schemes	REPL/SD/05/E9/E/CP/1605
6.0	Galvanic Anode Installation	REPL/SD/05/E9/E/CP/1606
7.0	Pipeline Grounding Through Polarisation Cell and Galvanic Anodes	REPL/SD/05/E9/E/CP/1608
8.0	Permanent Copper – Copper Sulphate Reference Cell & Installation Details	REPL/SD/05/E9/E/CP/1610
9.0	Test station for polarization cell	REPL/SD/05/E9/E/CP/1614
10.0	Connection scheme for hoocking throughCJB/TLP	REPL/SD/05/E9/E/CP/1616
11.0	Details of thermit weld for cable to pipe joint	REPL/SD/05/E9/E/CP/1618
12.0	Electrode for earthing system	REPL/SD/05/26/23/01
13.0	Earth electrode in test pit	REPL/SD/05/26/23/02

13.2 Drawings for Tender purpose enclosed with constructiontender

Schematic Route Diagram
P&ID

Plot Plan

13.3 Survey Drawings/ Details

a) Overall Schematic Route Dia

14.0 RESOURCES / FACILITIES

14.1 Recruitment of Personnel by Contractor

The Contractor shall not recruit perso nel of any category from among those who are already employed by the other agencies working at the sites but shall make maximum use of local labour available.

14.2 Construction Water and Power Supply

No water and power will be provided by the owner. It should be the responsibilities of the contractor toarrange water and power at his own cost.

14.3 Land for Residential Accommodation

Owner shall not provide any land for residential accommodation of contractor's staff and labour.

15.0 PROJECT SCHEDULING & MONITORING

The following schedules/documents/reports shall be prepared and by theBidder/Contractor for review/approval at various stages of the contract.

15.1 Along with Bid

b) Time Schedule

The Completion Time Schedule for the work (including mobilization period) as given in VOL-I of in allrespect, from the date of issue of letter/Fax of Intent.

The Bidder is required to submit a Project Time Schedule in Bar Chart Form, along with the Bid. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner interface activities shall be clearly identified with their latest required dates. Ownerreserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line withthe over all Project requirement.

c) Scheduling & Monitoring Sy tem

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package and sample outputs.

15.2 After the Award of Contract

a) Overall Project Schedule

The Contractor shall submit within 2 week of Fax of Intent, a sufficiently detailed over all Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.

The network will be reviewed and approved by Engineer- in-Charge and the comments if any shall be incorporated in the net ork before issuing the same for implementation. The network thusfinalised shall form part of the contract document and the same shall not be revised without the prior permission from Engineer-in- Charge during the entire period of contract.

b) Progress Measurement Methodology

The contractor is required to submit within 2 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/ delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner reserves the right to modify the methodology in part or in full.

c) Functional Schedules

The contractor should prepare detailed functional schedules in line with network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and construction.

15.3 Project Review Meetings

The Contractor shall present the programme and status at various review meetings as required.

Weekly Review Meeting

Level of Participation :Contractor's/Consultant's RCM/Site Incharge & Job Engineers.

Agenda : a) Weekly programme v/s actual achieved in the past week & programme for next week.

b) Remedial Actions and hold up analysis.

c)Client query/ approval.

Venue : Site Office

Monthly Review Meeting

Level of Participation : Senior Officers of SGL/REPL andContractors.

Agenda : a) Progress Status/ Statistics
b) Completion Outlook
c) Major hold ups/slippages
d) Assistance required
e) Critical issues
f) Client query/ approval

Venue : SGL/REPL Office/ Site Office

15.4 Progress Reporting Proforma

A) Monthly Progress Report

This report shall be submitted on a monthly basis within 10 (ten) calendar days from cut-off date,as agreed upon covering overall scenarios of the work. The report shall include, but not limited to the following:

- Brief Introduction of the work.
- Activities executed/ achievements during the month.
- Schedule versus actual percentage progress and progress curves for Detail Engg. Sub-Overall and quantum wise status & purchase orders against schedule.
- Area of concern/ problem/ hold-ups, impacts and actionplans.
- Resources deployment status.
- Annexures giving status summary for drawings, MRs, deliveries, sub-contracting and construction.
- Procurement status for items to be supplied byContractor.

B) Weekly Reports

The report will be prepared and submitted by the Contractor on weekly basis and will coverfollowing tems

- Activities programmed and completed during the week.
- Resource deployed men and machines.
- Quantities achieved against target in construction
- Record of Mandays lost.
- Construction percentage progress schedule and actual.

C) Daily Repots

- Activity programme for the day
- Progress of the previous day and commutativeprogress.
- Manpower & machinery deployed.

Successful bidder shall submit DPR (Daily progress report) & Monthly Monitoring Report to the owner/REPL as per the format in Annexure-A & B.

15.5 Progress Reports

15.5.1 CONTRACTOR shall make every effort to keep the OWNER adequately informed as to the progress of the WORK throughout the CONTRACT period.

CONTRACTOR shall keep the OWNER informed well in advance of the construction schedule so as topermit the OWNER to arrange for requisite inspection to be carried out in such a manner as to minimize interference with progress of WORK. It is imperative that close coordination be maintained with the OWNER during all phases ofWORK.

15.5.2 By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER a detailed report covering theprogress as of the last day of the previous month. These reports will indicate actual and scheduled percentageof completion of construction as well as general comments of interest or the progress of various phases of the WORK. The frequency of progress reporting by the CONTRACTOR shall be weekly.

15.5.3 Once a week, CONTRACTOR shall submit a summary of the WORK accomplished during the preceeding week in form of percentage completion of the various phases of the ORK, to the owner

15.5.4 Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs,test certificate etc. Such progress reports shall be in the form and size as may be required by the OWNER andshall be submitted in at least 3 (three) copies

15.5.5 Contractor shall prepare daily progress report (DPR) in the desired format and submit it the Engineer-in- charge schedule of next day to Engineer-in-charge.

16.0 CONSTRUCTION

OWNER reserves the right to inspe t all phases of CONTRACTOR's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other dulyauthorised representatives, made known to the CONTRCTOR present during progress of the WORK and such representatives shall have free access to the WORK at all times. The presence or absence of a OWNER's representative does not relieve the CONTRACTOR of the responsibility forquality control in all phases of the WORK. In the event that any of the WORK being done by the CONTRACTOR or any SUB-CONTRACTOR is found by OWNER's representatives to beunsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the CONTRACTOR shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS,

procedures and SPECIFICATIONS.

16.1 Rules & Regulations

CONTRACTOR shall observe in addition to Codes specified in respective specification, all National and Local Laws, Ordinances, Rules and Regulations and requirements pertaining to the WORK and shall be responsible for extra costs arising from violations of the same.

16.2 Procedures

Various procedures and method statements to be adopted by CONTRACTOR during the construction as required in the respective specifications shall be submitted to OWNER in due timefor APPROVAL. No such construction activity shall commence unless approved by OWNER in writing.

16.3 Field Inspection

CONTRACTOR shall have at all times during the performance of the WORK, a Competent Superintendent on the premises. Any instruction given to such superintendent shall be construed as having been given to the CONTRACTOR.

16.4 Erection and Installation

The CONTRACTOR shall carryout required supervision and inspection as per quality Assurance plan and furnish all assistance required by the OWNER in carrying out inspection work duringthis phase. The OWNER will have engineers, inspectors or other authorised representatives present who are to have free access to the WORK at all times. If an Owner's representative notifies the Contractor's authorized representative not lower than a Foreman of any deficiency, or recommends action regarding compliance with the SPECIFI ATIONS, the CONTRACTOR shall make every effort to carryout such instructions to complete the WORK conforming to the SPECIFICATIONS and approved

DRAWINGS in the fullest degree consistent with best industry practice.

16.5 Construction Aids, Equipment, Tools & Tackles

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction Equipments, Special Aids, Cranes, Tools, Tackles and testing equipments and appliances. Such construction equipments etc. shall be subject to examination by owner and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER shall be immediately got rectified, repaired or the equipment replacedaltogether, by CONTRACTOR OWNER shall not in any way be responsible for providing any such equipment machinery, tools and tackles.

The OWNER reserves the right to rearrange such deployment depending upon the progress and priority ofwork in various sections.

Tie-end between main line and starting point of terminal is included in the scope of contract, as and whenmain line section is available for Tie-ins.

16.6 ORDER OF WORKS/PERMISSIONS/RIGHT OF ENTRY/CARE OF EXISTINGSERVICES

The order in which the WORK shall be carried out shall be subject to the approval of theEngineer-in-charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently.

OWNER reserves right to fix up priorities which will be conveyed by Engineer-in-CCONTRACTOR shall plan and execute work accordingly.

Existing Service

Drains, pipes, cables, overhead wires and similar services encountered in course of the works shall be guardedfrom injury by the CONTRACTOR at his own cost, so that they may continue in full and uninterrupted use tothe satisfaction of the Owners thereof, or otherwise occupy any part of the SITE in a manner likely to hinderthe operation of such services.

Should any damage be done by the CONTRACTOR to any mains, pipes, cables or lines (whether above orbelow ground etc.), whether or not shown on the drawings the CONTRACTOR must make good or bear thecost of making good the same without delay to the satisfaction of the Engineer-in-Charge.

17.0 DOCUMENTATION

17.1 Drawings and design documents

17.1.1 The following documents shall be submitted along with the offer:

a) Filled up data sheets & Checklists
b) HSE Policy
c) QAP
d) Bar Charts & Project completionschedule
e) Bidder's Compliance Report (Annexure-AA)
f) Un-priced List of two years operation and maintenancespare

17.1.2 The following drawings (in three sets) & documents shall be submitted for approval within 3 weeks

ofaward of contract.

a) Various Procedures of CP system Installation Like- Soil survey (TCP), Thermit weld, Pin Brazing, Sacrificial anode (Zn/Mg/Ribbon) installations, Test stations & Junction Boxes installation, Cable laying, Installation of polarization cell, External ER probe, Surgediverter & grounding cell, connection & sealing of sacrificial anode, Earthing of above ground pipeline etc.

b) Soil survey report with marked location vulnerable area, corrosion severity & other details with respect to chemical & microbionalanalysis.

c) QA & QC Procedures.

d) Basis of system design and design calculations, equipment selection criteria and sizing calculations, formulae used

e) Detailed design calculations of TCP system (Complete DesignPackage).

f) Equipment layout, Cable layout & schedule.

g) Colour code identification for the various CP System cables used in thesystem

h) Procedure for field testing, pre-commissioning & commissioning of TCP.

i) Procedure for Monitoring & maintenance of CPsystem.

j) Equipment layout, Cable layout & schedule.

k) Post commissioning survey procedures.

l) TLP's & junction boxes installation & erection detailsdrawings.

m) Incorporation of Polarisation cell, surge arrester, TLP, Junction boxes & other relevant feature in CP system design in Alignment sheet, pipeline route diagram & Plot plan.

n) Schematic

o) Tentative Bill of Material

17.1.3 After the job completion, contractor shall prepare AS-BUILT drawings/data sheets and documents, submit catalogues/manuals (O&M) of major brought out items. Final certified as builtdrawings, documents and manuals etc shall be submitted by the contractor to owner in bound volumewith one set in soft copy (CD) plus five sets of prints to owner & one set to REPL..

Other drawings and documents shall be submitted by Drawings/Datasheets- contractor along with AS-BUILT

a) Test documents & drawings for bought out items.

b) Detailed commissioning report of pi eline CP system(TCP).

18.0 MAKE OF MATERIAL/BOUGHT OUT ITEMS

An Appendix-I of approved vendors for various major items is enclosed with this tender

specification. The bidder shall consider such names only as indicated in the aforesaid list and clearly indicate in the bid the name(s) as selected against these items. For any other item not

covered in the list enclosed with this tender document, prior approval shall be obtained by the contractor for itsmake/ supplier's name.

19.0 INSPECTION OF SUPPLY ITEMS

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner/ Consultant in writing at least 10 days in advance of thedate of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ Consultant. All costs towards testing etc. shall be borne by the contractor within their quoted rates. All inspection

of various items shall be carried out based on Quality Assurance Plan, which will be submitted by the Contractor and duly approved by Owner/ Consultant.

20.0 ESCALATION

The Rates quoted shall be kept firm till completion of work and no price Escalation shall be paid.

21.0 DOCUMENTS TO BE SUBMITTED/ PRODUCED ALONGWITH R.A. BILLS

a) Computerized R.A. Bill/ Manual Bill, with IT No./ ST No./ Labour License No. printedthereon.
b) ESI/ EPF clearance certificates for the last month alongwith R.A. Bills.
c) Insurance Policy as per relevant clauses of ContractAgreement.
d) Attendance Register and Salary Records.
e) Photocopy of the measurement book to be attached with R.A.Bills.
f) Any other document required for the purpose ofprocessing the bills.
g) Registration Certificate with Sales tax authorities of state concerned.

-x-x-x-

1.0 APPENDIX-I (LIST OF SUPPLIER/S OF MAJOR BOUGHT OUTITEMS)

1) CABLES

i) Brooks Cables
ii) Nicco Corporation Ltd
iii) CMI Ltd
iv) Delton Cables Ltd
v) KEI Industries
vi) Torrent Cables
vii) Universal cables
viii) Victor Cables
ix) Associated Flexible & Wires Pvt Ltd
x) Asain Cables (RPG Cables)
xi) Fort Gloster (Gloster Cables Ltd)
xii) Finolex Cable
xiii) Rediant Cables
xiv) NETCO Cables Pvt Ltd

2) JUNCTION BOX (FLP Type)

i) Exprotecta, Beroda
ii) Baliga
iii) Flexpro
iv) FFLP Control Gears
v) Sterling
vi) Sudhir

3) SACRIICIAL ANODES

i) M/s Scientific Metals Engineers Pvt. Ltd., Karaikudi
ii) M/s PSL Holding Pvt. Ltd., Mumbai
iii) M/s BHEL, Bhopal

iv) M/s Nippon Corrosion, Japan

v) M/s AFIC, KSA

vi) M/s Platt Bros. and Company, USA

vii) M/s YUXI, CHINA

viii) M/s Wilson Walton International

ix) M/s XIANG METAL, CHINA

x) M/s SHUNRUI, CHINA

xi) M/s Impalloy International

xii) M/s Corrpro International

xiii) M/s HOCKWAY, UK

xiv) M/s NAKABOHTEC, Japan

4)	Portable Reference Cell	:	M/s MC Miller (USA) or Equivalent
5)	Permanent Reference Cell	:	M/s Borin Manufacturer USA, M/s MC Miller USA
6)	AC operated Automatic Transformer	:	M/s Canara Electric (M/s Raychem RPG Ltd), M/sKriston systems
	Rectifier Unit/DC operatedAutomatic CPPSM Unit	:	M/s Erico, USA, M/s Cad Weld
		:	M/s Safe Track, M/s BAC UK
7)	Thermit WeldPin Brazing	:	M/s Dhen, M/s OBO, M/s Corrpro system, M/s Sohne
		:	MOTWANE, Rishabh, Fluke or Equivalent
8)	Surge diverter (Ex-d)		
9)	Digital Multimeter		
10)	CTSU	:	M/s Kriston systems or equivalent
11)	Solid state polaristation cell	:	M/s Dairyland, M/s Corrpro systems
12)	Anode (MMO Type)	:	

13)	Backup Agency for doingCIPL / interference survey	:	PLF Germany, Vendor Velde, Nippon Japan,Balslev Denmark, SSS Germany
14)	Anode Backfill Material :		1) M/S Goa Carbon (Goa) 2) M/S India Carbon (Calcutta), 3) M/S Petrocarbon & Chemical Company (Haldia)
15)	Heat Shrink Cap for AnodeTo Cable Joint	:	M/s RAYCHEM, M/s MATCOR (USA)
16)	MCCB/MCB for PowerDistribution Board	:	Siemens, Indo Asian, L&T, Hager, Merlin Gerin Schneider Electric, AEG, HAVELL'S, ABB, MDS
17)	ER- PROBE (External Corrosion USA M/sMonitoring)	:	M/s Rose Corrosion Services UK, M/s Metal Samples, Roharbak Cosasco, USA M/s Caproco, UK
17)	ER- PROBE & Corrosion Coupon USAAssembly	:	M/s Rose Corrosion Services UK, M/s Metal Samples, M/s Roharbak Cosasco, USA, M/s Caproco, UK
18)	Proposed CP Contractor	:	M/s CCS (B) Pvt ltd, M/s Raychem RPG Pvt ltd, M/s Consultech,

Sabarmati Gas	**LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK**	Resonance Energy
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		

Baroda, M/s UNDTS, Noida, M/s SARK EPC Pvt Ltd

Note-For any other brought out item(s) for which the vendor list is not provided in the tender , bidders can supply those item(s) from vendors/ suppliers who have earlier supplied similar item(s) for the intended services in earlier Oil and Gas projects and the item(s) offered is in their regular manufacturing/ supply range.

1) The vendor / supplier should not be in the Holiday list of SGL/ REPL / other PSU

2) The bidder is not required to enclose documentary evidences (PO copies, Inspection Certificate etc.) along with their offer, however in case of successful bidder, these documents shall required to be submitted by them within 30 days from date of Placement of Order for approval to SGL/ REPL.

	LAYING AND CONSTRUCTION OF 8'' NB UNDERGROUND STEEL PIPELINE AND ASSOCIATED WORK	
TENDER DOCUMENT NO REPL/SGL/STPL/009/22		

Appendix-II

2 Years Operational & Maintenance Spares for Temporary Cathodic protection system (1 Lot)

Sl. No.	Description	Unit	Total Qty.
1	Multimeter- Fluke 87V Digital Multimeter	Nos.	1
2	Clamp Meter (AC&DC)-Fluke	Nos.	1
3	Portable Cu/CuSO4 Reference Cell –Mc-Miller/Tinkar Razor	Nos.	2
4	UT (Ultrasonic Thickness Tester) Meter –Olympus model 27MG or equivalent	Nos.	1
5	Tool Box-Taparia Make (Consisting of Screw Driver Set, Electrical screw driver set, Adjustable Spanner 12‖, Flat File 12‖, Round File 12‖, Plyer, Chiesel, Hexa Frame, Hexa Blade, Hammer, Nose Plyer, E Spanner set 6-32, Ring spanner set 6-32‖, Allen key set etc.)	Set	1
6	Calibrated reference cell to calibrate portable half reference cell	Nos.	1

Annexure-A

Format for Daily Progress report

DAILY PROGRESS REPORT – TCP SYSTEM							
CLIENT:				**DPR NO.**			
CONSULTANT:		**REPL Limited**		**PROGRESS DATE:**			
CONTRACTOR:				**REPORT DATE:**			
PROJECT:				**PLACE:**			
S.No.	**ACTIVITY**	**UOM**	**SCOPE**	**PROGRESS PROGRESS (Spreads A, B……)**			**Remarks**
				PREVIO S	**TODAY**	**CUMULATIVE**	
1	**Soil Resistivity & Chemical Analysis**						
2	**Additional Data Collection**						
3	**TCP design Document**						
4	**P/ LENGTH**	**KM**					
5	**P/ LOWERED**	**KM**					
6	**TCP PROVIDED**	**KM**					
7	**PSP LEVEL**	**(-V)**					
S.No.	**Material Work Description**						
1	**Test station**	**Nos.**					
2	**Mg anode**	**Nos.**					
3	**Zn anode**	**Nos.**					
4	**Zn Ribbon Anode**	**Mtr.**					
5	**No. of Thermit**	**Nos.**					
5(a)	**No. of Pin Brazing**	**Nos.**					

5	**Surge Diverte**	**Nos.**					
6	**ER Probe**	**Nos.**					
7	**Polarisatio nCoupon**	**Nos.**					
8	**Polarisation Cell**	**Nos.**					
9	**Cased crossings**	**Loc**					
10	**TCP Cables**						
10(a)	**1Cx6 mm^2 Armoure d**	**Mtr.**					
10(b)	**1Cx6 mm^2 Un-Armoured**	**Mtr.**					
10(c)	**1Cx10 mm^2**	**Mtr.**					
10(d)	**1CX25 mm^2**	**Mtr.**					

Annexure -B

Format for TCP system Commissioning

Sr. No	TS No	Chainage	TS Type	Natural PSP	Instant PSP	Polarised PSP (24 Hrs.)	Anode Voltage(V)	Anode Current(mA)	AC Voltage(V)	Other Readings(If Any)	Remarks

Format for Monthly Monitoring Report of TCP system

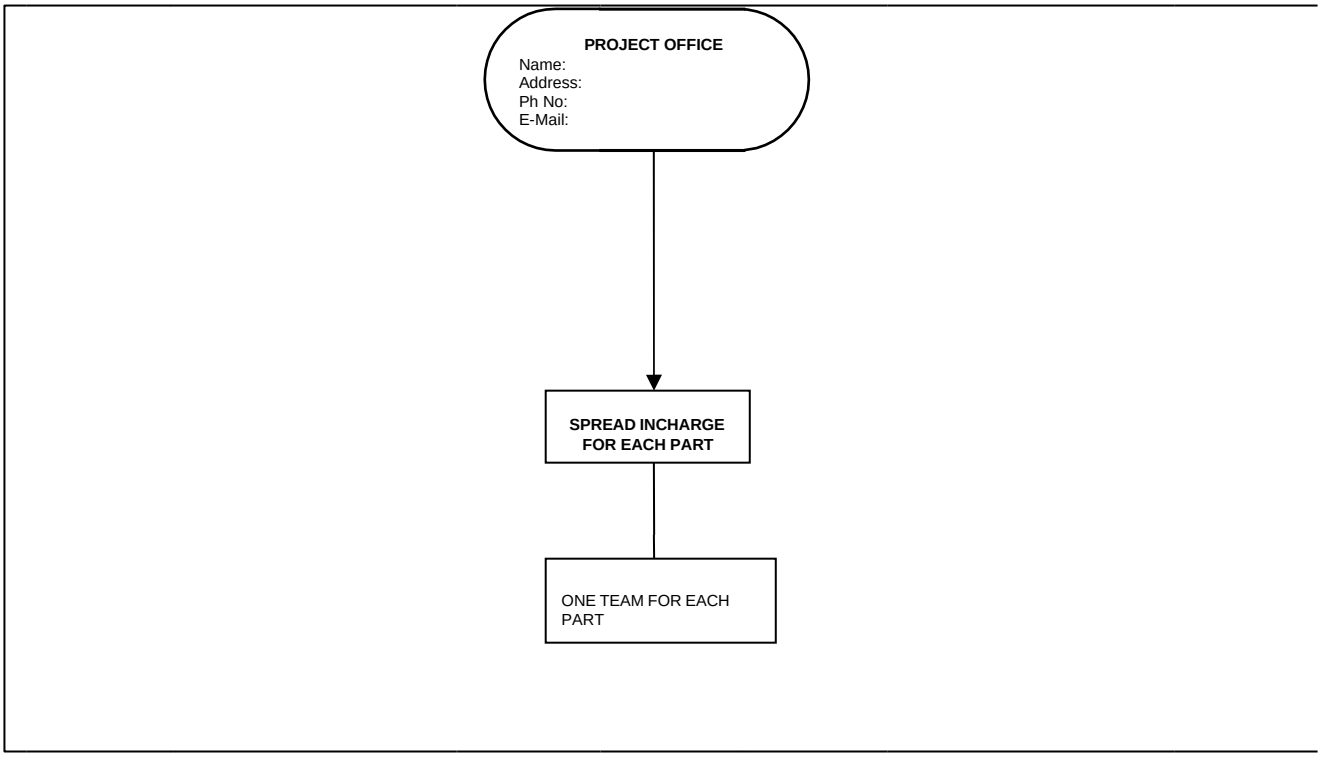
Sr. No	TS No	Chainage	TS Type	PSP (-) Voltage			Anode Voltage(V)	Anode Current (mA)	AC Voltage (mV)	Coupons Reading (ON & OFF)	Coupon AC discharge current AC (mA)	Other Readings (If Any)	Remarks
				Carrier		Casing							
				Without Bonding	Bonding								

Format for Natural PSP reading

Sr. No	TS No	Chainage	TS Type	PSP (-) Voltage		Anode Voltage OCV (V)	AC Voltage (mV)	Coupons Reading (ON & OFF)	Coupon AC discharge current (mA)	Other Readings (If Any)	Remarks
				Carrier	Casing						

Annexure-C

Organogram for the TCP work (Part-A/ Part-B/Part-C)



Note-

1. Spread Incharge should have B.E. or Diploma in (Electrical, Electronics and Metallurgical Engineering) & atleast 3 year Experience in the Cathodic Protection Field and shall be available at site office for entire time schedule of the project.

2. CVs including Experience & Qualification shall be submitted by successful bidder.

Annexure-AA

Compliance to Technical Bid (CP System)

Sl No.	Tender Clause No.	Description	Documents Required for Qualification (Technical Part of Bid)/ Bidder"s Compliance/Bidder"s Confirmation	Submitted in E- Bid (Bidder to Indicate Yes/No)	Reference In E-Bid Document (Bidder to indicate Place, Page No. /Vol No. In the Bid)
1	-	Technical Compliance to the complete scope of work	Bidder shall furnish –No Deviation Certificate‖. Deviation if any, due to of change/amendment/revision in design code (vendor specific) shall not be considered at this stage and subjected to review/approval of Client/REPL. (For the acceptance of the deviation in the design code suitable justification is required during detail engineering).		
2	-	Confirm No Deviation in Technical Bid.	Confirm (Offer may be rejected if there is any deviation).		
3	Annexure	Confirm No Deviation.	Confirm (Offer may be rejected if there is any deviation).		
4	Installation, Commissioning & Start-Up spares	All the spares required for Installation, Commissioning & Start- Up of the CP system shall be included in the scope of the bidder, any spares required permanently for the Installation, Commissioning & Start- Up of the CP system the same shall be supplied free of cost.	Confirm.		

5	16.1.1	All the required documents are enclosed with the bid document as per the clause.	Confirm.		
6	Tentative BOQ/BOM	Tentati e BOQ/BOM shall be prepared by bidder and shall be reviewed & approved by REPL during the detail engineering stage. As this is a Lump-Sump contract for any change in quantity mentioned in the scope of work the bidder‘s compensation for these changed quantities shall remain unchanged.	Confirm.		

-X-X-X-

	CONTRACTOR		**QUALITY ASSURANCE PLAN** **FOR** ELECTRICAL EQUIPMENT	CLIENT: PROJECT:	**CNG & City Gas Distributionin SGL**
	ORDER NO. & DATE			PACKAGE NO.	**U999**
	SUB-CONTRACTOR			PACKAGE NAME	**TCP**
	ORDER NO. & DATE				

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in tonnes (T) must be indicated under column 5 for each item.
   Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR

MFR : MANUFACTURER

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS:

Code Description Code Description Code Description DOCUMENTS:

1. Visual 12. Routine test as per relevant IS 23. Short time rating D1. Approved GA drawings
2. Dimensional other standard 24. Operational & functional D2. Approved single line/
3. Fitment & Alignment 13. Type test as perrelevant IS/ check schematic diagram
4. Physical Test (Sample) other standard 25. Over Speed Test D3. Approved
5. Chemical Test (Sample)
   (Review of test report only) 14. Impulse Test 26. Flame Proof Test data sheet
6. Ultrasonic Test 15. Partial Discharge Test 27. Clearance and creepage D4. Approved bill of materials
7. Magnetic Particle Test (MPT) 16. Heat runrisc test\tempr. Distance D5. Unpriced P.O. copy
8. Radiography Test 17. Enclosure Protection Test 28. Acceptance Test D6. Calibration Certificate
9. Dye Penetration Test 18. Calibration 29. Material test of all measuring instruments and gauges

10. Measurement of IR Value (MMO Anode), Resistivity (MMO bought out Zn & Zn Ribbon a) Before HV Test Anode) & comsumption rate (For Mg, b) After HV Test review of Test report) 19. Noise & Vibration components 20. Test certificates for Anode only 30. Coating Thickness

11. High Voltage test/Dielectric Contact Resistance anode to cable Joint test 21. Tank Pressure Test / Pressure Test 31. 32. Destructive testing

22. Paint shadeverification & Connection Scheme check, Name plate and terminal check 33. Test Station Thichness check

34. Chemical Composition & Open Circuit Potential (For Zn Ribbon Anode, Review of Test report only)

	EQUIPMENT & DETAILS						**INSPECTION & TEST**								
Sl. No.	Description (With equipment heading, place of use, and Breif Specifications)	Identification No.	Quantity		Manufacture's Name and Address	Expected schedule of Final Inspection	Raw Material and in process inspection			Final Inspection/Test by			Test Certificates & documents to be submitted to REPL	Acceptance Criteria Standards /IS/ BS/ASME/ Norms and Documents	REMARKS / SAMPLING PLAN
			No/ M	T			MFR	CONTR	REPL/ TPI	MFR	CONTR	REPL/ TPI			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	**CP Cables (1Cx6Sqmm, 1Cx10 Sqmm, 1Cx25Sqmm & 1Cx35Sqmm)**		**Meters**				**1,2,28**	**-**	**-**	**1,2,28**	**1,2, 28**	**1,2, 28**	**D1, D2, D3, D4, D5, D6, 20, 13**	**I.S., Approved Data Sheet & Specifications**	
2.	**Test Stations**		**Nos**				**1,2,3**	**-**	**-**	**1,2,3,**	**1,2,**	**1,2,**	**D1, D2,**	**I.S., Approv**	

	(Big & Small Type)		**.**				**,4,22, 29**			**4, 22,33**	**3,4, 22,33**	**3,4, 22, 33**	**D3, D4, D5, D6, 20, 13**	**ed Data Sheet & Specifications**	
3.	**Sacrificial Mg & Zn Anodes**		**Nos.**				**1,2,5**	**-**	**-**	**1,2,4, 5, 30, 32***	**1,2,4, 5, 30, 32***	**1,2,4, 5, 30, 32***	**D1, D2, D3, D4, D5, D6, 20, 13**	**I.S., Approved Data Sheet & Specifications**	*** on 1% of total nos. of anodes**

4.	**Spark Gap Arrestor (100 kA)**		**Nos.**				**-**	**-**	**-**	**-**	**-**	**-**	**Manufacturer test certificates & Compliance Report**	**Approved Data Sheet & Specifications**	
5.	**Polarisation Cell (Solid State)**		**Nos.**				**-**	**-**	**-**	**-**	**-**	**-**	**Manufacturer test certificates & Compliance Report**	**Approved Data Sheet & Specifications**	
6.	**Polarisation Coupon (External)**		**Set**				**-**	**-**	**-**	**-**	**-**	**-**	**Manufacturer test certificates & Compliance Report**	**Approved Data Sheet & Specifications**	***on one no. of each type**
7.	**Permanent Reference Cell**		**Nos.**				**-**	**-**	**-**	**-**	**-**	**-**	**Manufacturer test certificates & Compliance Report**	**Approved Data Sheet & Specifications**	
8	**Zinc Ribbon Anode**		**Mtr**				**-**	**-**	**-**	**-**	**-**	**-**	**Manufacturer test certificates &**	**Approved Data Sheet & Specifi**	

													Compliance Report	**cations**	

For REPL (Stamp & Signature)	for CONTRACTOR SUB-CONTRACTOR (Stamp & Signature)	**Q.A.P. NO. REPL/05/E9/U999/ QAP/082**	REV. **0**
		SHEET 2 OF 2	

SECTION – VI

SCHEDULE OF RATES

(Excel sheets attached Separately)