AAVANTIKA GAS LIMITED

(A JOINT VENTURE COMPANY OF GAIL & HPCL)

CITY GAS DISTRIBUTION PROJECT IN
INDORE, UJJAIN, PITHAMPUR & GWALIOR

STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS AT CITY GATE STATION PITHAMPUR

Tender No.: AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

DOMESTIC COMPETITIVE BIDDING

ISSUE DATE: 05.12.2025

Date & Time for submission duration of Technical Bid & Price Bid at AGL Head Office (HO):

Important Dates

Offline Pre-Bid Clarification Duration	06/12/2025 to 23/12/2025
Physical Pre-Bid Meeting at AGL HO	13/12/2025 @ 11:00 Hrs.
Last Date & Time of Submission of Tender	30/12/2025 up to 16.00 Hrs.
Date & Time of Opening of Un-Priced (Technical) Bid	30/12/2025 up to 16.30 Hrs.

Bidder Seal & Sign:

COVERING LETTER FORMAT IN BIDDER's LETTERHEAD

Bidder Ref No.

Date:

To,
Contracts and Procurement Dept.
Aavantika Gas Limited
Second Floor 202-B, NRK Business
Park, Vijay Nagar Square, AB Road,
Indore-452010
Tel- +91 (731) 4222520

Tender No. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

Subject: Letter of Bid Submission against Tender No. **AGL/0514/MANUAL TENDER/STATION PIPING/10-2025** for station piping, hookup and associated connectivity works.

Dear Sir,

With reference to above mentioned subject, please find enclosed herewith our Bid on behalf of "**BIDDER's COMPANY NAME**", along with Tender documents and below enclosures as required for the Bid;

1. (Document Name e.g. EMD details, Bidder's General Information) 2. ….
3. ….
4. ….
5. ….
6. ….
7. ….

Thanks, and Regards,

Submitted By: - "BIDDERS COMPANY NAME"
Authorized Person: -
Designation: -

Authorized Signatory

CITY GAS DISTRIBUTION PROJECT
STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY
WORKSTENDER NO. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

Sr. No.	Section	Particulars
1.	Section – I	Invitation for Bid (IFB)
2.	Section – II	Instructions to Bidders (ITB)
3.	Section – III	Technical Specification & Scope of Work
4.	Section – IV	Payment Terms & Special Conditions
5.	SECTION – V	General Condition of Contract - Goods (GCC-Works)
6.	SECTION – VI	Forms and Format
7.	SECTION – VII	Schedule of Rates (SOR)

CONTACT PERSON at Aavantika Gas Limited:

1) Mr. Varender Sharma, Ch Mngr: Mobile – 98889 25792 / Email: varender.sharma@aglonline.net
2) Mr. Himanshu Shrivastava, Mngr, Mobile – 9131099726 / Email: himanshu.s@aglonline.net
3) Mr. Anurag Singh, Engineer: Mobile – 86006 90470 / Email: anurag@aglonline.net
4) cp@aglonline.net 0731-4222520

SECTION – I

INVITATION FOR BIDS (IFB)

CITY GAS DISTRIBUTION PROJECT
STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY
WORKSTENDER NO. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

Aavantika Gas limited (AGL) (hereinafter referred as Owner), is supplying Piped Natural Gas (PNG) to domestic, commercial and Industrial consumers and Compressed Natural Gas (CNG) to automobiles in Indore, Ujjain and Gwalior cities of Madhya Pradesh. AGL invites sealed bids under single stage two bid system from eligible bidders for station piping, hookup and associated connectivity works at Pithampur City Gate Station (CGS).

The detailed scope of work includes in general, Procurement, fabrication, erection, installation, inspection, testing, pre-commissioning, commissioning and performance testing along with all associated works pertaining to complete premises, totally conforming to the Technical Specifications, Drawings, Data sheets and other information provided in this document.

1.0	**PROJECT**	**: CITY GAS DISTRIBUTION PROJECT FOR INDORE, UJJAIN, PITHAMPUR & GWALIOR**
2.0	**ITEM & QUANTITY REQUIRED**	**: MENTIONED IN SCHEDULE OF RATES (SOR)**
3.0	**SCOPE OF WORK**	**: STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS AT CITY GATE STATION PITHAMPUR**
4.0	**CONTRACT PERIOD**	**: SIX (06) MONTHS FROM THE DATE OF AWARD OF ORDER**
5.0	**BID VALIDITY**	**: 03 MONTHS FROM BID DUE DATE.**
6.0	**BID SECURITY / EMD**	: Rs. 44,000/- in form of DD or Bank guarantee.

The bid security shall be in the form of Demand Draft or Bank Guarantee in favor of Aavantika Gas Limited, Indore (India), valid for 2 months in excess of bid validity period i.e. for 05 months in the prescribed format (Form F-4) of the bid document.

Bidders registered with NSIC/MSME under its single point registration scheme are exempted from furnishing Bid Security. Submission of Bid Security/EMD is exempted only when bidder is relevantly registered under NSIC / MSME scheme.
NSIC / MSME certificate (updated & valid as on due date of submission to be submitted) shall be duly attested by CHARTERED ACCOUNTANT (CA) AND NOTARY PUBLIC WITH LEGIBLE STAMP.

Bank details for BG/LC (SFMS) receiving through SFMS:
Bank Name: ICICI Bank Limited
Bank IFSC: ICIC0000041
Bank A/c No.: 004105013583
Bank Address: ICICI BANK LTD, MALAV PARISAR,4 CHOTI KHAJRANI, A.B. ROAD.INDORE 452008 (M.P), INDORE

7.0 BID DOCUMENT FEE (NON-REFUNDABLE & NON-TRANSFERABLE): Nil.

8.0 BID ISSUE DATE : 05.12.2025

9.0 PRE BID MEETING : 13.12.2025 at 11:00 Hrs. at AGL Office, Indore

10.0 BID DUE DATE & TIME : 30.12.2025 up to 16:00 Hrs. at AGL Office, Indore

11.0 UN PRICED BID OPENING : 30.12.2025 at 16:30 Hrs. at AGL Office, Indore

12.0 PRICED BID OPENING : Will be informed later

13.0 **VALIDITY OF OFFER:** The offer should remain valid for 3 months from the bid due date / extended due date of tender.

14.0 The Bid Document calls for offers on single point "Sole Bidder" basis. Bidders are advised not to submit offers in "Consortium" or "Joint Bid". Joint bid referred herein is an offer, which seeks order to be placed on more than one party / co-bidder.

15.0 The prices once quoted shall not be changed whether resulting or arising out of any subsequent technical / commercial clarifications sought regarding the bid and even if any deviation or exclusion may be specifically stated in the bid.

16.0 Bidder is advised to quote strictly as per scope & terms and conditions of bid document and not to stipulate any deviation / exceptions.

17.0 Purchaser reserves the right to accept or reject any or all bids received at its absolute discretion without assigning any reason, whatsoever.

18.0 Bid document is non-transferable. Bids received from bidders in whose name Bid Document has been issued shall only be considered. Bidder must submit the Bid Document Fee in their name. Bid Document Fee will be submitted by Bidders as per Clause 7.0 above.

19.0 Bidder shall ensure that Bid Security having a validity of 2 months beyond the offer validity, i.e. validity of 5 months from the bid due date, must accompany the offer in the format made available in the Bid Document. Offer, if unaccompanied with Bid Security, shall be rejected.

20.0 Bids complete in all respects should reach on or before the BID DUE DATE AND TIME. Fax //Telegraphic/ E-Mail bids shall be rejected.

21.0 AGL shall not be responsible for cost incurred in preparation and delivery of bids.

22.0 This is **ZERO DEVIATION** bid document. The bids shall be evaluated as received without any Reference to the bidder. The Bids not meeting the Technical of this Tender Document will be rejected.

23.0 AGL reserves the right to reject any or all the bids received at its discretion without assigning any reason whatsoever.

24.0 **TECHNICAL BID EVALUATION CRITERIA:**

The bidder should have executed work having minimum value of Rs. 11 Lakhs in a single order/contract related to Carbon Steel piping/pipeline and associated connectivity work as a Main Contractor for any CGD / Natural Gas Pipeline Company in India within five years reckoned from bid due date.

25.0 **SUPPORTING DOCUMENTS & SPECIAL CONDITIONS:**

a) Bidder has to submit a copy of Order of Award along with corresponding Work Execution Certificate duly issued by the Client.
b) The Completion (Full/Partial/Provisional) Certificate should have cross reference with the order of award indicating Executed Value (INR).

Note : Failing to submit requisite documents against raised queries within the stipulated time frame, AGL reserves the right to reject the bid without making any reference to the Bidder.

26 FINANCIAL BID EVALUATION CRITERIA:

- **Turnover**
  The contractor should have achieved a minimum turnover of Rs. 11 lakhs in any one of the last 3 (three) audited financial years
- **Working Capital**
  The contractor should have achieved a minimum working capital of Rs. 2 Lakhs in any of the last audited balance sheets
- **Net Worth**
  Net worth must be positive as per last audited financial statement.

  Contractors must submit copy of financial statements including Balance Sheet and Profit & Loss account statement certified by Chartered Accountant for last three audited financial years in support of the above.

- **Declaration Letter/Certificate for line of credit (If the bidder's working capital is inadequate)**
  i) Declaration Letter/Certificate for line of credit due to short fall of working capital shall be from single bank only. Letters from multiple banks shall not be applicable. However, banking syndicate will also be acceptable wherein a group of banks can jointly provide line of credit to the bidder.
  ii) The bank shall be required to issue the letter from declaration/certificate of line of credit on their letter head along with the contact details of the issuing authority like email id, contact number etc. The Format for certificate from Bank for Line of Credit is attached in Tender Document.

In absence of requisite documents, AGL reserves the right to reject the bid without making any reference to bidders.

27.0 EVALUATION AND COMPARISON OF BIDS:

(i) Evaluation shall be done on overall lowest cost basic to the Purchaser considering Input Tax Credit, if any.

(ii) If quoted amount of two or more L-1 ranked bidders are same, then contract will be awarded to that L-1 bidder whose Turnover as per Last Audited Balance Sheet will be higher.

(iii) In case it is observed that a bidder has not quoted for any item in the Schedule of Rates, for the purpose of evaluation the maximum rate quoted by the other qualified bidders for such items shall be considered. If after evaluation, such bidder is found to be the lowest evaluated bidder, the rate for the missing item, the minimum rate quoted by the other qualified bidders for such item shall be considered for award and an overall discount shall be obtained from the bidder so as to maintain his total quoted amount unchanged. In case bidder does not agree to offer discount to maintain his originally evaluated overall price then the bid is liable for rejection.

28. Bidder has to submit all the documents required in the tender with serial number starting from the Covering Letter itself. An index also to be provided displaying the details of the documents submitted and the respective serial number also. Also, the Bids should be properly spiral binded.

- **Bidder has to submit seal and sign copy of Tender document printed both sides on paper.**
- **AGL reserve the right to verify the qualification documents submitted by bidder for fulfil the BEC criteria.**
- **Job(s) executed for bidder's own concern/company will not be considered for bidder's qualification**

Annexure -1 to IFB

CUT-OUT SLIPS

(ENCLOSED CUTOUT SLIP TO BE PASTED ON ENVELOPES OF THE OFFER)

CITY GAS DISTRIBUTION PROJECT
STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS
TENDER NO. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

CUT-OUT SLIP

(Outer Envelope / UN Priced BID / EMD/)

DO NOT OPEN - THIS IS A QUOTATION

CLIENT	: AAVANTIKA GAS LIMITED, INDORE
PROJECT	: CITY GAS DISTRIBUTION PROJECT
BID DOCUMENT NO.	: **AGL/0514/MANUAL TENDER/STATION PIPING/10-2025**
WORK	: STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS
DUE DATE & TIME	: To, C&P Department Aavantika Gas Limited, Second Floor 202-B, NRK Business Park, Vijay Nagar Square, AB Road, Indore-452010 Telephone: +91 (731) 4222520

FROM

NAME:

ADDRESS:

(To be pasted on the Outer and other envelopes containing Technical and Un Priced bids along with “BID SECURITY/EMD”)

CITY GAS DISTRIBUTION PROJECT
STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS
TENDER NO. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

CUT-OUT SLIP
(PRICED BID)

DO NOT OPEN - THIS IS A QUOTATION

CLIENT	: AAVANTIKA GAS LIMITED, INDORE
PROJECT	: CITY GAS DISTRIBUTION PROJECT
BID DOCUMENT NO.	: **AGL/0514/MANUAL TENDER/STATION PIPING/10-2025**
WORK	: STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS
DUE DATE & TIME	: To, C&P Department Aavantika Gas Limited, Second Floor 202-B, NRK Business Park, Vijay Nagar Square, AB Road, Indore-452010 Telephone: +91 (731) 4222520

FROM

NAME:

ADDRESS:

(To be pasted on the Outer and other envelopes containing Priced bid)

SECTION - II

INSTRUCTIONS TO BIDDERS

A. INTRODUCTION

1 SCOPE

1.1 The Purchaser invites sealed bids for the entire work as specified in the Bid documents.

1.2 The Bid document specifies the contractor scope of work, terms & conditions.

1.3 All terms, conditions and specifications of the Bid document shall be construed as applicable in general, unless specifically indicated to the contrary.

1.4 Bidders shall quote in the manner as specified in the Bid document. Purchaser reserves the right to evaluate and accept bids at their sole discretion. The provisions of this clause shall supersede any contrary provisions expressly stated or implied anywhere else in the Bid document.

2 ELIGIBILITY OF BIDDERS.

2.1 Bidders shall as part of their bid, submit a written Power of Attorney/Authorization letter authorizing the signatory of the bid to bind the bidder.

2.2 Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consultancy services for the preparation of the design, specifications, and other documents to be used for carrying out similar Works under this Invitation for Bids.

2.3 The Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Purchaser in accordance with ITB.

3 ONE BID PER BIDDER

3.1 A bidder shall submit only one bid in the same bidding process. A bidder who submits or participates in more than one bid will be disqualified.

3.2 Alternative bids are not acceptable.

4 COST OF BIDDING

4.1 The bidder shall bear all costs incurred & associated with the preparation and submission of the bid, and Purchaser will in no case be responsible or liable for this cost, regardless of the conduct or outcome of the bidding process.

5 NON-TRANSFERABILITY OF THE BID DOCUMENTS

5.1 Bid Documents are non-transferable. The party to whom the Bid documents are issued may only furnish the bid. The bid received from any party other than to whom the Bid documents are issued shall be rejected immaterial of fact of any relationship between party to whom Bid documents are issued and party, who furnished the bid.

6 SITE VISIT (If Applicable)

6.1 The bidder is advised to visit and examine the site of works and its surroundings and obtain for himself on his own responsibility, all information that may be necessary for preparing of the bid and entering into contract. The cost of visiting the site shall be at bidder's own expenses.

6.2 The bidder or any of its personnel or agents will be granted permission by the Purchaser to enter upon its premises and land for the purpose of such visits, but only upon the Express condition that the bidder, its personnel, and agents will release and indemnify the Purchaser and its personnel and agents from and against all liabilities in respect thereof, and will be responsible for death or personal injury, loss of or damage to

property, and any loss, damage, costs, and expenses incurred as a result of the inspection.

B. BID DOCUMENTS

7 CONTENTS OF BID DOCUMENTS

7.1 The Bid Documents are those stated below and should be read in conjunction with any corrigendum issued in accordance with clause 9.2 of Instruction To Bidder (ITB):

7.1.1 Invitation For Bid (IFB)

7.1.2 Instruction To Bidder (ITB)

7.1.3 Technical Specification & Drawing

7.1.4 Payment Terms

7.1.5 General Conditions of Contract

7.1.6 Agreed Terms and Conditions

7.1.7 Schedule of Rates (SOR)

7.1.8 Packaging and Marking

7.1.9 Forms & Formats

7.2 The bidder is expected to examine all instructions, forms, terms, specifications and drawings in the bid documents. The Bid Documents together with all its attachment thereto, shall be considered to be read understood and accepted by the bidder. Failure to furnish all information required by the Bid documents or submission of a bid not substantially responsive to the Bid documents in every respect will be at bidder's risk and may result in the rejection of the Bid.

8 CLARIFICATION ON BID DOCUMENTS

8.1 A prospective bidder requiring any clarification of the Bid Documents may notify Purchaser in writing or by fax at the address mentioned in the Invitation for Bid (IFB). Purchaser will respond in writing to any request for clarification of the Bid documents which it receives after issue of bid documents. Written copies of Purchaser's response (including an explanation of the query, if required, but without identifying the source of the query) will be sent to all prospective bidders who have received the Bid documents.

9 AMENDMENT OF BID DOCUMENTS

9.1 At any time prior to the bid due date, Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the Bid documents, by issuing corrigendum.

9.2 Any corrigendum thus issued shall be part of the Bid documents pursuant to ITB Clause-17 and shall be notified in writing by fax / post to all prospective bidders, who have received the Bid documents.

9.3 The Purchaser may, at its discretion, extend the bid due date in order to allow prospective bidders, a reasonable time to furnish their most competitive bid taking into account the amendments issued.

9.4 In order to allow reasonable time to respond to bidders queries, bidders must submit their queries, if any, at least seven (07) days before the bid submission due date. Queries received after this period will not be considered.

C. PREPARATION FO BID DOCUMENT

10 LANGUAGE OF BID

10.1 The bid prepared by the bidder as well as all correspondence/ drawings and documents relating to the bid exchanged by bidder shall be written in English language, provided that any printed literature furnished by the bidder may be written in another language so long as accompanied by an ENGLISH translation, in which case, for the purpose of interpretation of the bid, the ENGLISH translation shall govern.

11 DOCUMENTS COMPRISING THE BID

11.1 The bid prepared by the bidder shall comprise of the following components:

11.1.1 Envelope- I: Super - Scribing Techno-Commercial Un priced - Bid (PART-I).

Envelope - I Un-priced Bid and shall contain the following:

A. Covering letter with bidder's offer number as prescribed in this Tender.

B. Bidder's General Details / information as per format F-1.

C. Bid Security (EMD) as per format F- 4. **(Bids received without EMD shall be rejected)**

D. Copies of various documents as required as per F-2, F-3, F-5, F-8, F-10, F-11, F-12 and F-13.

E. NO Deviation Confirmation as per F– 6 on bidder's letter head.

G. **Copy of Un-Priced SOR marked "QUOTED" against the items quoted.**

H. Documentary evidence established in accordance with ITB that the bidder is eligible to bid and is qualified to perform the contract if its bid is accepted.

I. Addendum / Corrigendum, if any, to the Tender.

J. Power of Attorney/Authorization Letter authorizing the signatory of the bid.

Note:

1. **The bid offer shall consist of the above documents only.**
2. **Document submitted in addition to the above listed documents, shall not be considered as part of bid offer and shall not be taken into consideration for evaluation.**
3. **All pages of the bid offer to be signed and stamped by an authorized representative (as described in bid document) of the bidder.**

11.1.2 Envelope II: Super - scribing "Price Bid – Not to be Opened with Un-Priced Bid".

Envelope – II shall contain original Schedule of Rates duly filled in, in separate sealed envelopes duly signed and stamped on each page. In case of any correction, the bidders shall put his full signature and his stamp.

12 BID PRICES

12.1 The Prices should be quoted in INR only.

12.2 The Bidder shall indicate in the appropriate Price Schedule, the unit prices (where applicable) and total price of the services / works it proposes to execute under the

contract. If quoted in separate typed sheets and any variation in item description, unit or quantity is noticed, the bid is liable to be rejected.

12.3 Prices quoted by the bidder, shall remain firm, fixed and valid until completion of the contract and will not be subjected to any variation, except statutory variation (as specified in Bid document.)

12.4 All corrections and alterations in the entries shall be signed in full by the bidder with date. No erasures or over-writings are permissible.

12.5 Bidder shall quote the all-inclusive prices as per scope of work and SOR, taking into consideration all applicable taxes, duties, overheads, provision of safety gadgets to their personnel, transportation, conveyance, trainings, recruitments, communication charges, cost for providing tools & tackles, equipment's, machineries, minimum spares, etc. and nothing extra shall be payable by the Purchaser.

13 PERIOD OF VALIDITY OF BIDS

13.1 The bid shall remain valid for 3 months from the bid due date. Purchaser may reject a bid which is valid for a shorter period being non-responsive.

13.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Purchaser may request that the bidder extend the period of bid validity for a specified additional period. The requests and the responses thereto shall be made in writing (by fax/ post/ e-mail). A bidder can refuse the request without forfeiture of his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of its bid security for the period of the extension and in accordance with ITB clause 14 in all respects.

14 BID SECURITY

14.1 Pursuant to IFB Clause No. 6, the bidder shall furnish, as part of his bid, bid security in the amount specified in the Invitation for Bids.

14.2 The bid security is required to protect the Purchaser against the risk of bidder's conduct which would warrant the security's forfeiture, pursuant to ITB Clause- 14.7

14.3 The bid security will be in Indian Rupees and shall be in the form of Demand Draft / Banker's Cheque is to be drawn in favor of **Aavantika Gas Ltd,** payable at Indore or in the form of Bank Guarantee as per format F-4 enclosed in the Bid Document.

14.4 Any bid not secured in accordance with ITB Clause 24 and ITB Clause 14.3 may be rejected by the Purchaser as non-responsive.

14.5 Unsuccessful bidder's bid security will be discharged/ returned, as promptly as possible but not later than 30 days after the expiration of the period of bid validity prescribed by the Purchaser, pursuant to ITB Clause-13.

14.6 The successful bidder's bid security will be discharged upon the bidder's accepting the Order, pursuant to ITB Clause-34 and furnishing the Contract Performance Guarantee pursuant to ITB Clause-35.

14.7 The bid security may be forfeited:

14.7.1 If a bidder withdraws his bid during the period of bid validity.

14.7.2 In the case of a successful bidder, if the bidder fails:

i) To accept the Delivery Order in accordance with ITB Clause- 34 or

ii) To furnish Performance Guarantee in accordance with ITB Clause-35
iii) To accept correction of errors pursuant to ITB Clause- 26

14.8 Bid Security must indicate the Bid Document number and the item for which the bidder is quoting. This is essential for proper co-relation at a later date. The Bid Security in the form of Bank Guarantee shall be as per the format provided in the Bid Document.

15 FORMAT AND SIGNING OF BID

15.1 The bidder shall prepare one original of the document comprising the bid as per clause 11 of ITB.

15.2 The bid shall be typed or written in indelible ink and shall be signed by the person or persons duly authorized to sign on behalf of the bidder. The name and position held by each person signing must be typed or printed below the signature. All pages of the bid except any catalogues / literatures shall be signed and sealed by the person or persons signing the bid.

15.3 The bid shall contain no alterations, omissions or additions, unless such corrections are signed & sealed by the person or persons signing the bid.

16 ZERO DEVIATION

16.1 Bidder to note that this is a **Zero Deviation Tender**. AGL will appreciate submission of offer based on the terms and conditions in the enclosed General Conditions of Contract (GCC), Special Conditions of Contract (SCC), Instructions to Bidder (ITB), Scope of work, Technical Specifications etc. to avoid delay in seeking clarifications on technical/commercial aspects of the offer. Bids with any deviation to the bid conditions shall be **liable for rejection.**

D. SUBMISSION OF BIDS

17 SEALING AND MARKING OF BIDS

17.1 Bid shall be submitted in the following manner in separate sealed envelopes duly super scribed as below:

Envelope - I – Techno-commercial / Un-priced bid

Envelope - II- Priced Bid “Not to be Opened with Un-Priced Bid”

17.2 Both envelopes containing EMD/MSME/NSIC & Bid Documents and Price Bids shall further be sealed in one Master (outer) envelope super- scribing Name of Project, Tender Document Number and shall be addressed to the Purchaser at the address given in IFB.

17.3 Each envelop shall indicate name and address of the bidder to enable the bid to be returned unopened, if warranted.

17.4 If the outer envelope is not sealed and marked as above, the Purchaser will assume no responsibility for the misplacement or premature opening of the bid and its consequential rejection. The Purchaser recommends submission of Bids in – person and will assume no responsibility for any delay / damage to the bids received by Post / Courier.

18 DEADLINES FOR SUBMISSION OF BID

18.1 The Bid must be received by Purchaser (AGL) at the address as specified in IFB but not later than the time and date as specified in IFB.

18.2 The Purchaser may, in exceptional circumstances and at its discretion, on giving reasonable notice by fax or any written communication to all prospective bidders who have been issued the bid document extend the deadline for the submission of bids in which case all rights and obligations of the Purchaser and bidders, previously subject to the original deadline will thereafter be subject to deadline as extended.

19 LATE BIDS

19.1 Any bid received by the Purchaser after the deadline for submission of bid pursuant to clause no. 18 of ITB will be declared "Late" and rejected and may be returned unopened to the bidder at the sole discretion of the Purchaser.

20 MODIFICATION AND WITHDRAWAL OF BIDS

20.1 The bidder may modify or withdraw its bid after the bid submission, but, before the due date of submission provided that written notice of the modification, including substitution or withdrawal of the bid, is received by the Purchaser prior to the deadline prescribed for submission of bids.

20.2 The bidder's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with the Bid document, with the outer envelopes additionally marked "modification" or "withdrawal" as appropriate. A withdrawal notice may also be sent by fax/post, but followed by signed confirmation copy, post marked not later than the deadline for submission of bids.

20.3 No bid shall be modified after the deadline for submission of bid.

20.4 No bid shall be allowed to be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the bidder on the bid form. Withdrawal of a bid during this interval shall result in the bidder's forfeiture of its bid security, pursuant to clause 14.7 of ITB.

E. BID OPENING AND EVALUATION

21 BID OPENING

21.1 The Purchaser will open all bids in the presence of Bidders' representatives who choose to attend, at the time, on the date and place (as specified in IFB)**.** The Bidders' representatives, who are present, shall sign a register evidencing their attendance, if so required by the Purchaser.

21.2 The Bidder's names, bid modifications or withdrawals, and the presence or absence of requisite Bid Security (EMD) and such other details as the Purchaser, at its discretion, may consider appropriate, will be announced at the opening. No bid shall be rejected at bid opening, except for late bids, which shall be later returned unopened to the concerned Bidder pursuant to ITB Clause 29.

21.3 Bids (and modifications sent pursuant to ITB Clause 30) that are not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances. Bidder's specific attention is drawn to this stipulation to enable the representative of the Bidder at the bid opening time to bring out to the attention for the Purchaser any documents pertaining to its bid is not being acknowledged and relevant portions read out.

21.4 The Purchaser will prepare a bid opening statement to be signed by all representatives present during bid opening.

22 CLARIFICATION OF BID

22.1 During evaluation of the bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing, and no change in the prices or substance of the bid shall be sought, offered, or permitted.

23 CONTACTING THE PURCHASER

23.1 From the time of the bid opening to the time of the award, if any bidder wishes to contact the Purchaser for any matter relating to the bid it should do so in writing.

23.2 Any effort by a bidder to influence the Purchaser in any manner in respect of bid evaluation or award will result in the rejection of that bid.

24 PRELIMINARY EXAMINATION OF BIDS

24.1 Techno-Commercial Bid Evaluation

24.1.1 The Purchaser will examine the bids to determine whether they are complete, whether required securities have been furnished, whether the documents have been properly signed and whether the bids are generally in order.

24.1.2 Prior to the detailed evaluation, the Purchaser will determine whether each bid is of acceptable quality, is generally complete and is responsive to the Bid Documents. For the purpose of this determination, a responsive bid is one, which confirms to all the terms, conditions and specification of the Bid document, without deviations, objections, conditionality or reservations.

24.1.3 No deviation, whatsoever, is permitted in the Bid Documents and the price bids of those bidders, whose technical and commercial bids contain any exception to the conditions and stipulations of the Bid Documents may not be opened.

24.1.4 The Purchaser's determination of bid responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence. If a bid is non-responsive, it may be rejected by the Purchaser.

24.1.5 The Purchaser will carry out a detailed evaluation of the bids previously determined to be responsive in order to determine whether the technical aspects are in accordance with the requirements set forth in the Bid documents. In order to reach such a determination, the Purchaser will examine and compare the technical aspects of the bids on the basis of the information supplied by the bidders, taking into account the following factors:

24.1.5.1 Overall completeness and compliance with the Technical Specifications, quality functions and operations of any process control concept included in the bid. The bid that does not meet minimum acceptable standard of completeness, consistency and detail will be rejected as non-responsive.

24.1.5.2 Any other relevant factor, if any that the Purchaser deems necessary or prudent to be taken into consideration.

24.1.5.3 Requisite forms contain all necessary information stipulated in the Bid Document.

25 REJECTION CRITERIA

25.1 Minor unconformities may be neglected and/or bidders may be required to rectify such minor unconformities.

25.2 The provisions of the following clauses of the Bid document must be adhered to, failing which the bid shall be considered as non-responsive and shall be summarily rejected:

25.2.1 Tender fee, Bid Security i.e. non-submission, shorter Value (EMD) or Bid Security (EMD) not complying with the specified requirements.

25.2.2 Submission of Contract Performance Bank Guarantee as per tender.

25.2.3 Period of validity of bid.

25.2.4 Firm & fixed Prices throughout execution of work

25.2.5 Offer for complete scope of work

25.2.6 Warranty and guarantee for work executed/ defect liability

25.2.7 Resolution of Dispute/ Arbitration clause.

25.2.8 Payment terms.

25.2.9 Validity of Contract.

25.2.10 Prices as per Schedule of Rates.

25.2.11 Price reduction schedule provisions.

25.2.12 Penalty provisions.

26 OPENING OF PRICE BID

26.1 The Bidder whose bid is found substantially responsive shall be invited to attend the opening of price bid. Such bidders may be required to attend the price bid opening at a short notice. The place, date and time of price bid opening will be informed to all such Bidders. The Bidders' representatives who are present shall sign a register evidencing their attendance.

26.2 The bid prices and discounts, if any stated in the price schedules will be announced during price bid opening.

27 ARITHMETIC CORRECTIONS

27.1 The bids will be checked for any arithmetical errors as follows if any, will be rectified on the following basis:

27.1.1 If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected;

27.1.2 If there is a discrepancy between words and figures, the amount in words will prevail;

27.2 If the bidder does not accept the correction of errors, its bid will be rejected and the bid security will be forfeited.

28 EVALUATION AND COMPARISON OF BIDS: Refer IFB section of this Tender.

29 POST-QUALIFICATION

29.1 In the absence of pre-qualification, the Purchaser will determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB.

29.2 The determination will take into account the Bidder's financial, technical, and production Capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Purchaser deems necessary and appropriate.

29.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid, in which event

the Purchaser will proceed to the next lowest evaluated bid to make a similar determination of that Bidder's capabilities to perform satisfactorily.

F. AWARD

30 AWARD CRITERIA

30.1 Subject to ITB Clause 21 to 29 of section E, the Purchaser will place the order on the successful bidder whose bid has been determined to be substantially responsive and has been determined to be the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the order satisfactorily. The Award of work shall be done in accordance with Clause No. 24 of IFB of this Document.

31 PURCHASER'S RIGHT TO VARY QUANTITIES

31.1 Purchaser reserves the right to increase or decrease the quantities specified in the Schedule of Rates, without any change in unit price or other terms and conditions.

31.2 Bidder shall note that the quantities mentioned against each activity in Schedule of Rates are tentative only and subject to change based on actual requirement. The unit rates quoted by the bidders shall remain fixed and firm, no price adjustment shall be allowed after bid submission.

32 PURCHASER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

32.1 Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligations to inform the affected bidder or bidders the reason for the Purchaser's action.

33 NOTIFICATION OF AWARD / FAX OF INTENT

33.1 Prior to the expiration of period of bid validity, the Purchaser will notify the successful bidder in writing by fax or e-mail to be confirmed in writing that his bid has been accepted.

33.2 The date of Fax of Intent for notification of Award will constitute effective date.

33.3 Upon the successful bidder's furnishing of Contract Performance Bank Guarantee (CPBG), pursuant to ITB Clause 35, the Purchaser will promptly notify each unsuccessful bidder and will discharge the bid security of such bidders.

34 ACCEPTANCE OF PURCHASE / DELIVERY ORDER

34.1 Purchaser will issue the Purchase / Delivery Order to the successful bidder within 10 days of award of work. Bidder shall sign all pages and return the acceptance copy of the Purchase / Delivery Order to the Purchaser.

35 CONTRACT PERFORMANCE BANK GUARANTEE

35.1 Within Fifteen (15) days from the date of award of Contract, the successful bidder shall furnish the performance guarantee in accordance with Special Conditions of Contract & General Conditions of Contract in the form provided in the Bid documents.

35.2 The Contract Performance Bank Guarantee shall be for an amount as defined in Special Conditions of Contract (SCC) & General Conditions of Contract (GCC) towards faithful performance of the contractual obligations. This bank guarantee shall

be valid for a period of 03 months beyond the expiry of the contract, including the defect liability period.

35.3 Failure of the successful bidder to comply with the requirements of this clause shall constitute sufficient ground for the annulment of the award and forfeiture of the bid security.

35.4 In case of non-compliances to Contract terms & conditions, Technical Specifications/ Requirements, poor quality of work, damages etc Owner may deduct the amount from any money due i.e., Contract Performance Security or becoming due to the CONTRACTOR under the CONTRACT or any other CONTRACT currently being executed or already completed by the CONTRACTOR or may be recovered by actions of law or otherwise, if the CONTRACTOR fails to satisfy the OWNER of such claims.

36 CORRUPT AND FRAUDULENT PRACTICES

36.1 The Purchaser requires that Bidders observe the highest standard of ethics during the execution of Contract. In pursuance of this policy, the Purchaser defines, for the purposes of this provision, the terms set forth below as follows:

i) "Corrupt Practice" means the offering, giving, receiving, or soliciting of anything of value to influence the action of public official in contract execution; and

ii) "Fraudulent Practice" means a misrepresentation of facts in order to influence the execution of a Contract to the detriment of the Purchaser, and includes collusive practice amongst bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition;

36.2 Purchaser will reject a proposal for award, if it determines that the bidder recommended for award is engaged in corrupt or fraudulent practices in competing for the award in question;

36.3 Purchaser will declare a firm ineligible, either indefinitely or for a stated period of time, if at any time the Purchaser determines that the firm has engaged in corrupt or fraudulent practices in competing for or in executing a contract.

37 INCOME TAX LIABILITY

37.1 The bidder shall bear all Income Tax liability, both corporate as well as for his personnel.

38 EMPLOYEE PROVIDENT FUND (EPF) (As Applicable)

38.1 Bidders have to furnish the proof of existing Employee Provident Fund details.

39 GENERAL

39.1 Any failure on the part of the Purchaser at any time to enforce the strict observances of the performance of any of the term(s) and condition(s) or rights, shall not effect or deprive the Purchaser to exercise the same at any later date.

39.2 The work will be supervised by Purchaser's Engineer-In-Charge or his representative and the Contractor has to strictly adhere to his instructions.

39.3 During the tenancy of this contract, Purchaser can increase and/or decrease the quantity of the work/ service (s) required. The quantity of work / service (s) shown in the Schedule of rates is tentative.

39.4 The contract period shall be reckoned from the date of issue of Purchase Order (PO).

39.5 The agreed rates shall remain firm & fixed till the expiry of contract and the contractor shall not be entitled to any inflation, escalation or revision (statutory or otherwise) or any right to claim, whatsoever by way of representation, explanation, statement or alleged representation or an outstanding or promise given or alleged to have been given by any employee of the Purchaser or due to contractor's own ignorance or on account of the difficulties or hardships faced by him. The rates quoted shall be all-inclusive of applicable taxes/ duties and shall remain firm till expiry/entire tenancy of this contract. It is agreed that the bidder has inspected the sites and assessed the nature and the extent of the work including the conditions prevalent under which the work is to be carried out.

40.0 BID PRICES & GST CLAUSES:

Bidders shall indicate the following in the Price Schedule/SOR format:

A. Ex-works Price including packing and forwarding charges (such price to include all costs as well as duties and taxes paid or payable on components and raw materials incorporated or to be incorporated in the goods).

B. GST (CGST & SGST/UTGST or IGST) on the finished goods including inland transportation (which will be payable on the finished goods, if this Contract is awarded).

C. Inland transportation upto Delivery Location and other costs incidental to delivery.

D. The material is required to be delivered through a reliable bank approved Road Transport Company. Also, AGL reserves the right to transport the material with it's own transporter.

E. Charges for incidental services and GST (CGST & SGST/UTGST or IGST) on these services as per the Price Schedule/ Schedule of Rates.

F. It shall be the endeavor of the Purchaser to arrange transit insurance (refer bidding document for details). For the purpose of arranging transit insurance of the goods dispatched / shipped, vendors are required to furnish the dispatch / shipping particulars to the Insurance Company giving complete details of dispatches along with Policy No. etc.

G. Prices must be filled exactly in the format for "Price Schedule/ Schedule of Rates [SOR]" enclosed as part of Tender Document. If quoted in separate typed sheets and any variation in item description, unit, quantity, any conditions of SOR etc. is noticed, the Bid is liable to be rejected.

H. The delivery basis of the goods is mentioned in bidding document. Other terms shall be interpreted as per INCOTERMS®2010 or its latest version.

I. All duties, taxes and other levies (if any) payable by the Seller under the Contract or for any other cause, except GST (CGST & SGST/UTGST or IGST) on finished product & on the incidental services, shall be included in the rates / prices and the total bid-price submitted by the Bidder. The quoted rate of GST (CGST & SGST/UTGST or IGST) on finished product & on the incidental services shall be indicated in the specific Format, as provided in ITB and the bid prices. Bidders are required to quote the prices after carefully reading the provisions mentioned in tender document including SCC, GCC, Scope of Work, etc.

J. Prices quoted by the Bidder, shall remain firm and fixed and valid until completion of the Contract and will not be subject to variation on any account, whatsoever.

K. The Bidder shall quote the rates in 'figures' & 'words', as per Price Schedule /SOR format provided in the Tender Document. There should not be any discrepancy between the prices indicated in figures and in words. In case of any discrepancy, the same shall be dealt as stipulated in ITB.

L. Further, Bidder shall also mention the Harmonized System Nomenclature (HSN) at the designated place in Price Schedule

GST CLAUSE:

1. Within the contractual delivery period, the statutory variation in applicable GST (CGST & SGST/UTGST or IGST) on supply and on incidental services, shall be to AGL's account.

   Any increase in the rate of GST (CGST & SGST/UTGST or IGST) beyond the contractual delivery period shall be to Supplier's account whereas any decrease in the rate GST (CGST & SGST/UTGST or IGST) shall be passed on to the Purchaser.

   The base date for the purpose of applying statutory variation shall be the Bid Due Date.

2. In case of statutory variation(s) in the taxes & duties mentioned at clause no. 4.1 above, the Supplier shall submit a copy of the 'Government Notification' to evidence the rate as applicable on the Bid Due Date and on the date of revision. Claim for payment of Statutory variation should be raised preferably along with the Invoice. Any claim for arrears on account of statutory variation shall be submitted to Purchaser within Two [02] months from the date of issue of such Government Notification otherwise such claim may not be entertained.
3. **New Taxes & Duties:** Any new taxes & duties, if imposed by the State/ Central Govt. of India on the finished goods after the due date of bid submission but before the Contractual Delivery/Completion Date, shall be reimbursed to the Supplier on submission of copy of notification(s) issued from State/ Central Govt. Authorities along with documentary evidence for proof of payment of such taxes & duties, but only after ascertaining it's applicability with respect to the Contract.
4. Deemed Export benefits are not applicable and Bidder should furnish prices without considering the same.
5. Supplier shall ensure timely submission of correct invoice(s), as per GST rules/ regulations, with all required supporting document(s) within a period specified in Contract to enable AGL to avail input credit of GST (CGST & SGST/UTGST or IGST). Further, returns and details required to be filled under GST laws & rules should be timely filed by Supplier of Goods / Services with requisite details.
6. If input tax credit is not available to AGL for any reason not attributable to AGL, then AGL shall not be obligated or liable to pay or reimburse GST (CGST & SGST/UTGST or IGST) claimed in the invoice(s) and shall be entitled to deduct/ setoff /recover such GST (CGST & SGST/UTGST or IGST) together with all penalties and interest, if any, against any amounts paid or payable by AGL to the Supplier.
7. In case CBEC (Central Board of Excise and Customs)/ any equivalent government agency brings to the notice of AGL that the Supplier has not remitted the amount towards GST (CGST & SGST/UTGST or IGST) collected from AGL to the government exchequer, then, that Supplier shall be put under Holiday list of AGL for period of six months as mentioned in Procedure for Evaluation of Performance of Vendors/ Suppliers/Contractors/ Consultants.
8. AGL will prefer to deal with registered supplier of goods/ services under GST. Therefore, bidders are requested to get themselves registered under GST, it not registered yet.
9. However, in case any unregistered bidder is submitting their bid, there prices will be loaded with applicable GST (CGST & SGST/UTGST or IGST) during evaluation of bid, if payable by AGL under Reverse Charge Mechanism. Where AGL is entitled for input credit of GST (CGST & SGST/UTGST or IGST), the same will be considered for evaluation of bid as per evaluation methodology of tender document.
10. In case the GST rating of vendor on the GST portal / Govt. official website is negative / black listed, then the bids may be rejected by AGL. Further, in case rating of bidder is negative / black listed after award of work for supply of goods / services, then AGL shall not be obligated or liable to pay or reimburse GST (CGST & SGST/UTGST or IGST) to such vendor and shall also be entitled to deduct / recover such GST (CGST & SGST/UTGST or IGST) along with all penalties / interest, if any, incurred by AGL.
11. **Anti-profiteering clause** - As per Clause 171 of GST Act, it is mandatory to pass on the benefit due to reduction in rate of tax or from input tax credit to the consumer by way of commensurate reduction in prices. The Service Provider may note the above and quote their prices accordingly.
12. GST (CGST & SGST/UTGST or IGST) is implemented w.e.f. 01.07.2017 which subsumed various indirect taxes and duties applicable before 01.07.2017. Accordingly, the provisions of General Condition of Contract relating to taxes and duties which are subsumed in GST are modified to aforesaid provisions.

13. The rate of GST as quoted in Priced Schedule shall be considered as the prevailing present applicable rates on the Bid due date and same shall be considered for price comparison as well as for ordering, in the event for such L-1 bidder, Work Order will be issued with actual applicable GST% limiting total Work Order Value within the total quoted value. Any error of judgment on part of the Bidder in identifying the present applicable rates shall not be admitted. The applicable rate of GST as indicated by the bidders in Priced Schedule shall be considered as the maximum payable in the event when no statutory variations take place and any remainder/balance GST, if payable, beyond that quoted rates shall be borne by the Bidder.

However, in the event of any statutory variations in the rate of GST, if the quoted rates are found erroneous then the base rates for calculation of statutory variations for the purpose of reimbursement of GST shall take into account either the rates actually prevalent on the due date of submission of bid or the erroneous rates quoted by the Bidders whichever is beneficial to AGL. Consequently, any difference in GST if it becomes payable to the tax authorities shall be borne by the Bidder.

Below example demonstrate issuing Work Order as per above clause:

Sr. No. (1)	Bidder Name (2)	Base Rate in Rs. (3)	GST% (4)	GST Amount Rs. (5) = (3x4)	Total Amount Including GST in Rs. (6) = (3+5)	Actual Applicable GST
Case – 1						
Rates quoted by Lowest bidder						
1.	XXXX	100	5%	5	Rs. 105	12%
In above Case Work Order will be awarded as;						
1.	XXXX	93.75	12%	11.25	Rs. 105	
Case – 2						
Rates quoted by Lowest bidder						
1.	XXXX	100	12%	12	Rs. 112	5%
In above Case Work Order will be awarded as;						
1.	XXXX	100	5%	5	Rs. 105	

41.0 VENDOR EVALUATION PROCEDURE:

1.0 PROCEDURE FOR EVALUATION FOR PERFORMANCE OF VENDORS/SUPPLIERS/CONTRACTORS/CONSULTANTS

2.1 GENERAL

A system for evaluation of Vendors/Suppliers/Contractors/Consultants and their performance is a key process and important to support an effective purchasing & contracting function of an organization.

Performance of all participating Vendors /contractors /consultants need to be closely monitored to ensure timely receipt of supplies from a vendor, completion of an assignment by a consultant or complete execution of order by a contractor within scheduled completion period. For timely execution of project and meeting the operation & maintenance requirement of Operating Plant / Location, it is necessary to monitor the execution of order or contract right from the award stage to completion stage and take corrective measures in time.

2.2 OBJECTIVE

The objective of evaluation of performance aims to recognize, and develop reliable Vendors/ Suppliers/ Contractors/ Consultant so that they consistently meet or exceed expectations and requirements.

The purpose of this is to put in place a system to monitor performance of Vendors/ Suppliers/ Contractors / Consultants associated with AGL in Project and O&M so as to ensure timely completion of various project, timely receipt of supplies including completion of works & services for operation and maintenance of Operating Plant / Location and quality standards in all respects.

2.3 METHODOLOGY

i) Preparation of Performance Rating Data Sheet

Performance rating data sheet for each and every Vendor/Supplier/Contractor/Consultant for all orders/Contracts with a value of Rs 07 Lakhs and above is recommended to be drawn up. Further, Performance rating data sheet for orders/contracts of Vendor/Supplier/Contractor/Consultant who are on watch list/holiday list/banning list shall be prepared irrespective of order/contract value. These data sheets are to be separately prepared for orders/contracts related to Projects and O&M within 30 days after execution of Order/Contract. Format, Parameters, Process, responsibility for preparation of Performance Rating Data sheet are separately mentioned.

In case of non-performance, these data sheets are to be prepared, as and when need arises.

ii) Measurement of Performance

Based on the parameters defined in Data Sheet, Performance of concerned Vendor/Supplier/Contractor/Consultant would be computed and graded accordingly. The measurement of the performance of the Party would be its ability to achieve the minimum scoring of 60% points in the given parameters.

iii) Initiation of Measures:

Depending upon the Grading of Performance, corrective measures would be initiated by taking up the matter with concerned Vendor/Supplier/Contractor/Consultant. Response of Vendor/Supplier/Contractor/Consultant would be considered before deciding further course of action.

iv) Implementation of Corrective Measures:

Based on the response of Vendor/Supplier/Contractor/Consultant pertaining to ongoing or completed orders/contracts, concerned Authority as specified in PO/WO would take approval from Competent Authority and recommend for continuation or discontinuation of such party from the business of AGL.

v) Orders/contracts placed on Proprietary/OEM basis for O&M will be evaluated and, if required, corrective action will be taken for improvement in future.

Note: All departments other than Projects like O&M, HSE, HR, F&A, Marketing etc. will be covered under definition of O&M.

2.4 EXCLUSIONS:

The following would be excluded from the scope of evaluation of performance of Vendor/Supplier/Contractor/Consultant:

i) Orders/Contracts below the value of Rs 07 Lakhs if Vendor/Supplier/Contractor/Consultant is not on watch list/holiday list/banning list.
ii) Orders for Miscellaneous/Administrative items/Non stock Non valuated items.

However, concerned Engineer-in-Charge/OICs will continue to monitor such cases so as to minimize the impact on Projects/O&M due to non-performance of Vendor/Supplier/Contractor/Consultant in all such cases.

2.5 PROCESS OF EVALUATION OF PERFORMANCE OF VENDORS/ SUPPLIERS/CONTRACTOR/CONSULTANTS

2.5.1 FOR PROJECTS:

i) Evaluation of performance of Vendors/Suppliers/Contractors/Consultants in case of PROJECTS shall be done within 30 days of Commissioning of any Project / Completion of Contract.

ii) On commissioning of any Project, EIC (Engineer-in-charge)/ Project-in-charge shall prepare a Performance Rating Data Sheet (Format enclosed) for all Orders and Contracts excluding cases under Para 2.4.

iii) Depending upon the Performance Rating, following action need to be initiated by Engineer-in-charge/Project-in-charge:

Sr. No.	Performance rating	Action
1	POOR	Seek explanation for Poor performance
2	FAIR	Seek explanation for Fair performance
3	GOOD	Letter to the concerned for improving performance in future
4	VERY GOOD	No further action
5	EXCELLENT	Appreciation Letter to the concern

iv) Reply from the concerned Vendor/Supplier/Contractor/Consultant shall be examined by EIC. In case of satisfactory reply, Performance Rating data sheet to be closed with a letter to the concerned for improving performance in future.

v) When no reply is received or reasons indicated are unsatisfactory, the following actions need to be taken based on recommendations of site level committee and HO level committee:

The methodology for processing of cases of "POOR" (as per Performance Rating) shall be as under:

i) Within 7 days of issuance of explanation Letter by EIC or no reply/receipt of non-satisfactory reply to explanation letter for "Poor" Performance Rating, site level committee will recommend the case to HO level committee.

ii) On receipt of above details from Site level committee, HO level committee will take approval from Competent Authority and accordingly HOD (C&P) will issue Advisory notice (duly vetted by Law Department) to Vendor/Supplier/Contractor/Consultant for putting them on watch list for a Period of Three (03) Years.
The copy of Advisory notice will also be sent to all OICs/HoDs for instructing EICs to closely monitor the performance of such Vendor/Supplier/Contractor/Consultant in other ongoing/new Orders/Contracts placed on them.
Simultaneously AGL's SAP/Portal will be Yellow Flagged for such Vendor.

iii) For the case of "Subsequent Instances" in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant, the matter will be deliberated by the site level committee and recommendations to be forwarded to C&P for further deliberation by a HO Level Committee consisting of following:
(1) HOD (C&P)
(2) HOD (F&A)
(3) HOD (HSE-Q)
(4) HOD of Concerned department.

All other subsequent process of committee recommendation for issuance of Show Cause Notice (SCN) cum suspension order, vetting of same etc will be as per vendor performance.
On receipt of reply to SCN, C&P will forward the same to concerned OIC/HoD at HO for point wise reply to issues bought out by Vendor/Supplier/Contractor/Consultant in their reply to show cause notice.
On receipt of recommendation from site committee through OIC/HoD at HO, the matter will once again be deliberated by the aforesaid HO level committee. All other subsequent process of committee recommendation for keeping the Vendor/Supplier/Contractor/Consultant on holiday or otherwise, vetting of speaking order, approval etc. will be as per vendor performance.

A) **Where Performance rating is "POOR"** (as per Performance rating carried out after execution of Order/Contract and where no reply/unsatisfactory reply is received from party against the letter seeking the explanation from Vendor/Supplier/Contractor/Consultant along with Sharing the Performance rating)

Recommend such defaulting Vendor/Supplier/Contractor/Consultant for the following action:

1. Poor Performance on account of Quality (if marks obtained against Quality parameter is less than 20):
   - **a) First Instance: Holiday (Red Card) for Two Years, and effect of Holiday will be as mentioned in Clause No. 2.7**
   - **b) Subsequent instance (s) in other ongoing order (s) / contract (s) or new order (s) / contract (s) on such Vendor/ Supplier/ Contractor/ Consultant: Holiday (Red Card) for Three Years**

2. Poor Performance on account of other than Quality (if marks obtained against Quality parameter is more than 20):
   - a) **First such instance: Advisory notice (Yellow Card)** shall be issued and Vendor/Supplier/Contractor/Consultant shall be put on watch list for a period of Three (03) Years.
   - **b) Second such instance in other ongoing order (s) / contract (s) or new order (s) / contract (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (red Card) for a period of One Year.**
   - **c) Subsequent instances (more than two) in other ongoing order (s) / contract (s) or new order (s) / contract (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (Red Card) for Three Years**

(B) Where Poor/Non-Performance leading to termination of contract or offloading of contract due to poor performance attributable to Vendor/Supplier/Contractor/Consultant (under relevant Contract Clauses)

(a) **First Instance: Advisory notice (Yellow Card)** shall be issued and Vendor/Supplier/Contractor/Consultant shall be put on watch list for a period of Three (3) Years.

Further such vendor will not be allowed to participate in the re-tender of the same supply/work/services of that location which has terminated/offloaded. Moreover, it will be insured that all other action as per provision of contract including forfeiture of Contract Performance Security (CPS) etc. are undertaken.

However, such vendor will be allowed to participate in all other tenders and to execute other ongoing order/contract (s) or new contract / order (s).

The Yellow card will be automatically revoked after a period of three years unless the same is converted into Red Card due to subsequence instances of poor/non-performance in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant.

(b) **Second instances** in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant: **Holiday (Red Card)** for period of One Year and they shall also to be considered for suspension.

(c) **Subsequent instances (more than two)** in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant: **Holiday (Red card) for period of Three Years and they shall also to be considered for suspension.**

A provision in AGL's SAP/Portal will be made for flagging **(Yellow card and Red card)** of such Vendor/Supplier/Contractor/Consultant so as to track their performance. List of such Vendor/Supplier/Contractor/Consultant shall also be uploaded on the AGL's intranet/web site.

Further, the bidder status regarding Yellow card should be mentioned in the **TCR/Proposal for Price Bid Opening** so that delivery/execution may be closely monitored by the concerned.

2.5.2 <u>FOR CONSULTANCY JOBS</u>

Monitoring and Evaluation of consultancy jobs will be carried out in the same way as described above in 2.5.1 except the functions of Project Manager will be performed by concerned In-charges of user departments such as Project, Marketing, HR, Finance, HSE etc.

2.5.3 FOR OPERATION & MAINTENANCE:

i) Evaluation of performance of Vendors/Suppliers/Contractors/Consultants in case of Operations and maintenance shall be done within 30 days of execution of order/contract or Completion of Contract.
ii) After execution of orders/contracts a Performance Rating Data Sheet (Format enclosed) shall be prepared by respective Engineer-in-Charge excluding cases under Para 2.4.
iii) Depending upon the Performance Rating, following action need to be initiated by Engineer-in-charge:

Sl. No.	Performance rating	Action
1	POOR	Seek explanation for Poor performance
2	FAIR	Seek explanation for Fair performance
3	GOOD	Letter to the concerned for improving performance in future
4	VERY GOOD	No further action
5	EXCELLENT	Appreciation Letter to the concern

iv) Reply from the concerned Vendor/Supplier/Contractor/Consultant shall be examined. In case of satisfactory reply, Performance Rating data sheet to be closed with a letter to the concerned for improving performance in future.

v) When no reply is received or reasons indicated are unsatisfactory, the following actions need to be taken based on recommendations of site level committee and HO level committee:

The methodology for processing of cases of "POOR" (as per Performance Rating) shall be as under:

i) Within 7 days of issuance of explanation Letter by EIC or no reply/receipt of non-satisfactory reply to explanation letter for "Poor" Performance Rating, site level committee will recommend the case to HO level committee.

ii) On receipt of above details from Site level committee, HO level committee will take approval from Competent Authority and accordingly HOD (C&P) will issue Advisory notice (duly vetted by Law Department) to Vendor/Supplier/Contractor/Consultant for putting them on watch list for a Period of Three (03) Years.
The copy of Advisory notice will also be sent to all OICs/HoDs for instructing EICs to closely monitor the performance of such Vendor/Supplier/Contractor/Consultant in other ongoing/new Orders/Contracts placed on them.
Simultaneously AGL's SAP/Portal will be Yellow Flagged for such Vendor.

iii) For the case of "Subsequent Instances" in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant, the matter will be deliberated by the site level committee and recommendations to be forwarded to C&P for further deliberation by a HO Level Committee consisting of following:
(5) HOD (C&P)
(6) HOD (F&A)
(7) HOD (HSE-Q)
(8) HOD of Concerned department.
All other subsequent process of committee recommendation for issuance of Show Cause Notice (SCN) cum suspension order, vetting of same etc will be as per vendor performance.
On receipt of reply to SCN, C&P will forward the same to concerned OIC/HoD at HO for point wise reply to issues bought out by Vendor/Supplier/Contractor/Consultant in their reply to show cause notice.
On receipt of recommendation from site committee through OIC/HoD at HO, the matter will once again be deliberated by the aforesaid HO level committee. All other subsequent process of committee recommendation for keeping the Vendor/Supplier/Contractor/Consultant on holiday or otherwise, vetting of speaking order, approval etc. will be as per vendor performance.

A) **Where Performance rating is "POOR"** (as per Performance rating carried out after execution of Order/Contract and where no reply/unsatisfactory reply is received from party against the letter seeking the explanation from Vendor/Supplier/Contractor/Consultant along with Sharing the Performance rating)

Recommend such defaulting Vendor/Supplier/Contractor/Consultant for the following action:

1. Poor Performance on account of Quality (if marks obtained against Quality parameter is less than 20):
   a) First Instance: Holiday (Red Card) for Two Years**, and effect of Holiday will be as mentioned in Clause No. 2.7**
   b) Subsequent instance (s) in other ongoing order (s) / contract (s) or new order (s) / contract (s) on such Vendor/ Supplier/ Contractor/ Consultant: Holiday (Red Card) for Three Years

2. Poor Performance on account of other than Quality (if marks obtained against Quality parameter is more than 20):

a) First such instance: Advisory notice (Yellow Card) shall be issued and Vendor/Supplier/Contractor/Consultant shall be put on watch list for a period of Three (03) Years.
b) Second such instance in other ongoing order (s) / contract (s) or new order (s) / contract (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (red Card) for a period of One Year.
c) Subsequent instances (more than two) in other ongoing order (s) / contract (s) or new order (s) / contract (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (Red Card) for Three Years

(B) Where Poor/Non-Performance leading to termination of contract or offloading of contract due to poor performance attributable to Vendor/Supplier/Contractor/Consultant (under relevant Contract Clauses)

(a) **First Instance: Advisory notice (Yellow Card)** shall be issued and Vendor/Supplier/Contractor/Consultant shall be put on watch list for a period of Three (3) Years.

Further such vendor will not be allowed to participate in the re-tender of the same supply/work/services of that location which has terminated/offloaded. Moreover, it will be insured that all other action as per provision of contract including forfeiture of Contract Performance Security (CPS) etc. are undertaken.

However, such vendor will be allowed to participate in all other tenders and to execute other ongoing order/contract (s) or new contract / order (s).
The Yellow card will be automatically revoked after a period of three years unless the same is converted into Red Card due to subsequence instances of poor/non-performance in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant.

(b) **Second instances** in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant: **Holiday (Red Card)** for period of One Year and they shall also to be considered for suspension.

(c) **Subsequent instances (more than two)** in other ongoing order (s)/ contract (s) or new order (s)/ contract (s) on such Vendor/Supplier/Contractor/Consultant: **Holiday (Red card) for period of Three Years and they shall also to be considered for suspension.**

A provision in AGL Portal will be made for flagging **(Yellow card and Red card)** of such Vendor/Supplier/Contractor/Consultant so as to track their performance. List of such Vendor/Supplier/Contractor/Consultant shall also be uploaded on the AGL's web site.
Further, the bidder status regarding Yellow card should be mentioned in the **TCR/Proposal for Price Bid Opening** so that delivery/execution may be closely monitored by the concerned.

2.6 REVIEW & RESTORATION OF PARTIES PUT ON HOLIDAY

An order for Holiday passed for a certain specific period shall deemed to have been automatically revoked on the expiry of that specified period and it will not be necessary to issue a specific formal order of revocation.

Further, in case Vendor/Supplier/Contractor/Consultant is put on a Holiday due to quality, and new order is placed on bidder after restoration of Vendor/Supplier/Contractor/Consultant, such order will be properly monitored during execution stage by the concerned site incharge.

2.7 EFFECT OF HOLIDAY

A) If a Vendor/Supplier/Contractor/Consultant is put on Holiday, such Vendor/Supplier/Contractor/Consultant should not be considered in ongoing tenders/future tenders.

B) However, if such Vendor/Supplier/Contractor/Consultant is already executing any other order/contract and their performance is satisfactory in terms of the relevant contract, should be allowed to continue till its completion without any further increase in scope except those incidental to original scope mentioned in the contract. In such a case CPBG will not be forfeited and payment will be made as per provisions of concerned contract. However, this would be without prejudice to other terms and condition of the contract.

C) Effect on other ongoing tendering:
   i) After issue of the enquiry/bid/tender but before opening of Technical bid, the bid submitted by the party shall be ignored.
   ii) After opening of the Technical bid but before opening the Price bid, the Price bid of the party shall not be opened and BG/EMD submitted by the party shall be returned to the party.
   iii) After opening of Price, BG/EMD made by the party shall be returned; the offer of the party shall be ignored & will not be further evaluated. If errant party emerges as the lowest (L-1), then such tender shall also be cancelled and re-invited.

2.8 While putting the Vendor/Supplier/Contractor/Consultant on holiday as per the procedure, the holding company, subsidiary, joint venture, sister concerns, group division of the errant Vendor/Supplier/Contractor/Consultant shall not be considered for putting on holiday list.

Any Bidder, put on holiday, will not be allowed to bid through consortium route also in new tender during the period of holiday.

2.9 In an unsuccessful bidder makes any vexatious, frivolous or malicious complaint against the tender process with the intention of delaying or defeating any procurement or causing loss to AGL or any other bidder, such bidder will be put on holiday for a period of six months, if such complaint is proved to be vexatious, frivolous or malicious, after following the due procedure.

2.10 APPEAL AGAINST THE DECISION OF THE COMPETENT AUTHORITY

a) The party may file an appeal against the order of the Competent Authority for putting the party on Holiday list. The appeal shall be filed to Appellate Authority. Such an appeal shall be preferred within one month from the date of receipt of Holiday order.
b) Appellate Authority would consider the appeal and pass appropriate order which shall be communicated to the party as well as the Competent Authority.
c) Appeal process may be completed within 45 days of filing of appeal with the Appellate Authority.
d) “Appellate Authority” shall mean Committee of nominee director of either GAIL or HPCL other than Chairman of the AGL Board and Executive management i.e. Managing Director and Director (Commercial) of Aavantika Gas Limited.

2.11 ERRANT BIDDER

In case after price bid opening the lowest evaluated bidder (L-1) is not awarded the job for any mistake committed by him in bidding or withdrawal of bid or modification of bid or varying any term in regard thereof leading to re-tendering,

AGL shall forfeit EMD paid by the bidder and such bidders shall be debarred from participation in retendering of the same job(s)/item(s).

Further, such bidder will be put on watch List (Yellow card) for a period of three years after following the due procedure. However, during the period in watch list such vendor will be allowed to participate in all other tenders and to execute other ongoing order/contract (s) or new contract/ order (s).

In case of subsequent instances of default in other tender(s) during aforesaid watch list period, the action shall be initiated as per provision of Sl. No. 2 of Para (A) of Clause no. 2.5.1 (v).

The Yellow card will be automatically revoked after specified period unless the same is converted into Red Card.

2.12 In case GST department or any other Statutory department brings to the notice of AGL that a party has not paid to the credit of the Government the GST or any Statutory payment collected from AGL, then party will be put on holiday for a period of Six months after following the due procedure, including holding his payment.

2.13 All departments other than Projects like O&M, HSE, HR, F&A, Marketing etc. will be covered under definition of O&M.

2.14 Further, **PERFORMANCE RATING DATA SHEET** (FOR PROJECTS/CONSULTANCY JOBS/O&M) is enclosed for reference for Evaluation of Performance of Vendors/ Suppliers/ Contractors/ Consultants.

2.15 Site level committee of Three members shall be formed for location other than Indore (HO), comprising of OIC of the location and available senior most members at the location of User and HSE-Q department.
Site level committee of Two members shall be formed for Indore location, comprising of available senior most members of User and HSE-Q department below HOD level.

2.16 As per the recommendations received from Site level Committee and HO level Committee, Head of the C&P department has to take Approval from Competent Authority prior issuing any letter to vendor regarding putting a vendor on a Watch list or Holiday list.
However, Show Cause/Explanation notices for putting vendors on Watch list or Holiday list may be issued by HOD of user department or HOD (C&P).

AAVANTIKA GAS LIMITED
PERFORMANCE RATING DATA SHEET

(i) Project/Work Centre :
(ii) Order/Contract No. & Date :
(iii) Brief description of Items Works/Assignment:
(iv) Order/Contract value (Rs.) :
(v) Name of Vendor/Contractor/ Supplier/Consultant :
(vi) Contractual delivery/ Completion Schedule:
(vii) Actual delivery/ Completion date:

Performance Parameter	Delivery/Completion Performance	Quality Performance	Reliability Performance#	Total
Maximum Marks	40	40	20	100
Marks Allocated (*)				

Note:
Remarks (if any)

PERFORMANCE RATING (**)

Note:
(#) Vendor/Supplier/Contractor/Consultant who seek repeated financial assistance or deviation beyond contract payment term or seeking direct payment to the sub-vendor/ sub-contractor due to financial constraints, then '0' marks should be allotted against Reliability Performance.
(*) Allocation of marks would be as per enclosed instructions
(**) Performance rating shall be classified as under:

Sl. No.	Range (Marks)	Rating
1.	60 & below	POOR
2.	61 - 70	FAIR
3.	71 - 80	GOOD
4.	81 - 90	VERY GOOD
5.	MORE THAN 90	EXCELLENT

Signature of Authorized signatory with Name & Designation

INSTRUCTIONS FOR ALLOCATION OF MARKS

Marks are to be allocated as under:

i. DELIVERY/COMPLETION PERFORMANCE: 40 MARKS

Delivery Period / completion Schedule		**Delay in Weeks**	**Marks**
a)	Up to 3 months	Before CDD	40
		Delay up to 3 weeks	35
		Delay up to 6 weeks	30

		Delay up to 9 weeks	25
		Delay up to 12 weeks	20
		Delay up to 15 weeks	15
		More than 15 weeks	0
b)	Above 3 months	Before CDD	40
		Delay up to 4 weeks	35
		Delay up to 8 weeks	30
		Delay up to 10 weeks	25
		Delay up to 16 weeks	20
		Delay up to 20 weeks	15
		Delay up to 24 weeks	10
		More than 24 weeks	0

ii. QUALITY PERFORMANCE **40 MARKS**

For Normal Cases: No Defects/No Deviation/No failure: 40 marks

i)	Rejection/Defects	Marks to be allocated on pro-rata basis for acceptable quantity as compared to total quantity for normal cases	10 Marks
ii)	When quality failure endangers the system integration and safety of the system.	Failure of severe nature - Moderate nature - low severe nature	0 marks 5 marks 10-25 marks
iii)	Number of deviations	No. deviation No. of deviations <=2 No. of deviations >2	5 Marks 2 marks 0 marks

iii. RELIABILITY PERFORMANCE 20 MARKS

FOR WORKS / CONTRACTS

i) Submission of order acceptance, agreement, PBG, 4 marks

	Drawings and other documents within time	
ii)	Mobilization of resources as per Contract and in time	4 marks
iii)	Liquidation of Check-list points	4 marks
iv)	Compliance to statutory and HS & E requirements Or Reliability of Estimates/Design/Drawing etc. in case of Consultancy jobs	4 marks
v)	Timely submission of estimates and other documents for Extra, Substituted & AHR items	4 marks

FOR SUPPLIES

i)	Submission of order acceptance, PBG , Drawing and other documents within time	5 marks
ii)	Attending complaints and requests for after Sales service/warranty repairs and/or query/advice (up to the evaluation period)	5 marks
iii)	Response to various correspondence and conformance to standards like ISO	5 marks
iv)	Submission of all required documents including Test Certificates at the time of supply	5 marks

EIC SIGNATURE:

EIC REMARKS:

SECTION III

TECHNICAL SPECIFICATION

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1. GENERAL & PROJECT DESCRIPTION

Aavantika Gas Limited Joint venture of GAIL & HPCL proposes to develop City Gas distribution network in their authorized GA Locations. AGL is inviting tenders on piping and associated connectivity work execution at upcoming CGS in Pithampur.

The scope of work for this tender includes construction of Steel Piping (AG) / Pipeline and Associated work at CGS – Pithampur.

The detailed scope of work includes in general, Procurement, fabrication, erection, installation, inspection, testing, pre-commissioning, commissioning and performance testing along with all associated works pertaining to complete premises, totally conforming to the Technical Specifications, Drawings, Data sheets and other information provided in this document.

All materials either supplied by the owner or supplied by the contractor shall be included in the scope of erection/ construction of the contractor. It must be clearly understood that each and every system of this project should be completed by the contractor in all respects, including supply of material, so that the project is commissioned and made operational without any shortcomings.

No extra claims or variations related payments will be allowed for items or activities which are required to complete the pipeline system and make it fully operational as per the Scope of Work defined in the Bidding Document.

1.1. 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.
1.2. 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.
1.3. 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 Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.
1.4. 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 standards, codes and specifications, these additional requirements shall also be satisfied.
1.5. Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain work or provide certain facilities, it is understood that the CONTRATOR 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.
1.6. It is mandatory for the bidder to visit and inspect the site, and get acquainted with the pipe-line route, various crossings, location of HDD, general terrain, type of population at various locations en route pipe line, climatic condition, storing space etc. before submission of his bid. It is to be clearly understood that AGL shall not entertain any claim whatsoever at any stage on account of Bidder’s non familiarisation of the site condition.
1.7. It will be Contractor’s responsibility to bring to the notice of Engineering-in-Charge any irreconcilable conflict in the contract documents before starting the works(s) or making the supply with reference to which the conflict exists.
1.8. 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 / direction of the Engineering-in-Charge, which will be binding on the Contractor.

2. SCOPE OF WORK – GENERAL

- The general scope of work tendered for the project include residual engineering, procurement, construction, commissioning, project closeout and all associated work pertaining to complete pipeline and terminal works.
- The scope of work by the bidder shall include the following:
  a) Project Management
  b) Residual Engineering
  c) Inspection and Quality Control
  d) Procurement & Supply (Other than Free issue material)
  e) Storage at site
  f) Construction, Installation, Erection & Testing
  g) Pre-Commissioning & Commissioning
  h) Project Close out (The work shall be completed conforming to technical specifications drawings data sheets as furnished in the tender and any other information provided by Owner/Owner's representative.)

2.1. PROJECT MANAGEMENT INCLUDING DOCUMENT CONTROL SYSTEM:

- Preparation of detailed project schedule.
- Material Management Plan.
- Planning & Scheduling
- Monitoring and Reporting of progress on each front of the project.
- Expediting and Monitoring of all procurement and construction activities with approved vendors / sub-contractors

2.2. RESIDUAL ENGINEERING

- Preliminary Alignment Sheets and plot plan and piping GAD drawings for SV stations and tap-off are included in the Bid package.
- However, any residual engineering required during execution shall be included in the scope of Contractor in accordance with design basis, codes & standards and project specifications contained in this bid package. Requirements of Indian Standards and Codes shall be complied with wherever applicable.
- Hydro & Pneumatic test Plan.
- Preparation of design documents, Preparation of pipeline construction drawing such as alignment sheets for detour portion if required, pipe support drawings, piping isometrics etc., procedures, manuals, drawings etc. as referred in relevant clause of this document.
- As built drawings/documents of all the systems including Line History Sheet.

2.3. INSPECTION & QUALITY CONTROL

- Ensuring adequate quality assurance and control including stage wise inspection, testing and certification.
- Appoint an independent TPIA for supply of material (Other than free issue) from Owner's approved list. The TPIA appointed by bidder shall be common for inspection of complete scope of supply. All inspection reports shall be submitted for owner's review/approval.
- Carryout proper documentation of inspection and quality assurance programme 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.

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

2.4. PROCUREMENT & SUPPLY

- 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 and shall be procured from approved vendor list. CONTRACTOR shall obtain Owner's prior written approval for inclusion of new vendor. Equipments requiring specialized maintenance or operation shall be avoided as far as possible. Equipment offered shall be field proven.
- CONTRACTOR shall procure all materials, components, equipment, consumable etc. required for successful completion of the pipeline system. 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 specifications are available in the contract, the same shall be prepared by CONTRACTOR based on the piping material specification and shall be subject to Owner's approval.
- Material take-off with complete description of size, rating, material, thickness and specifications.
- Store management for contractor supply items as well as free issue materials if any including receipt, warehousing, preserving the material in good condition, issue of material to construction site, reconciling / handling over surplus material to OWNER for OWNER supplied items at Owners store. Contractor shall arrange temporary land for storage of material if required.
- Submit periodic manufacturing progress reports highlighting hold ups and slippages, if any, to OWNER and take remedial measures.
- Interact with authorities such as Sales Tax Octroi, Excise, and Customs etc. as necessary and arrange for transportation of the materials under his scope of supply to site.
- All purchase requisitions including purchase orders, design, drawings and data sheets shall be approved by OWNER / Owner's Representative.
- Compliance with vendors and supplier's instructions and recommendations for transportation, handling, installation & commissioning.
- As – built drawing after completion of site work prior to installation, Erection and Testing Project Closed out.
- Mandatory spares

The items to be supplied by the contractor shall be broadly, but not limited to as follows:

1) Seamless Pipe: ASTM A106 GR. B (CHARPY) B 36.1 SCH 80

2) Elbow, Reducer, Tee: ASTM A234 GR. WPB (CHARPY) B 16.9 BW SCH 80

3) WNRF, BLRF, BLRF with NPT: ASTM A105 (CHARPY) B 16.5 RF 300# / 600# SCH 80

4) Below 4" size valve: ASTM A 105, TRIM SEAT RPTFE Bs-5351

5) Sockolet: ASTM A 105 MSS-SP97 SW, 3000

6) Gasket: 4.5 mm thick Spiral Wound Gasket with SS inner Rings of 300# / 600#

7) Stud Nut: HDG

8) TF: 4" CS X 125 MM PE100 SDR 11

9) PG: 150 mm Dial, Maximum Range - 70 Kg/Cm2

10) TG: 150 mm Dial, Maximum Range - 80 °C

14) Supply of Type F TLP for Insulation joint with minimum 4 cables including supply of 1Cx06sqmm & 1Cx25sqmm cables, Prepacked 20KG + 20KG Zinc Grounding Cell with connecting 1Cx25sqmm cable for grounding, Surge Diverter.

15) Supply of special tools and tackles, consumables, manpower and special instruments /equipment needed for calibration, erection, commissioning and completeness of the total system.

Except above types of fittings if any other fittings required then it should be SCH 80 with minimum thickness is 6.4 mm. details specification will provide by AGL as per site requirement

2.5. CONSTRUCTION, INSTALLATION, ERECTION & TESTING

- Carry out construction as per “Issued for Construction” drawings, procedures, specification and applicable codes and standards. Any changes at site shall need prior approval form the OWNER and revision of drawings.
- Delivery and handling of material at site.
- Lease land for storage of material if required.
- Construction planning and monitoring.
- “Receiving and Taking over” of all Company supplied free issue materials from the designated place(s) of issue i.e. AGL stockyard at indore, transportation including loading, unloading, handling, including arranging all necessary intermediate storage area(s) there of as required till the permanent installation of materials.
- Mobilizing adequate machinery, manpower, tools, tackles, consumables etc. for construction.
- Fabrication & Installation of AG Piping along with required facilities as per drawing.
- Fabrication of pipe supports, construction and installation.
- Painting of above ground station piping & Support.
- To ensure adequate quality control, stage wise inspection and testing during construction work at site.
- 200 % NDT of all AG Joints
- Hydro-testing, Pneumatic Testing, 100 % Water removal & swabbing and including supply of materials, consumables, tools and tackles, equipment/machineries and manpower.
- Installation of Free issue materials like valves(i.e. 4” Meter).
- Idle time preservation of the pipeline (if required) for the specified period by filling with nitrogen to a positive pressure of 0.5 bar (g) including supply of nitrogen etc. as required.
- All incidental and associated works and any other works not specifically listed there in but are required to be carried out to complete entire work related to pipelines and terminals.

2.6. PROJECT CLOSE OUT

- Submission of all as built documentation, inspection reports, purchase orders, material reconciliation report, NDT records both in soft and hard copy duly approved by Owner/Owner’s representative.

- Submission of relevant documents, manuals, test certificates of all the items supplied by contractor for the execution of the complete scope of work.
- Submission of operational acceptance report including all the documents, test certificates etc.
- Contractor shall close out the project as defined below:
  i. If Contractor completes pre-commissioning and gas is not available upto 3(Three) months, Contractor will be issued provisional completion certificate. However company reserves the right to ask the contractor to mobilize manpower to commission the facilities within 6(six) months from the date of pre-commissioning.
  ii. If contractor completes pre-commissioning and gas is not made available within 6(six) months from the date of pre-commissioning, the contract is deemed closed subject to completion of punch points and completion of contract.
  iii. In case the gas is made available immediately upon pre commissioning, in that case the contract shall be closed within 3(three) months from the date of operational acceptance.

2.7. FREE ISSUE SUPPLY BY OWNER

- Unless otherwise mentioned in the tender, Owner will not supply any material to contractor as free issue except for the following items as listed below:
  - 4” Flange End Meter
  - 4” Monolithic Insulating Joints (300 # / 600#)
  - 4” AG Ball Valve

2.8. VARIATION LIMITS

- Variation limits of each station are identified in the drawings and described in detail in the RFP document. The bidder shall quote for the station work on a lump-sum basis and absorb all variations arising due to change in area of the station to the extent of +/- 15% for civil works. For Mechanical works the variation limits shall be 15%of the pipes and fittings quantity of each station. For Instrumentation works, all variation needs to be absorbed within the scope of work.

2.9. INSURANCE

- As per GCC and SCC of Commercial Volume
- Unless specifically excluded in the Bidding Documents all insurance cover required during the construction, pre-commissioning and testing period shall be on account of the Bidder. The insurance shall cover all material in transit for construction, all work in progress, and completion of project, third party liability, workmen compensation, and all statutory insurance covers. The Owner shall be the beneficiary of insurance Policies and nominated as Loss Payee.

2.10. PROJECT COMPLETION SCHEDULE

- The Contractor shall ensure that the entire scope of work shall be completed Within 6 months including mechanical completion, hydro testing, pre-commissioning & commissioning from the date of letter of intent, unless such schedule has been revised in accordance with the provisions of the Contract.

3. SCOPE OF WORK - DETAILED

3.1. SPECIFICATION FOR WELDING PROCEDURE SPECIFICATION (WPS) QUALIFICATION ACTIVITY AND ELECTRODE QUALIFICATION TEST (EQT).

3.1.1. PURPOSE

The purpose of document is to establish a method to carry out the Welding Procedure Qualification activity and Electrode Qualification Test (EQT).

3.1.2. SCOPE OF DOCUMENT

This procedure covers the work method for testing of electrodes and for Welding Procedure Qualification including welder's documentation for **A**avantika **G**as **L**imited (AGL).

3.1.3. FIELD OF APPLICATION

This procedure will be applicable for welding of steel pipe as well as for the fabrication of all types of welded joints of carbon steel piping systems connected with the pipeline and related facilities for construction of AGL CGD Project Work.

- All line pipe joints of the circumferential butt Weld.
- Attachments of castings, forgings, flanges and other supports to pipes.
- Welded manifold headers and other sub-assemblies.
- Welded branch connections.
- Joints in welded/ fabricated piping components.
- The attachments of smaller connections for vents, drains and other instrument tapings.

3.1.4. REFERENCES

- Standard for welding of pipelines and related Facilities-API 1104, latest Edition.
- Applicable Code and Specification for welding Electrodes and Filler Materials: ASME B 31.8, ASME SEC. II-Part C.
- Nondestructive examination ASME Sec. V
- OISD B 141
- ASME Section IX (Latest Edition)
- PNGRB T4S CGD, PNGRB T4S NGPL

3.1.5. SPECIFIC COMPETENCY REQUIREMENTS

- B.E. with relevant and adequate Experience in Project Management preferably in CGD sector.
- Knowledge of relevant code and standard.

3.1.6. TOOLS AND TACKLES

- Welding Generator/Rectifier
- Grinder
- L.P.G Burners.
- Digital Temperature Indicator & Stopwatch.
- Degree protector & Slip Gauges.
- Tong Tester
- Digital Temperature Indicator & Stopwatch.
- Pipe- cutting (beveling cutter)
- NDT Crew (UT/LPT)
- External clamp
- Welding Machine
- LPG Torch for Heating
- Filler Gauge

3.1.7. PERSONAL PROTECTIVE EQUIPMENT / SAFETY TOOLS

- Safety Shoes
- Safety Helmet
- Safety Gloves
- Face Shield
- Boiler Suit/Cotton Coverall

- Cotton mask

3.1.8. PROCEDURE

3.1.8.1. Procedure for Electrode Qualification Test

- Plate for EQT and other requirements for the test to be confirm as per ASME Sec II – Part C.
- Fit up for Welding to carried out as per sketch 1.
- Before starting the welding, the surface of the base metal to be welded, shall be cleaned & Pre heated. Preheat temp shall be maintained.
- Minimum length test assembly shall be welded.
- The joint root shall be seal welded with the electrode using stringer beads.
- The weld passes per layer and total no. of layers shall be carried out as ASME SEC-II Part-C.
- Detail of Consumable Materials and its details, Parameter Sheets are attached. (Each Batch Electrodes)
- The electrode shall be purchased from the list of approved manufacturers' and the same shall be supplied with proper certificate and batch certificate.
- Electrode QT sample need to be sent for NDT/DT at approved laboratories, Post report verification & be taken up for WPS/PQR.

I. DETAIL OF PROCESS AND REQUIREMENTS FOR ELECTRODE

Base Material Used :
Process :
Electrode Size :
Electrical Characteristics :
Joint Design :

II. DETAILS OF CONSUMABLES

Manufacture's Name : Will be written in the qualification test record format
Batch No. : Will be written in the qualification test record format
Welding Position :
Preheat Temperature : :
Inter pass Temperature :

III. REQUIRED TEST

a. Chemical Analysis : Preparation of test pad as per ASME Sec II – Part C
b. All weld metal tension test: As per ASME Sec II – Part C
c. All weld Impact Test : As per ASME Sec II – Part C
d. Radiographic Test : As per ASME Sec II – Part C

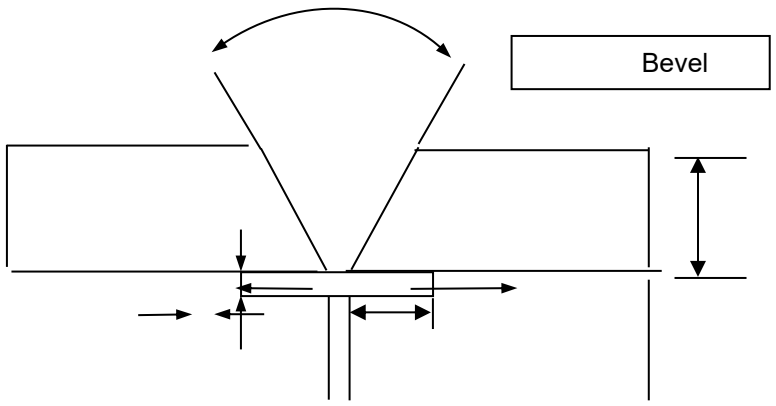


Plate Standard Size –

Backing Strip Size –

SKETCH – 1

3.1.8.2. Procedure for Welding Procedure Qualification

- Welding procedure qualification shall be carried out in accordance with the relevant requirements of API 1104 latest edition and AGL Specification.
- Only approved welding consumables should be used. The welding consumable qualification test records shall be submitted as per Client Specification for obtaining approval. Batch Test Certificate of each batch should be submitted.
- Contractor shall submit the proposed welding procedure specification to AGL for review and for releasing the procedure for procedure qualification tests. The procedure qualification test shall be carried out by Contractor under field conditions and is to be witnessed by AGL.
- Test specimen dimensional requirement for testing as per API 1104.
- A complete set of parameters and data shall be recorded jointly by Contractor and AGL as per proposed welding procedure specification.
- Once welded specimens are visually cleared, it shall be subjected to Radiographic Testing and Subsequently to destructive testing. Destructive testing shall be done as per AGL Specification.
- A complete set of test results in the specified format shall be submitted to AGL for approval immediately after completing the procedure qualification tests. Standard tests as specified in the code shall be carried out in all cases, in addition to these tests' macro, micro, hardness, charpy V-notch impact shall be carried out on specimens as per Codes/Standard. Contractor shall be responsible for carrying out all tests required to the satisfaction of the AGL.

3.2. NON-DESTRUCTIVE EXAMINATION:

- Non-destructive examination shall mainly consist of examination using radiography. Radiography test of 100% girth welds will be done. Welds shall meet the standards of acceptability as in API-1104 latest edition.
- AGL shall review all radiographs and the decision of Client shall be final and implemented in this regard. In addition, UT tests to be carried out.
- 200 % NDT (Minimum 2 nos. NDT) need to perform in all AG Station Piping joints as per AGL Instructions. In which 1st preference is RT (X-Ray/Gamma), 2nd Preference is UT, 3rd Preference is Root DPT & 4th Preference is MPT.

3.2.1. PURPOSE

- This procedure is to carry out Radiography testing (X Ray/Gamma) of weld joint in steel pipeline, to detect volumetric and certain favorably oriented planar discontinuities in specimens during the welding activity of Steel Pipeline, internal discontinuities of weld in gas pipeline, examination of weld of pipelines using Ultrasonic flaw detector method, Liquid Penetration testing, discontinuities over weld for steel pipeline and to establish an acceptable system for carrying out Magnetic Particle Test for pipeline activity.

3.2.2. SCOPE OF DOCUMENT

- This document is applied for Radiographic testing (X Ray/Gamma), Ultrasonic testing of weld joints, LPT and Magnetic Particle testing wherever required for Aavantika Gas Limited (AGL).

3.2.3. FIELD OF APPLICATION

- This is applied for Radiographic Testing of welds by using X-Radiations/Gamma from respective Source for detecting the discontinuities of pipeline butt welds.
- This is applied for examination of weld of pipelines using Ultrasonic flaw detector with pulse echo contact beam method for different diameter 4"φ, 6"φ, 8"φ, 12"φ, 16"φ & 18"φ welded joints which are using of girth weld, all repaired portions of weld joint, weld joint of tie-in, and all golden joints. The UT shall be done at all above mentioned types of joints after the x-ray film interpretation. This procedure is useful for examination of welds of single wall of pipes. The welds are single 'V' Butt welds.

- This is also applicable for liquid penetrate examination for Bevel Edges, Root welds, Final welds, Back side weld, preparation surfaces, weld repair cutting area etc. whenever required

3.2.4. REFERENCES

- ASME B31.8
- API 1104 (Latest edition), Section 9.5 & 11.3
- ASNT SNT TC-1A/CP-189
- ISO R 148
- ASME Section V - SE- 165, Article 2, Section VIII DIV 1,
- ASTM E94, A370
- API 650

3.2.5. SPECIFIC COMPETENCY REQUIREMENTS

- B.E / B-Tech with relevant and adequate Experience in Project Management preferably in CGD sector.
- Knowledge of relevant code and standard.
- NDT ASNT Level 2 will be preferred.

3.2.6. TOOLS AND TACKLES

- X-ray Source with control units (X-ray Crawler/External X-ray Unit) with all arrangements
- Survey Meter
- Dosimeter
- Films loaded in Cassettes as per Requirement
- Lead Screen
- Warning Placards
- Cordoning Rope
- Crayon or Paint Markers
- Measuring tape - Elastic
- Pentameters (ASTM SET A/10 ISO 16)
- Lead Markers
- Dark Room Accessories & Consumables
- Gamma-ray Source with control units (radiation camera) with all arrangements
- Pit Room
- Ultrasonic Flaw Detector, A scan type, meeting the requirements of T- 530 of article 5 of ASME Section V.
- Suitable Miniature and Large Probes (Normal Probe, TR Probe, Angle Probes of 45°, 60° & 70°)
- Matching Cables
- Suitable Couplant
- Scale and Paint Marker
- Drawing & Gauging Tool
- Penetrate: - Solvent removable visible.
- Cleaner
- Developer
- Wire brush (As recommended)
- Lint free cloth
- Surface Temperature meter (digital type)
- Stopwatch for recording of dwell time
- Electromagnetic Yoke
- Permanent Magnetic Yoke
- Magnetic Particles
- ASTM Field Indicator
- White Contrast Paint

3.2.7. PERSONAL PROTECTIVE EQUIPMENT / SAFETY TOOLS

- Safety Shoes
- Safety Helmet
- Reflective Jacket
- Electrical Safety Gloves

- Steel toed Gumboots (as and when required)
- Safety Goggles
- Boiler Suit/Cover All
- UV Rays protection
- Steel toed Gumboots (as and when required)

3.2.8. PROCEDURE

3.2.8.1. PERSONNEL QUALIFICATION

- Pipeline radiographers shall be qualified in accordance with the requirement of API 1104 and to the full satisfaction of AGLand as per ASNT-TC-1A Level 2.
- Certification of all the radiographers, qualified as per above, shall be furnished by the Contractor to the Client before a radiographer will be permitted to perform production radiography.
- The radiographers shall be required to qualify with each radiographic procedure they use, prior to performing the work assigned to him in accordance with the specification.
- The qualification of the NDT inspector to carry out this testing shall be minimum ASNT level II & and /or Company's level II in accordance with Company's Written Practice which is in accordance to ASNTSNT TC 1A & / ANSI CP 189.
- Before work begins, the Contractor shall present a specification describing the proposed procedure qualification and calibration methodology.
- This specification shall state, as an indication only but not limited to the following information:
  i. Type of LT Equipment used
  ii. Details for calibration
  iii. Type and dimensions of transducers
  iv. Frequency range
  v. Coupling medium
  vi. Inspection technique
  vii. Record details
  viii. Reference to the welding procedure where it is intended to adopt the weld location.
  ix. Temperature range of the joints to be inspected.
- The ultrasonic inspection procedure shall be approved by the Client. This specification test consists in testing (under normal operating conditions) some Contractors welds made according to the same production procedure, where there are typical defects the test intends to detect.
- This test shall be conducted in the presence of the Client.

3.2.8.2. METHOD

A) I.Q.I. Selection (Image Quality Indicator)

- I.Q.I selection shall be as per ASME Section V article 2 Table T 276 for ASTM WIRE TYPE PENETRAMETER. The reference Tables are as follows.

Pipe Wall Thickness or Weld Thickness(mm)	Essential Wire Dia (mm)	ASTM SET	DIN SET
0-6.4	0.20	A	10 ISO 16
6.4-9.5	0.25	A or B	10 ISO 16
9.5-12.7	0.33	B	10 ISO 16 or 6 ISO 12
12.7-19.1	0.41	B	6 ISO 12

19.1-25.4	0.51	B	6 ISO 12
25.4-50.8	0.64	B	6 ISO 12

B) Film Selection
- Radiographs shall be obtained using Industrial Radiography films. The Films used shall be Class II or III (D4, D7 or equivalent); Fine grain, High contrast Film.

C) Intensifying Screen
- Lead screen of thickness 0.005”/0.1 to 0.15 mm and 0.2 to 0.25 mm front & back respectively shall be used.

D) Surface Preparation
- As far as possible all irregularities from the surface (to the extent of coverage of films) shall be removed for better results and interpretation.

E) Prevention of Back Scattering
- To achieve Radiography definition, it is required to check back scattering by placing lead no. B on the backside of film holder to ensure the back scattering does not harm the film quality. In such case, it is advised to place lead sheets on the backside of holder.

3.2.8.3. TECHNIQUES

A) Procedure for Radiography Inspection (X-Rays & Gama Rays)
- Radiography shall be carried out using the following Techniques with X-Radiation.

i. Single Wall Single Image:
- This Technique is ideal for pipelines. In this technique the radiation penetrates through single wall of test Object & image of the single wall is recorded on the Radiograph. In the case of Pipelines, the Radiography Equipment with Panoramic X-ray source is placed at the Center of the Pipeline if possible.

ii. Double Wall Single Image:
- This Technique is also ideal for pipelines. Here the Single wall single image is not possible. In this technique the Radiation penetrates through both the walls of test object (Pipeline) and Single image of the test object closest to the film is recorded on the Radiography film.

Placement of Marker And I.Q.I
- Lead markers shall be kept identifying the test Object, Date of Radiography, area of interest of the object, the weld numbers location of the Radiographs and any other information as specified by the Client.
- I.Q.I. shall be placed approximately 25mm away from the location marker such that the thinnest wire of the ASTM/DIN type pentameter shall be far most from the source side. In case of Panoramic Exposure Techniques, minimum 4 Nos. of IQI’s shall be placed equal distant along the circumference.
- All films shall be clearly identified by lead numbers, letters, and/or markers. The image of the markers shall appear on the films, without interfering with the interpretation. These markers positions shall also be marked on the part to be radiograph and shall be maintained during radiography.

Source to Film Distance
- Focus (Source) to Film distance shall be such that the geometrical un-sharpness (Ug) shall be as per the chart (as per ASME Section V, Article 2, Table 285) below.

Material thickness (inches)	Ug Maximum in “in”	in “mm”
Under 2	0.020	0.51

2 to 3	0.030	0.76
over 3 to 4	0.040	1.02
Greater than 4	0.070	1.78

The Ug is determined by

$U_g = Fd/D$

Where Ug – Geometrical un-sharpness

F – Focal spot the maximum projected dimension facing perpendicular to film center.

D - Distance from focus of radiation to the specimen being radio graphed. (FFD)

d - Distance from source side of the specimen to the film (thickness)

Exposure Time

- Exposure time shall be calculated with penetrated wall thickness, F.F.D. and film speed using Exposure chart.

Film Loading

- Film shall be loaded in the dark room under proper safe light, Filter. Films shall be cut carefully without any damages, scratches or finger marks/Nail marks. Sandwich the film between pair of screens & loaded into tight PVC cassettes or holders.

Number of Exposures

- The number of Exposures will be such that the area of Interest is completely covered and when multiple films are used the overlap between any 2 films will be a minimum of 40mm. One exposure shall be taken for single wall single Image and Minimum of three exposures for Double Wall single Image technique for Pipeline joints.

Film Processing

- Film shall be process in a dark room under safe light. The temperature of the chemical shall be 20°C ± 1°C or as specified. The film shall be unloaded in hangers/ spools carefully to avoid any marks.
- The manual processing involves the following steps:
- All the steps shall be performed on a test film initially to determine any effect of processing.

  Step: 1, Developer: Shake the hangers or spools to avoid any uneven developing marks. Developing time shall be as recommended by film manufacturer varies from min. 3 to 8 minutes for class II films.

  Step: 2, Stop bath: The stop bath is water with 5 to 6 drops of acetic acid per gallon of water. To arrest developing action, films are immersed in a stop bath. Shake hangers/spools for 2 to 3 minutes in the stop bath.

  Step: 3, Fixer: To remove the excess silver grains from unexposed or less exposed part of film & to harden base of film, the hangers/spools shall be immersed in fixer for at least 10 minutes.

  Step: 4, Running water: Films shall be kept in running water tank where excess fixer will be washed from the surface of the film. Wash at least for 10 minutes.

  Step: 5, Drying: Films shall be dried in open space or in dryer with circulating hot air less than 55°C.

Film Viewing

- The films shall be viewed under a high intensity Film Viewer capable of reading Radiographs of Density up to 4.0 & with adjustable light intensity. Viewing shall be done under subdued background lighting of an intensity that will not cause troublesome reflection.

Film Density

- To measure the film density, a calibrated densitometer or to calibrate the densitometer
- Certified Step Wedge Density Strip should be used.

- The transmitted film density shall be between 2 and 3.5 throughout the weld in case of X-ray. The unexposed base density of the film shall not exceed 0.30.
- However as per API 1104 (Latest Edition) clause no. 11.1.10.1, except small localized areas caused by irregular weld configuration, the transmitted H&D density in the area of interest of transparent based film shall not be less than 1.8 or greater than 4.0. Transmitted H&D Density for small localized area may exceed these limits; however minimum densities shall not be less than 1.5 and maximum density shall not exceed 4.2.

Film Contrast

- Contrast of the film shall be adequate to manifest on the Radiograph even the smallest thickness differential. Better the contrast; better the visibility of discontinuity during interpretation.

Sensitivity

- The film sensitivity shall be better than 2 % & shall be confirmed by computing or in accordance with ASME Section V, Article 2, and Table 276 equivalent wire size.
- The quality level of Radiographic sensitivity required for radiographic inspection shall be 2% of thickness.

$$\textbf{\% of sensitivity} = \frac{\textbf{Dia of Thinnest wire visible on the Radiograph}}{\textbf{penetrated thickness at the area of interest (Diagnostic Area)}} * 100$$

Interpretation

- All indications that are equal to or greater than rejection level described in acceptance / rejection criteria of API 1104 or as agreed by Client shall be considered representing defects and may be cause of rejection or repair of the weld or base metal. All Radiographs showing film marks in the area of interest shall be reshoot in accordance with this procedure.

Acceptance or Rejection Criteria

- Acceptance or rejection criteria shall be in accordance with API 1104. Radiographic examination of all girth welds with 100% coverage of the weld shall be done as per requirement. All welds shall meet the requirement of criteria as in API 1104 & Client Specification.

Re-Test

- Retest of the repaired area shall be carried out in accordance with this procedure and Repair film shall be identified with letter “R” on the film.

Reporting

- All details of inspection and results shall be documented in respective report Document or in client’s format NDT inspector shall sign the reports and client’s representative.

Film Storage & Archive Life

- Films shall be stored in dry place with humidity less than 80% in proper storage boxes with identification. Methylene blue test shall be carried out to find out its archive life.

B) PROCEDURE FOR ULTRASONIC TESTING

- Circumferential welds shall be inspected from both sides using angled probes.
- If, during the test, echoes of doubtful origin appear, it shall be necessary to inspect a convenient area on the pipe surface, close to the weld, with a straight beam transducer in order to check whether any manufacturing defects are present which could have interfered with the ultrasonic beam.
- The equipment shall include but not be limited to the following
  i. Ultrasonic equipment and coupling medium
  ii. Sample sections for calibration of instruments
  iii. Equipment for cleaning of surface to be examined
  iv. Rules calibrated in centimeters for exact location of the position of defects.

Reference Blocks

- The efficiency of the equipment used, the effective refraction angle of the probe, and the beam output point, shall be checked using a V1 and V2 sample block, IIW type or the calibration block ASTM E-428.

Qualification of Ultrasonic Testing Operators

- Before the inspection begins or during the same inspection, the Owner/Consultant may require a qualification test for the ultrasonic equipment operators. Minimum qualification of the operator shall be ASNT-Level –II.

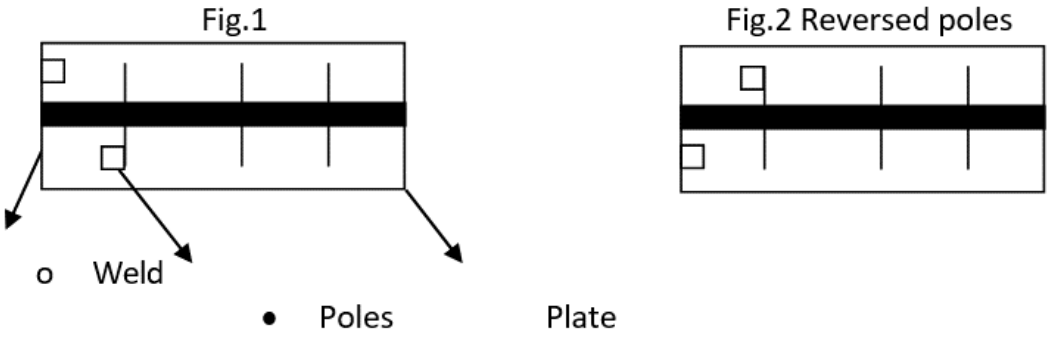
C) Procedure for Liquid Penetrant Test

- Clean the specimen using solvent cleaner, using lint free cloth.
- The Penetrate/solvent removable visible shall be applies by spraying method and allow for soaking / dwelling. Dwell time shall be according to the type of discontinuity expected. The dwell time varies from (Min. as per SE-165/T-672) 8 – 10 (Max. as per manufacturer) minutes as recommended.
- Excess penetrate removing: - after the specified penetration (dwell) time has elapsed, penetrate remaining on the surface shall be removed by wiping with a cloth or absorbent paper, repeating the operation until most traces of penetrate have removed. Flushing the surface with solvent, following the application of penetrate and prior to developing is prohibited.
- Develop the test object by spraying developer on the area of interest to give thin & uniform layers. Developing time for final interpretation begins immediately after the application of the dry developer or as soon as a wet developer coating is dry. The spraying shall be done 20-25 cm away from the surface. Allow at least 10 minutes (as per SE-165 / T672) to develop the indications and the maximum permitted developing times are 2hrs for aqueous developer and 1 hr. for non-aqueous developer.
- After Inspecting & recording the indication, clean with dry cloth and Post clean the part thoroughly with cleaner.

D) Procedure for Magnetic Particle Test

- Magnetic particle testing operator shall be qualified as per ANSI-IV-1A Level II or equivalent.
- The surface temperature shall be in accordance to match magnetic Particle selection; test shall not be performed on parts whose temperature exceeds 300°C.
- The Surface shall be cleaned & shall be free from all irregularities; any loose scales shall be removed for better Magnetic Testing results.
- The surface Contrast shall be matched for better Indication visibility, if required a thin layer of White Contrast Paint shall be applied of maximum 40 microns thick.
- For Yoke Methods the Lifting Capacity shall be
- Electro Magnetic Yoke AC Current - 4.5 Kgs
- Electro Magnetic Yoke DC Current - 18 Kgs
- Permanent Magnetic Yoke - 18 Kgs.
- True continuous Reverse Pole Technique shall be applied, where Magnetization, Particle spray and Inspection shall be carried out at same time.
- Magnetization Technique - Yoke Technique
- Type of Ferro-magnetic Particle – Dry/Wet
- Surface Preparation – Power Grinding/Buffing
- Mark the locations as per Prod or Yokes spacing.
- Place the Prod/Yoke 100% contact as far as possible as shown in figure 1.
- Select current in case of Electromagnetic Yoke or Prod.
- Place field Indicator to check Direction and Field Adequacy.
- Magnetize Spray particles & Inspect.

- Reverse the Pole as Shown in figure 2 and carry out testing.



- Test Area of Interest 100%.
- Record the Indications if any observed.
- De-Magnetization if required.
- All the materials on the surface shall be removed by wiping with clean cloth or by spraying cleaner on the surface.
- Acceptance Criteria shall be applying API 1104 latest edition.

3.3. DESTRUCTIVE TESTING:

- 4" Dia. Test specimen for Procedure Qualification Test & Production Welding subsequent to successful completion of all test values and parameters shall be documented in the form of Procedure Qualification Record and shall be submitted to AGL for approval.

3.3.1. Preparation

- After the visual and the non-destructive inspection, the test weld shall be subjected to mechanical test.
- After satisfactory completion of all visual & non-destructive testing the procedure test weld shall be set aside for a period not less the 72 hours.
- Weld specimens shall be taken from the positions as per approved WPS. In addition to API 1104 tests the following tests of minimum numbers to be carried out as tabulated low :-
- Type and Number of Test Specimens for Procedure Qualification Test and Production Welds

Pipe size, outside diameter-inches	Number of Specimens		
	Macro	Hardness	Impact
Wall thickness- under 1/2 inch			
Under 2.375	0	0	0
2.375 to 4½	0	0	0
Over 4½ less than 14¾	2	2	12
12¾ and over	2	2	24
Wall thickness-over ½ inch			
4½ and smaller	0		

Over 4½ less than 12¾	7		
12¾ and over	2	2	24

- Macro and hardness shall be carried out, generally at the top and bottom of the joint suitably as per approved WPS.
- The test shall be carried out at laboratories approved by the Owner/Consultant. The specimens shall be prepared in accordance with the relevant standard code requirements.

3.3.2. Tensile strength

- Specimens shall be taken from the position as per approved WPS. The test shall be carried out in accordance with API 1104. Acceptance Criteria shall be as per API 1104.

3.3.3. Nick-break test

- Specimens for nick-break test with notches, thus worked, can break in the base metal, instead of in the fusion zone; therefore, an alternative test piece may be used after authorisation by the Owner/Consultant with a notch cut in the reinforcement of outside weld head to a maximum depth of 1.5 mm, measured from the surface of the weld head.
- Acceptance Criteria shall be as per API 1104.

3.3.4. Macroscopic Examination

- Specimens shall be taken from the positions as indicated in the approved WPS and shall be prepared in accordance with ASTM E2 and E3. One of the specimens shall be taken from the T-intersection at the line pipe seam weld.
- The width of the macro-section has to be at least three times the width of the weld. The section is to be prepared by grinding and polishing and etched to clearly reveal the weld metal and heat affected zone.
- Specimens shall be carefully examined under the microscope, with a magnification of at least 25 (25:1).
- Owner/Consultant reserves the right to ask for a micrograph with 5 times (5:1) magnification, for Documentation purposes.
- Under macroscopic examination, the welded joints shall show good penetration and fusion, without any defect exceeding the limits stated in the evaluation criteria of the Nick Break test.

3.3.5. Hardness Test

- The prepared macro-section is to be used for hardness testing using the Vickers method (HV10). Test shall be made on selected specimen of weld joint. These series of reading shall be extended from unaffected base metal or one side across the weld to unaffected base metal on the other side. Three transverse shall be made as follows - first 2 mm from the outer edge, the second across the centre and third 2 mm from the inner edge. The specimen between the hardness impressions shall be 0.75 mm. The hardness impression nearest the fusion line shall be with in 0.5 mm.
- Hardness value shall not exceed 325 HV10.
- All the hardness values contained from the heat affected zone shall not exceed 40 HV with respect to the average hardness values obtained for the base metal. If these additional tests give hardness within the specification limit the slightly higher value may be accepted.

3.3.6. Charpy-V-notch Impact test

- Specimens shall be taken from the position as per approved WPS. The test shall be carried out in accordance with ASTM-370.
- Five test specimens shall be taken from each sample and they shall be cut and worked so that their length is transverse and perpendicular to the weld bead with the notch position. The notch shall be perpendicular to the rolled surface. The test specimen width shall depend upon the pipe wall nominal thickness as following:

Nominal wall thickness in mm	Test specimen width in mm
Over 12	10

- Test pieces shall be immersed in a thermostatic bath and maintained at the test temperature for at least 15 minutes. They shall then be placed in the testing machine and broken within 5 seconds of their removal from the bath.
- The test temperature shall be 0ºC.
- The acceptable values of the impact energy shall be as follows:

Test specimen size (mm)	Average of three specimens (Note 2) Joules (Minimum)	Any single value (Note1) Joules (Minimum)
10.0	27	22

Note:

1. These values are specified for resistance to brittle fracture only. Where additional requirements are specified by Owner/Consultant, the same shall be followed.
2. Two samples of the highest and lowest values shall be discarded.

3.3.7. Bend test requirements

- The Bend Test Specimens shall be made and tested as per the requirements of API 1104.
- The acceptance criteria shall be as per API 1104.

3.4. SPECIFICATION FOR WELDING ACTIVITY

3.4.1. PURPOSE

- This Procedure covers the method for various Welding related activities including Station Piping Welding, Weld Repair, Golden Joint and Weld Joint Numbering during the execution of Aavantika Gas Limited (AGL) CGD Project.

3.4.2. SCOPE OF DOCUMENT

- The content in this procedure is to establish the guidelines for Welding works of steel pipeline which covers procedure for Station Piping Welding, Weld Repair, Golden Joint and Weld Joint Numbering during the execution of Steel Pipeline Construction by Contractor.

3.4.3. REFERENCES

- Approved WPS & PQR (ASME Section IX)
- Gas Transmission and Distribution Piping Systems ASME: B31.8
- Standard for welding of pipelines and related Facilities-API 1104 Latest edition
- PNGRB T4S CGD, PNGRB T4S NGPL
- APPROVED EQT
- ASME Section II part - A. sec II part-C & sec V.
- General Arrangement Drawing (Released for Construction)
- Approved Isometric Drawings

3.4.4. SPECIFIC COMPETENCY REQUIREMENTS

- B.E. with relevant and adequate Experience in Project Management preferably in CGD sector.
- Knowledge of relevant code and standard.

3.4.5. TOOLS AND TACKLES

- Pipe Layer/Hydra Crane
- Diesel Welding Generator Set
- External Clamp with mechanical jack
- Beveling Machine
- Pipe- cutting (beveling cutter)

- Hand –cutting set
- Grinding Machine GQ4, AG5 & AG7
- Wire or Power Brush
- Welding Booth
- Hand Tools i.e. Chipping Hammer, Gloves, Welding Shields etc.
- Flame Heating Burner with LPG Cylinder
- Filler gauge
- Hi Lo gauge
- Welding gauge
- Clamp meter
- Thermo meter/Thermo pen
- NDT Crew (UT/LPT)

3.4.6. PERSONAL PROTECTIVE EQUIPMENT / SAFETY TOOLS

- Safety Shoes
- Safety Helmet
- Safety Gloves
- Face Shield
- Boiler Suit/Cotton Coverall
- Cotton mask
- Fire Extinguisher
- Barricading & Sign Board

3.4.7. PROCEDURE

3.4.7.1. Mainline Welding

- Prior to start of fit-up bevel, cleaning shall be carried out using power brush from the edge of bevel for inside and outside of pipe. Bevel shall be visually inspected for any dent/damage or improper machining.
- Before starting the welding full weld joint, if required, it should be cover with temporary booth which contains fire resistance cloth to protect welding space from weather until the weld completed.
- Dents in bevels with a depth of less than 1 mm shall be removed by Contractor during cleaning, grinding. If the depth of bevel dent/defect is between 1 mm and 3 mm. Contractor shall re bevel the pipe end by beveling/ grinding machine. If the depth of bevel dent/defect is more than 3 mm, Contractor shall cut the defective bevel end and re bevel the pipe end. The beveling shall be done using a beveling/ grinding machine. Such new bevels shall be examined by 100% visually & by 100% LPT & UT method, inspected to ensure free from laminations and record shall be maintained. The cut bevel shall be checked with bevel gauge before fit-up of the joint.
- Pipes shall be checked for correct thickness, dia. and spec, with respect to the approved alignment sheets. The first pipe shall be positioned on skids of appropriate height from the ground supports shall be minimum two per pipe and skid shall have soft pads placed over them to avoid damage to the PE coating, Pipes shall be locked to prevent their rolling from the skids. External/Internal shall be loaded as required. The second pipe shall be held by side boom/ crane and shall be aligned with the first pipe and the external clamp shall be actuated. The root gap shall be checked as per qualified WPS.
- For welded pipes, circumferential weld seam and longitudinal weld seams of adjoining pipes shall be staggered such that a both longitudinal welds or at top 90º quadrant of the pipeline whichever is lesser (Except for bends).
- For pipe of same nominal wall thickness the off-set shall not exceed 1.6 mm. The offset may be checked from outside using dial gauges.

- The branch connection sleeve, etc. shall be minimum 150 mm from any other weld. The welds for fittings shall be so located that the toe of the weld shall not come within 50mm of any other weld. Cold dressing is permissible only in cases of slight misalignment and may only be carried out with a bronze headed hammer. Hot dressing shall not be permitted.
- The offset may be checked from outside by dial gauges or hi-lo gauge. When different thickness are involved, the thickness of higher pipe shall have a taper of minimum 1:4 by grinding or any other means at inside of pipe at site, alignment and fit-up shall be checked before welding and the welds shall be subject to both ultrasonic and radiographic inspection.
- Before starting of welding works Contractor shall submit batch Certificates of the electrodes for review & approval.
- Maximum inter pass temperature shall be 250°C as per WPS.
- Earthing clamp shall be used for connecting pipe to welding machine terminal.
- Welding shall be done as per the approved welding procedure specifications (WPS). Only qualified welders shall be engaged, and each welder shall bear an identity card during welding operation.

Shielded Metal Arc Welding (SMAW) :

- When an external line-up clamp is used, all spaces between bars or minimum 60% of the root pass length shall be welded before the clamp is released. The remaining pipe shall be adequately supported on each side of the joint.
- The root pass of butt joints shall be executed properly so as to achieve full penetration with complete fusion of the root edges. Welding shall not be interrupted during a pass and shall be completed as early as possible.
- Pre-heating to be done at min. 100°C. Subsequent passes tip to weld completion shall be protected to avoid rapid cooling, if meteorological conditions so dictate. Cleaning between passes shall be done carefully so as to reduce the possibility of inclusions.
- Only one welder shall be used for main line welding work up to the 8” φ pipeline & two welders shall be used for main line welding work above the 8” φ pipeline subjected to client approval.
- In case of two welders to be used, Welder No. 1 shall start from 12'O' clock position and proceed towards 6'O' clock, In respect to Anti-clock wise direction Welder No.2 shall start from 3`O`clock position and proceed towards 6`O`clock and then start from 12 o’clock to 3 o’clock, in respect to clock wise direction.

Guidelines

- Welder shall follow direction of welding as per approved WPS / PQR.
- Cleaning / removing the flux craters, welding irregularities slag etc. by power brush.
- Removal of Clamp shall be disengaged and taken out of the second pipe. The pipe shall be lowered on pre-positioned skids.
- Hot Pass and fill pass Process by SMAW Welding progression shall be as qualified welding procedure.
- Arc strikes outside the bevel surface shall not be permitted. If arc strikes found on pipe, pipe re cut and new bevels shall be examined by 100% visually & by 100% LPT & UT method. The skids used in during welding shall be removed only, after completion of full welding.
- Every pass shall be cleaned by power-brush, grinding machine and chisel, starting and finishing points shall be staggered minimum 100mm apart for every pass.
- Capping shall be max 1.6 mm over the surface of the pipe. Spatters shall be removed, and cleaning shall be done by power brush and any remedial grinding necessary, shall be performed limited to dressing.
- Further subsequent pipe alignment, joints shall be welded in the same manner as explained above.
- For weather protection, windshield made of metallic frame covered by. G.I sheets/canvas shall be provided to cover the welders and joint during welding, if necessary, to protect against rain/drizzling/wind.
- Weld penetration inside pipe shall not exceed 1.6 mm wherever not specified by the applicable codes.
- Visual Examination (as per API-1104)

- All finished welds shall be visually inspected for excessive reinforcement, concavity of welds, shrinkage, cracks, undercuts, dimensions of weld surface porosity and other surface defects. If any such defects are noticed they shall be rectified.

Destructive Testing

- The Engineer-in-charge has the authority to order the cutting of up to 0.1% of the total number of welds completed for subjecting to destructive tests at no extra cost to AGL.
- Destructive test shall also be carried out minimum one joint for each size, thickness and grade.
- In addition, welds already cut out for defects for any reason may also be subjected to destructive testing. If the results are unsatisfactory, welding operations shall be suspended and may not be restarted until the causes have been identified and Contractor has adopted measures which guarantee acceptable results, if it is necessary in the Client opinion the procedure shall be re-qualified.
- If one production weld fails to conform to the specified requirements, Contractor shall cut two additional weld joints from either side of the failed one and shall carry destructive testing as per the specification requirement. If one or both the retested joints fail to conform to the specified requirements, the Client shall select joints randomly in pipeline for production testing. If one or more out of ten joints fail, then welding work shall be terminated and further investigation shall be carried out.
- The CONTRACTOR at his own expense shall carry out the sampling and the re execution of welds. If the results are unsatisfactory, welding operations shall be suspended and may not be restarted until the causes have been identified and the CONTRACTOR has adopted measures, which guarantee acceptable results. If it is necessary in the Engineer-in-charge opinion the procedure shall be re qualified. The weld joint represented by unsatisfactory weld shall stand rejected unless investigation proves otherwise.
- Allowable welding repairing of joints is max 5% per welder. Repair percentage for any welder should be 5% max., minimum of 25 joints shall be welded by any welder for calculating repair percentage calculation. Welder disqualifies after allowable limit.

3.4.7.2. Station Piping

A) Technical Requirements:

Fabrication Area

- Fabrication of different materials/spools if any shall be done in separate areas called fabrication yard, segregated from each other to prevent cross contamination during cutting and welding.

Material Receipt and Storage

- It shall be the responsibility of the contractor to inspect all material upon receipt at site, and ensure that the correct grade of material has been procured and supplied with identification of dimensions, material quality and end preparations are in accordance with the requisite AGL standards and specifications and the same shall be reviewed by AGL.
- Materials found to have been damaged during shipment or prior to receipt or which is incorrectly marked, shall be immediately brought to the attention of AGL, subsequently placed in a storage area separate from acceptable material with sufficient safeguards to preclude its being used.
- All material, whether loose or prefabricated, should be stored aboveground on flat surfaces, platform type skids or other similar approved supports in a manner that will prevent deterioration or any damage.

Damaged Materials

- Material which have been damaged or found to have defects shall not be used except the minor surface marks which may be dressed, provided that the minimum wall thickness is not encroached upon after considering the manufacturing tolerances defined in the appropriate material or purchasing specification. Any dressing will require prior approval from AGL.

B) General Requirements

Welding Requirements

- All welding shall be strict in accordance with the AGL specification. Prior to fabrication, contractor shall submit qualified welding procedure and welder's certificate of qualification to AGL for approval, which meets the requirements of AGL specification.
- Where closing dimensions at the beginning or end of a line are unknown at the time drawings are issued "For Construction", the symbol "FFW" (field Fit Weld) below the tentative dimension shall mean the contractor shall detail and furnish the spool that excess pipe metal can be trimmed to suit actual site conditions when the final closing weld is made, and the same shall be approved by AGL. Additional allowances for welding on test blanks/caps to accommodate hydrostatic test requirements. All RT films & weld visual reports shall be maintained as per Format.
- All welds shall be located to be clear of supporting steel work and pipe support clamps, welded attachments, etc. A minimum clearance of 75mm shall be maintained between welds measured toe to toe.
- Socket weld valves must be open position during welding. The weld shall be allowed to cool between runs to prevent overheating.
- Where valves are butt welded consideration shall be given to the removal of internals (if possible) to avoid damage to seats and seals or the welding shall be performed as per manufacturer's recommendation.

Welding Preparation

- Carbon steel pipe shall be cut by flame cutting provided the cut edge is machined or ground back sufficiently to give specified material properties, with a minimum dressing of 1.5 mm.
- All edges shall be accurate to design requirement with a smooth, even surface and all cutting dress, slag, etc, removed with special care taken to ensure no foreign matter remains inside the pipe.
- All welding work shall be done as per approved Qualified WPS and by qualified Welder.

Installation

- Contractor shall inspect all prefabricated pipe work, valves, piping specials, etc, before installation to ensure that protective packing, covers are removed and internal protective such as silica gel bags and other foreign matter are removed. Protective covers of valves if any shall not be removed until immediately prior to installation.
- Contractor shall examine all pipe work, valves, etc, to ensure that no deterioration has occurred in storage with particular note of valve internals. All manually operated valves shall be cycled from fully opened to fully closed and back again to ensure operability.
- Piping isometrics shall be prepared for all piping and the same shall be submitted to AGL prior to construction, for information, and at the time of job completion, "as built" records shall be prepared.
- Piping shall be supported on to sleepers as indicated on the piping drawings issued by AGL. Where supports other than those shown on the piping drawings are required to facilitate installation, it shall be of removable type. Temporary supports shall not transfer detrimental reactions to piping, structure members. Welding to pipe and/or supports as a temporary support measure during installation, is not permitted.
- Contractor shall check all piping dimensions to headers and equipment and make field adjustments as necessary to assemble pipe work. All modifications other than the 'field fit welds' designated on piping drawings shall be notified to AGL together with the method proposed for rectification before work is commenced.
- Pipe work shall be carefully and accurately fabricated and installed without the use of force to connect closing pieces. Connection to headers or equipment’s shall not be made until the foundation bolting is completed.
- Flanged faces shall be cleaned of protective coating, etc, and checked for mechanical or corrosion damage to the gasket contact surfaces.
- Flange bolts shall be tightened evenly and sequentially to impose even pressure on the gaskets and to avoid distortion or overstressing of equipment.
- Bolts shall be installed so as to leave two to four threads exposed from each nut over long bolts shall not be used.

- Contractor shall ensure that gaskets do not protrude inside pipe bore. And CAF and spiral wound gaskets shall not be reused. If a flange joint must be opened, e.g. for system pressure testing, line flushing, removal of temporary blinds or strainer, etc, the joint shall be re-made with new gaskets. No sealing component shall be applied to gaskets or flange faces.

Pipe Support Installation

- Pipe Supports steel work shall be installed as per GAD drawings and surfaces which will subsequently be inaccessible will be coated in accordance with the surface coating specification, before the pipe work installation, whenever possible.
- Temporary supports shall be limited to the unavoidable minimum span. They shall be designed and manufactured to take all loadings that they will be subjected to AGL Specification/drawings. They shall be painted a suitable colour to warn of the necessity of removal before plant/station start up. The same shall be approved by AGL.

Inspection and Testing

- Prior to Hydro testing, contractor shall submit detailed checklist and relevant documentation to AGL for approval. The same shall be submitted at least 24 hours prior to testing.
- All prefabricated spools shall be dimensionally checked prior to erection to ensure compliance with approved piping GAD drawings/Isometric Drawings. After fabrication of spools, spools to be punched as per line No and recorded as per attached Format.
- AGL shall have the right to examine all aspects of the work at the contractor Fabrication shop at any reasonable time during fabrication and erection, including test and inspection records.
- Line history sheet shall be maintained as per Format and the same shall be reviewed by AGL prior to hydro test.

3.4.7.3. Weld Repair

- A separate welding procedure specification sheet shall be formulated and qualified by Contractor for repair welds simulating the proposed repair to be carried out. Separate procedures are required to be qualified for:
  - Full through thickness repair
  - Partial thickness repair.
- Welders shall be qualified in advance for repairs and in accordance with "Qualification and Procedures of Welders". The root pass, for repairs opening the root, shall be done by the vertical up technique. The procedure shall be proven by satisfactory procedure tests to API 1104 including the special requirement of the specification, and shall also be subject to metallographic examination, hardness surveys and Charpy tests to determine the effects of repair welding on the associated structure.

Location:

- With respect to radiography or other NDT method, location shall be marked on the weld with reference to marking of ref. Points (markers).

Method of Evaluation

a) Partial repair (External):

- Each layer will be thoroughly checked for this type of discontinuity shown in NDT reports. Smooth grinding will be done to make ‘V’ Groove and clean all surfaces. This is limited to 30% of weld length only. Minimum 2 runs shall be made for partial repair. After cutting the repair area, Contractor shall be checked and ensure that the defect has been removed, by LPT on cutting area.

b) Through repair / Root Repair

- Grinding will be done up to the root, opening will be done by chisel, hacksaw blade. The entire vol. will be ground smoothly to ‘V groove, root gap will be achieved using blades, thin grinding wheels and filing. Maximum repair length is 20% of weld. The minimum length of a repaired area shall be 100mm as measured over the recapped length.

- Die-penetration test shall be done during and after removal of defective weld metal by grinding to ensure that the defect has been removed. After removing of the same, welding for repair should be carried out.

Welding

- Welding shall be done as per approved WPS and PQR (for repair of weld) after identifying the defects. Care shall be taken to ensure that no grinding marks are made on pipe surface anywhere. Repair weld deposition shall be smooth, free from burrs, cuts and other surface irregularities. The root gap shall be made carefully and shall conform to the welding procedure. The welded area shall be thoroughly cleared.
- The repair welding shall have a minimum preheat of 100°C and shall be preheated for at least 50 mm on either side of repair
- Any repaired area that is irregular shall be rejected and a full cut out and re-beveled to make a joint Repairs opening the root shall be carried out in the presence of experienced Supervisor. All repairs shall be carried out during the day after initial radiography. Weld shall be cut at zone of at least 50 mm at pipe material on both side of the welds & new bevel shall be made & checked by LPT. Shallow crater crack or star crack shall not be repaired by welding. Crack must be removed by cutting. RT & UT as per Client Specification shall re inspect weld repair.
- The reports of all repairs shall be maintained by Contractor and shall be submitted every day to client for review. Contractor shall identify the welders giving repairs more than acceptable limit and that particular welder shall be warned by Contractor.
- In case the percentage of repair is not reduced within acceptable limits after issuing warning letter, welder shall be rejected by Contractor.
- Allowable welding repairing of joints is max 5% per welder. Welder disqualifies after allowable limit.
- Each pass will be thoroughly cleaned using power brush / grinder.
- A qualified welder for the appropriate process, consumable and direction alone will be envisaged.
- Welding should be carried out in accordance with approved PQR.
- Parameters are as per WPS & PQR (approved)

NDT

- Liquid Dye Penetrate test for repair area after cutting.
- Radiographic inspection which covering the repair weld length.
- Ultrasonic Examination which covers the repair welds length.

3.4.7.4. Golden Joint

- All work shall be carried out as per approved WPS/PQR.
- The Section to be welded shall have over lapping, uncovered pipe of enough length to absorb, without including excessive stresses in the steel, small displacement necessary for perfect alignment and connection of the ends.
- For Golden Tie In at already hydro-tested section, the pre-tested pup pieces shall be used. Alignment and fit up should be checked before starting welding as per WPS/PQR.
- Welding joints 100% tested by Ultrasonic & Radiography testing.
- UT Shall be checked on pipes which have been cut to an extent of 25mm at the new bevel to ensure it is free from lamination. The new bevel shall be 100% visual and 100% DP tested and the report shall be prepared for all the above tests.
- Before any pipe length is cut the coated Pipe No., Heat No. shall be transferred to the either side of pipe-length of the cut pipe also recorded and painted with pipe no. and heat no.

3.5. SPECIFICATION FOR TESTING ACTIVITY

3.5.1. PURPOSE

- The purpose of this procedure is to establish various Valve testing procedures including Pre-Hydro testing, Pneumatic Testing, Shall Test, Seat Test & Valve Passing Test of Steel pipeline.

3.5.2. SCOPE OF DOCUMENT

- This is applicable for the following testing wherever required by Aavantika Gas Limited (AGL) CGD projects -
  i. Pre-hydro testing of Valve section & Hookup connectivity section to be used for CNG/CGS/DRS Connectivity.
  ii. Pneumatic Testing of all types of valve.
  iii. Shall Test & Seat Test of All type of valves.

3.5.3. FIELD OF APPLICATION

- This procedure is applicable for
  i. Mainline testing headers and Pre hydro testing header during the City Gas Distribution Project.
  ii. Hydro testing & Pneumatic Testing with Nitrogen or Air of UG Valve & station piping assemblies to locate leaks in the flanged joints, Valves etc. by the application of soap solution.

3.5.4. REFERENCES

- AGL Tender specification
- API 6D: Specification for Pipeline Valves
- API 598: Valve inspection and Testing
- ASME B 16.34: Valves - Flanged, threaded and Welding Ends
- API 1104: Welding of Pipeline and related Facilities
- Line History Sheet
- Calibration Certificates

3.5.5. SPECIFIC COMPETENCY REQUIREMENTS

- B.E. with relevant and adequate Experience in Project Management preferably in CGD sector.
- Knowledge of relevant code and standard.

3.5.6. TOOLS AND TACKLES

3.5.6.1. Pre- Hydro Testing

- Water Fill Pump
- Manual Pressurization Pump
- Digital Pressure Gauge
- Testing Header & accessories/fittings
- Waring/caution signs

3.5.6.2. Pneumatic Testing

- Nitrogen Cylinder Bank/ Tanker
- N2 Pouring Header or Manifold
- Suitable Pressure hoses – As required
- Pressure gauge
- Soap solution for leak test

3.5.7. PERSONAL PROTECTIVE EQUIPMENT / SAFETY TOOLS

- Safety Shoes
- Safety Helmet
- Reflective Jacket
- Safety Gloves
- Hard barricading
- Caution Board
- Caution Tap

3.5.8. PROCEDURE

3.5.8.1. Valve Installation

- When removing the valve from storage, proper inspection to be done for any sort of damage. (Applicable when valve is directly dispatched at site).

- Before installing the valve, remove the protective covering and end-caps to ensure there are no serrations on flange face and it is not damaged.
- Prior to installation, ensure that the pipeline/valve is clean from debris, scaling, etc. since this will damage the soft seat inserts of the valve and it may cause seat passing during testing/commissioning.
- Valves can be mounted in a horizontal (with stem upwards only) or vertical position depending on pipeline routing/Valve assembly drawing.
- It may be necessary to firmly support the pipeline to protect the valve from excessive stress and pipeline vibrations (applicable for above ground installation).
- To facilitate servicing, it is recommended that the valve body must be supported, using approved support devices. Do not fasten supports to flange bolting or actuator (wherever applicable).
- Valve's shall be in open position during welding.
- Welding operation must be performed by a qualified welder. The welding procedure shall be performed according to API 1104.
- To prevent seat/seal damage during welding installation, do not allow the temperature of the valve body seat area to exceed 200° F (94° C). Use thermal chalks/temperature guns to monitor temperatures and suitable means (such as ceramic wool etc.) can be used around valve body to prevent direct heat transfer.

3.5.8.2. Field Testing:

- Prior to field testing of valves only pretested pipes need to be used
- Field valve test shall be done strictly as per this document. There shall not be any deviation unless until approval from competent authority.
- Clean the pipeline by blowing through the system with water to remove any internal protective films/coatings that may be present.
- While testing the pipeline and valve assembly use only Tested clean fluids
- Manual Pressure pump shall be used for short length section / Valve assembly hydro test. In exceptional cases electrical pressure pump can be used with additional safety device (safety relief valve) which shall be installed in testing Header.
- Safety relief valve shall be calibrated and set at 5% higher than test pressure.
- Operate the valve once to check for smooth operation.
- If no obvious problems are observed, the test pressure may be applied, and tightness and operability may be checked.
- The pipeline shall be filled with water with all valves in fully open position. This will push all construction debris downstream to the end of the test section instead of having the debris fall into the bottom of the valve body where it could plug off the body vent or body bleed fitting.
- Prior to pressurizing/filling of water, valves shall be rotated to half closed/ open position. This will prevent the possibility of a pressure differential in the valve body during hydrostatic testing.
- Pressure will be raised to 50% of test pressure and pumps shall be stopped to check leakage in every joint, flange and fittings.
- After ensuring no leakages pumps shall be re-started and valve assembly to be pressurized till final test pressure.
- Only Pre-tested headers with traceability to be used before every valve hydro testing, also it need be ensured that properly cleaned pipe to be used during valve assembly fabrication and testing.
- Ensure the tested water (for PH & Chlorine content) is being used for hydro testing.
- Minimum Test Duration and pressure recommended below is as per API 6D, 24th Edition and various OEM recommendations.

Table 1a - Pressure Test as per API 6D and OEM recommendation

Sr.	Medium	Test Type	Ball position	Test Pr.	Acceptance criteria
		Shell Test	Half Open / Close	77 bar	No visible leakage from Body / Gland

1	Hydro	Seat Test	Full Open	58 bar	No visible leakage from Vent/ Drain/ NRV
		Seat Test	Downstream	58 bar	
		Seat Test	Upstream	58 bar	
		Seat test	*DBB	58 bar	
2	Pneumatic	Seat Test	Full Open	6 bar	No Air bubble
		Seat Test	Downstream	6 bar	
		Seat Test	Upstream	6 bar	
		Seat Test	*DBB	6 bar	

Table 1b - Shell Test

Valve Size		Test Duration
DN (mm)	NPS (inches)	In mins
15-100	1/2 to 4	2
150-250	6 to 10	5
300-450	12 to 18	15
≥500	≥20	30

Table 1c - Seat Test

Valve Size		Test Duration
DN (mm)	NPS (inches)	In mins
≤100	≤4	2
≥150	≥6	5

*DBB – Double Block and Bleed

Note: Duration of test mentioned in Table 1b is only for Valve. If other fittings, Pipe, etc is installed along with Valve then Shell test duration is minimum 4 hours.

3.5.8.3. Body Shell Test

- Every valve shall be subjected to a hydrostatic test of the body shell at 1.5 times the rated pressure at 100°F (38°C), see Table 1a and latest edition of API 6D. The body should remain tight for the test duration given in Table 1b. The test shall show no leakage, no wetting of the external surfaces, and no permanent distortion under full test pressure.
- The valve shall be set in the half open position for this test and filled with test fluid. Blank off the ends of the assembled valves. Any entrapped air should be vented from both ends and the body cavity or via either of them.
- The gland and any body connections shall be deemed as a part of the pressure envelope.
- The valve shall then be brought to the required test pressure (stage wise pressurization)
- All external surfaces should be dried, and the pressure shall be held for at least the minimum test duration.
- There shall be no visible leakage during the test duration specified in Table 1b & 1c.
- If leakage is found, applicable corrective actions may be taken to eliminate the leakage and the test is repeated.

3.5.8.4. Hydro Seat Test

- Every valve shall be subjected to a hydrostatic seat test as per table and latest edition of API 6D. The seat sealing surface / closure interface shall be free from oil, grease and sealant. There shall be no visible leakage during the test period defined in Tables.
- With the valve in partially open position, the cavity shall be filled with test fluid and any entrapped air should be vented from both ends and the body cavity or via either of them.
- Any passing in the valve during hydro seat test need to be checked through body cavity drain (where fitted)
- No passing to be observed from sealant pipes fitted with Stem, D/S and U/S seats.

- Floating Ball (other than a double block & bleed) - The pressure shall be applied successively to each side of the closed valve with the other side open to the atmosphere to check for leakage at the atmospheric side of the closure.
- Trunnion Ball (double block & bleed) - The pressure shall be applied successively to each side of the closed valve through the valve port. Any excess fluid in the body cavity should be allowed to drain. The seat test shall be held for at least the minimum test duration. Check for leakage into the body cavity. If the seat pressure is held successfully, then the other seat shall be tested in the same manner.
- If leakage is found, applicable corrective action may be taken to eliminate the leakage and the seat test shall be repeated. If the valve is disassembled to eliminate the leakage, all previous testing must be repeated upon re-assembly.

3.5.8.5. Pneumatic Seat Test

- Every valve shall be subjected to a Pneumatic test at 100°F (38°C), see Table 1a and latest edition of API 6D for test pressure and duration.
- Air hose to be connected with vent connection to check any passing is observed at the given pressure. (inside water bottle)

3.6. TECHNICAL SPECIFICATION FOR PAINTING

3.6.1. GENERAL

- These technical specifications shall be applicable for the work covered by the contract, and without prejudice to the provisions of various codes of practice, standard specifications etc. It is understood that contractor shall carry out the work in all respects with the best quality of materials and workmanship and in accordance with the best engineering practice and instructions of Engineer-In-Charge.
- Wherever it is stated in the specification that a specific material is to be supplied or a specific work is to be done, it shall be deemed that the same shall be supplied or carried out by the contractor. Any deviation from this standard without written deviation permit from appropriate authority will result in rejection of job.

3.6.2. COLOR CODE FOR PIPING:

- The color code scheme is intended for identification of the individual group of the pipeline. The system of color coding consists of a ground color and color bands superimposed on it.
- Line coating shall meet DIN 30670 standard for external coating and API 5L RP – 2 for internal coating.
- The thickness for the epoxy should be 180 microns, adhesive 200 microns and balance should be PE
- The minimum coating thickness on weld seam shall be 3.2 mm and minimum coating thickness on body should be 3.2.

3.6.3. COLOR CODE:

A) Ball Valve (Above Ground) : Off White
B) Globe Valve (Above Ground) : Oxford Blue-RAL 5005, IS-519941005
C) Check Valve(Above Ground) : Oxford Blue-RAL 5005, IS-519941005
D) Launcher / Receiver : Yellow Golden
E) Jib Crane / Trolley : Yellow Golden
F) All underground valves shall have epoxy base coating after surface finish of SA 2:5
G) Valves and above ground pipes need to be properly blasted to achieve surface finish of Sa 2:5 before the application of Golden Yellow paints. (**Primer**: Catalyst For Epilux 610 CTG GREY; **Paint**: Bthane PU Glossy FIN Golden YLW).

3.6.4. MANUFACTURERS

- The paints shall conform to the specifications given above and Class-I quality in their products range of any of the-following manufacturers:

  i. Asian Paints (India) Ltd
  ii. Bombay Paints
  iii. Berger Paints India ltd.
  iv. Gaodlass Nerolac Paints Ltd.
  v. Jenson & Nicholson
  vi. Shalimar Paints

3.7. TECHNICAL SPECIFICATION FOR CATHODIC PROTECTION

3.7.1. Procedure for Cable Laying

- Before Starting the work check material against datasheet & test certificate.
- Cables shall be laid in accordance with standard specification/approved layout drawings.
- Check IR value before and after laying.
- No joint shall be permitted in a single run of anode and a cathode cable. Cable route shall be carefully measured and cables to be cut for required length including required loops at either end. Minimum half meter slack/loop shall be provided near anodes, pipeline, and test stations to account for any adjustment.
- Obtain the cable route approved prior installation /excavation in plant area.
- All cables inside station/plant area shall be laid at a depth of min 0.75 mtr and Cable outside plant/ station area shall be laid at the depth of 1.5 mtr. Cables shall be laid in sand under brick cover backfield with normal soil and in rocky terrain area cable shall be laid at min 0.5m depth. Outer or inside plant the route shall be marked with polythene cable warning mats placed at a depth of 0.4/0.9m from the finished grade for 0.75 & 1.5mtr installations.
- C.P. System shall be laid in G.I. conduit of sufficiently size up to accessible height for protecting against mechanical damage with all fittings, fixtures, and accessories.
- The armour of all the cables from pipeline to test station (potential measurement, reference cell cables, cathode cables etc.) and test station to ground bed (anode cable) shall be clipped at both end of the cable to avoid armour carrying CP current. The cable armour shall be insulated by cutting and taping with insulation tape.
- Cable termination should be by means of correctly sized crimped Tinned copper lugs. Crimping shall be by means of proper Crimping tools only.
- Installation shall be recorded in Installation formats.
- Cables are to be of sufficient length so as to reach the termination point without any joint with sufficient loop for further maintenance purpose.
- All cables are to be appropriately tagged.
- Prior to unloading/installation cable shall be checked for mechanical Damage. One set of drawings/documents should be kept by site supervisor at workplace. Proper Personnel Protective Equipment (PPE) shall be used during works at site.

3.7.2. Procedure For Sacrificial Zinc Anode Installation

- Before Starting the work check material against datasheet & test certificate.

- Measure 2m distance from pipeline to left side (or) right side of ROU based on the land availability and mark anode location.
- Excavate the pit upto1.5m and Width as requires vertical or horizontal. The top of the anode shall be at the bottom of the pipeline.
- Install the pre-packaged sacrificial Zn anode in the excavated pit. The anodes shall be installed either horizontally or vertically as per design with the top of the minimum 1.5mtr.
- The Prepacked galvanic anode, top of the anode shall be installed at min depth equal to bottom level of the pipeline or 1.5m depth whichever is deeper.
- The anodes shall be installed perpendicularly to the pipeline. Backfill the excavated soil and soil shall be tamped down.
- Measure and record open circuit potential of anode after installation.
- At any location if rock is found than anode shall be installed at 0.5m depth or equal to depth of pipeline whichever is higher in horizontal configuration, this is to avoid current shielding because of rock; however, it should be ensured that the pipeline is protected cathodically.
- The anodes shall be installed in a manner as above to avoid interference problems on the existing pipeline in a common ROW. (i.e.) anode shall not be installed on existing pipeline side
- Excavate a trench of 0.3mx1.5m deep from excavated location to test station location for cable laying.
- If more than One anode is to be installed at location, the centre to centre spacing between consecutive anodes shall be 2M to 3M.
- Terminate cable in test station as per connection scheme.
- The anode open circuit potential shall be measured after installation w.r.t. a portable copper- copper sulphate reference cell.
- The Anode shall be soaked in water before installation for minimum one day.
- Install pre-packaged anode carefully. While lowering, the anode should not be suspended or lowered by its lead wire.
- Anode shall be soaked in water before installation for minimum one day.
- The backfilling soil shall be without stones and garbage etc. and well compacted to a void later.
- If native soil is dry than watering may be done for proper moisture and reduce resistance.
- All cables are to be properly tagged. All cable connections should be checked for proper tightening. Anode Tail Cable should be of enough length so that it reaches TLP without any Joint. Epoxy Hardener should be solid, and no air gap holes be for the backfill.
- One set of Drawing/Document should be kept by site supervisor at workplace. Proper Personnel Protective Equipment (PPE) shall be used during works at site

3.7.3. Procedure For Test Station Installation

- Before Starting the work check material against datasheet & test certificate.
- The location of the test station shall be marked on right of use as per approve document with their connection scheme and other related information on alignment sheet.
- Make a pit of dimension 0.8mx0.8mx0.8m. The distance of pipeline centre to foundation pit centre shall be 2 m on the Right or left hand sidesteps shall not be installed at the Space between parallel pipelines.
- Fix shuttering plates. Place the reinforcement and pipe bend and level it to ensure that cable entry point be faced towards the pipeline.
- Bonding provision at test station shall be provided at every 5km interval for Existing Pipeline.
- Place a PVC ring/bushing on the rim of the M.S pipe protruding out of the foundation block to avoid damage to cable insulation while pulling the cables in to the enclosure.
- Foundation should be cast either at site location. The overall dimensions of foundations shall be 600 mm x 600 mm x 800 mm as per drawing. The concrete mix should be of RCC M 20 Grade & ensure

about compactness of foundation. The foundation cast should be properly watered and cured appropriate. 150mm PCC shall be done on top of the foundation after installation of test station.

- Pull the cables upto the top of foundation and then drive them through the support pipe into the enclosure. The cable entry shall be sealed properly after laying of cable to avoid entry of water into test station.
- The M.S. support pipe along with enclosure should be erected on top of foundation block by matching the base plate bolt welded with baseplate.
- Test station shall be sealed at both side of cable entry.
- The orientation of the terminal enclosure should be such that its door faces the pipeline.
- Mount the necessary hardware within the enclosures and terminate the cable on to the respective terminals. No of terminal and different scheme of wiring shall be as per the Test Station connection Scheme. Minimum 20% spare terminals shall be provided in each test station. Refer to respective connection scheme drawing as per approved Test station schedule.
- Test station No. shall be painted on test station along with arrow showing direction of product flow by 40mm stencil block letter in black along with chainage detail and TLP No. or as directed by EIC of Aavantika Gas.
- The name plate of test station shall in minimum carry following information which is to be fitted during commissioning of PCP system.
- 150mm PCC shall be done on top of the foundation after installation of test station.
    - Test station number
    - Chainage in Km
    - Test station connection scheme type (Permanently Fixed)
    - Distance from pipeline in meters.
    - Direction of product flow
- Installation shall be recorded in installation formats.
- Cables used shall be of enough length so as to reach termination point without any joint provide sufficient care for feature maintenance purpose.
- Test station for bonding shall be provided with shunt and Resistors as means to monitor and control current.
- Test station should be straight & level to check before final setting.
- All cables are to be appropriately tagged & all the connection should be checked for proper tightening.
- Cable core ferrules are to be provided at end before final termination & cable should be neatly dressed inside the trench and to be terminated inside test station.
- Test station used for sacrificial anodes shall have shunt for measurement of anode current and provision for variable resistance insertion to limit the anode current outputs.
- All necessary civil work should be done to protect the Test Station.
- One set of Drawing/Document should be kept by site supervisor at workplace. Proper Personnel Protective Equipment (PPE) shall be used during works at site.

3.7.4. Procedure for Surge Diverter Installation

- Surge diverter shall be installed to avoid the damage to the isolation joints from excessive over voltage across the joint due to lightning or overhead AC power line failure.
- Check the location of the Isolating Joints and check the insulation of the joint.
- Measure the Copper Strip & cut for required length. Connect the strip by clit welded with pipeline and tight the bolt (Brass nut and bolt).

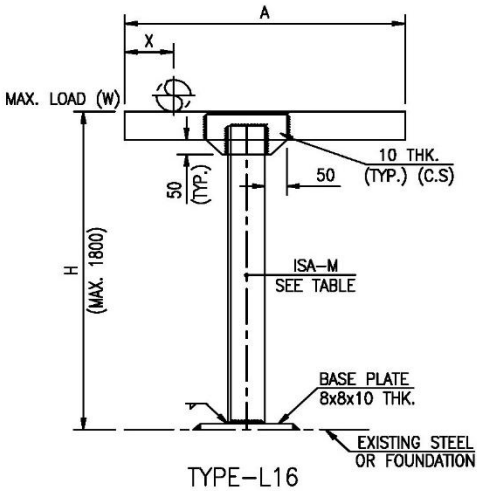
- Connect the Surge diverter across the Insulation Joint in the copper strip and tight the bolt.
- All the exposed connection parts with the pipeline shall be covered by means of Epoxy- Hardener.
- Measure the PSP readings at both sides of the IJ/Surge Diverter. Connect all the cables as per F-Type test station.
- Visually inspect the surge diverter before mounting/connecting it. Polarity to be checked as per manufacturer instructions.
- All the cable connection should be checked for proper tightening & tagging. One set of Drawing/Document should be kept by site supervisor at workplace. Proper Personnel Protective Equipment (PPE) shall be used during works at site.

APPROVED VENDOR LIST - CP SYSTEM		
Sr.No.	Item	Name of the Vendor
1	TEST STATIONS (Non-Flame proof)	Advance Electronic Systems
2		Kriston systems, Mumbai,
3		Shakti Enterprises Ahmedabad
4		Corrpro Asia PVt Ltd
5		Raychem RPG Pvt.Ltd
6		Corrosion Control Services Mumbai
7		Control Plus Oil & Gas solutions Pvt. Ltd.
8	TEST STATIONS (Flame proof)	Flameproof Equipments Private Limited
9		FCG Flameproof Control Gears Pvt. Ltd.
10		Baliga Lighting Equipments Private Limited
11	CABLES	Netco Cable Industries Private Limited
12		Ravin Cable
13		KEI, Silvassa
14		Gloster Cables Limited
15		Suyog
16		Cables Corporation of India Ltd.
17	SURGE DIVERTER	DEHN GmbH + Co. KG
18		Dairy land Electrical Industries

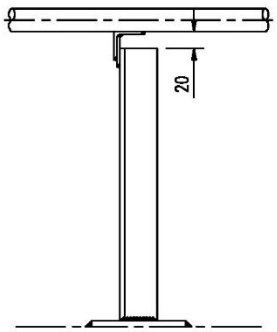
19		M.C. Miller Co., Inc.
20		International Corrosion Control Co.
21	ZINC GROUNDING CELL/ MAGNESIUM ANODE/ZINC ANODE	Electro Protection Service India Private Limited
22		Metal founders,Mumbai,
23		Shakti Enterprises Ahmedabad
24		Protech Anodes & Alloy Engineers
25		Scientific Metal Engineers (P)Ltd.
26		Control Plus Oil & Gas solutions Pvt. Ltd.
27	PIN BRAZING	Safe Track
28		Back Seal
29	ANODE BACKFILL MATERIALS	Loresco,USA,
30		Goa Carbon,GOA,
31		Indian carbon,Calcutta,
32		Petrochemical & chemical company, Haldia

Note: In addition to above approved vendor list, if material is to be procured from some other party, then approval is to be taken from EIC on submission of requisite documents such as, previous track record of supply of subject material to reputed Hydrocarbon company (GAIL/HPCL/BPCL/IOCL/PSU-JV/CGD etc)

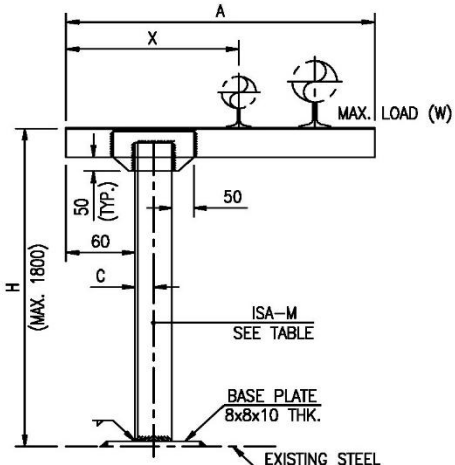
3.8. PIPING STANDARD DRAWING



TYPE–L16



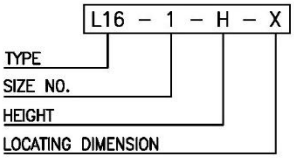
SIDE VIEW



TYPE–L16A

NOTE:–

1. DO NOT USE FOR ANCHORING THE PIPE.



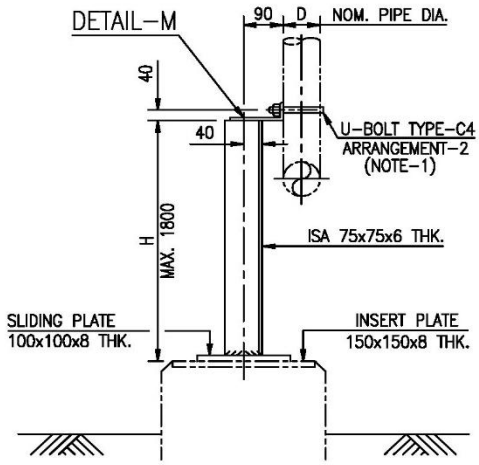
SYMBOL

SIZE NO.	MAX. LOAD (W) Kg.	M	A	B	C
1	500	ISA 80x80x8	600	150	45
2	800	ISA 100x100x10	700	150	60
3	1500	ISA 130x130x12	800	150	80

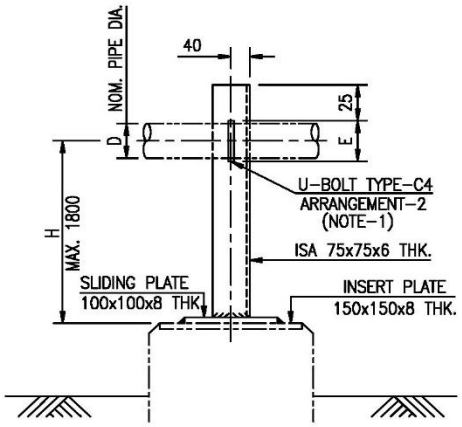
REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.
0	11.06.09	APPROVED	DK	GV	DDS

LOW SUPPORT STANCHION
TYPE–L16 AND L–16A

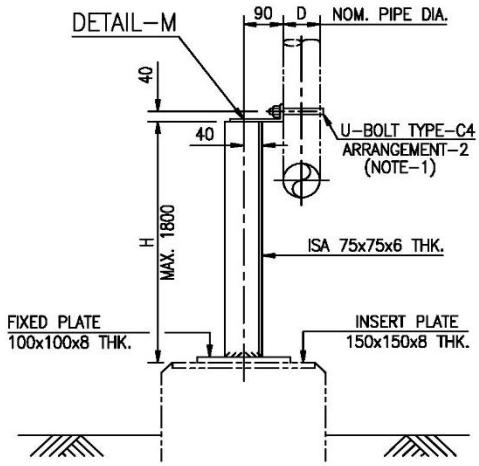
DRAWING NO.
1–08–007
SHEET NO. 1 OF 1



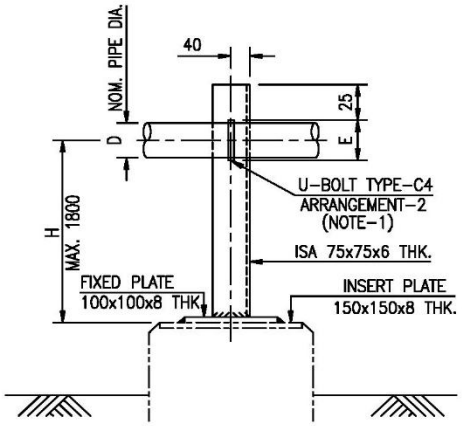
ARRANGEMENT TYPE–1
(SLIDING)



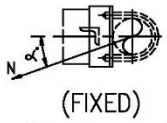
ARRANGEMENT TYPE–2
(SLIDING)



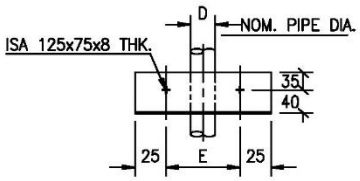
ARRANGEMENT TYPE–3
(FIXED)



ARRANGEMENT TYPE–4
(FIXED)



(FIXED)
(FOR TYPE–1 & 3)



DETAIL–M

D	E
3/4"	36
1"	45
1 1/2"	60

α = (FOR TYPE 1 & 3) L15 – 1 – H – D

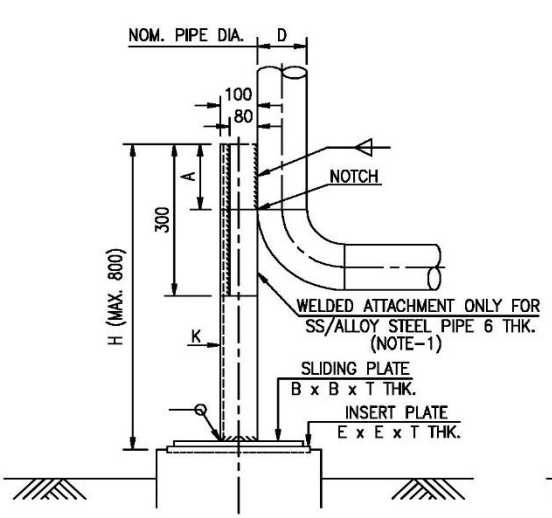
TYPE
ARRANGEMENT TYPE
HEIGHT
NOM. PIPE DIA. (INCH)

SYMBOL

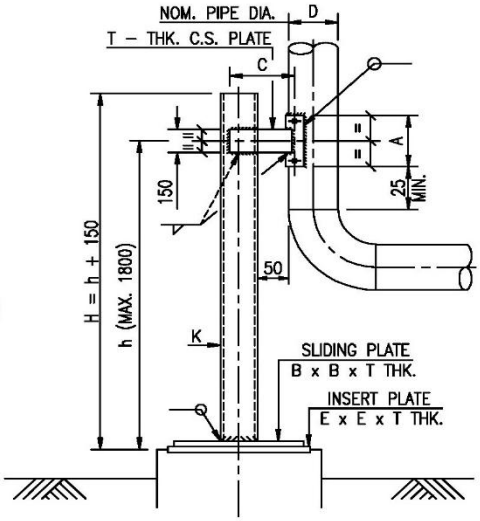
REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.
0	11.06.09	APPROVED	DK	GV	DDS

LOW SUPPORT SLIDING AND FIXED FOR PIPE SIZE 3/4" THRU 1.1/2" TYPE L–15

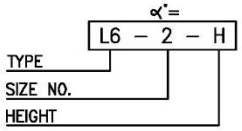
DRAWING NO.
1–8–008
SHEET NO. 1 OF 1



FOR PIPE SIZES 2" THRU 4"



FOR PIPE SIZES 6" THRU 24"



SYMBOL

NOTES:–

1. MATERIAL FOR WELDED ATTACHMENT SHALL BE EQUIVALENT TO PIPE MATERIAL.
2. PROTECTION SHIELD IS TO BE CUT FROM LINE PIPE.

SIZE NO.	D	K	A	T	C	E	B
1	2" TO 4"	CUT FROM ISMB 200	200	10	–	250	150
2	6" TO 10"	ISMC–125 2 NOS.	200	12	150	300	200
3	12" TO 24"	ISMC–225 2 NOS.	300	12	230	400	300

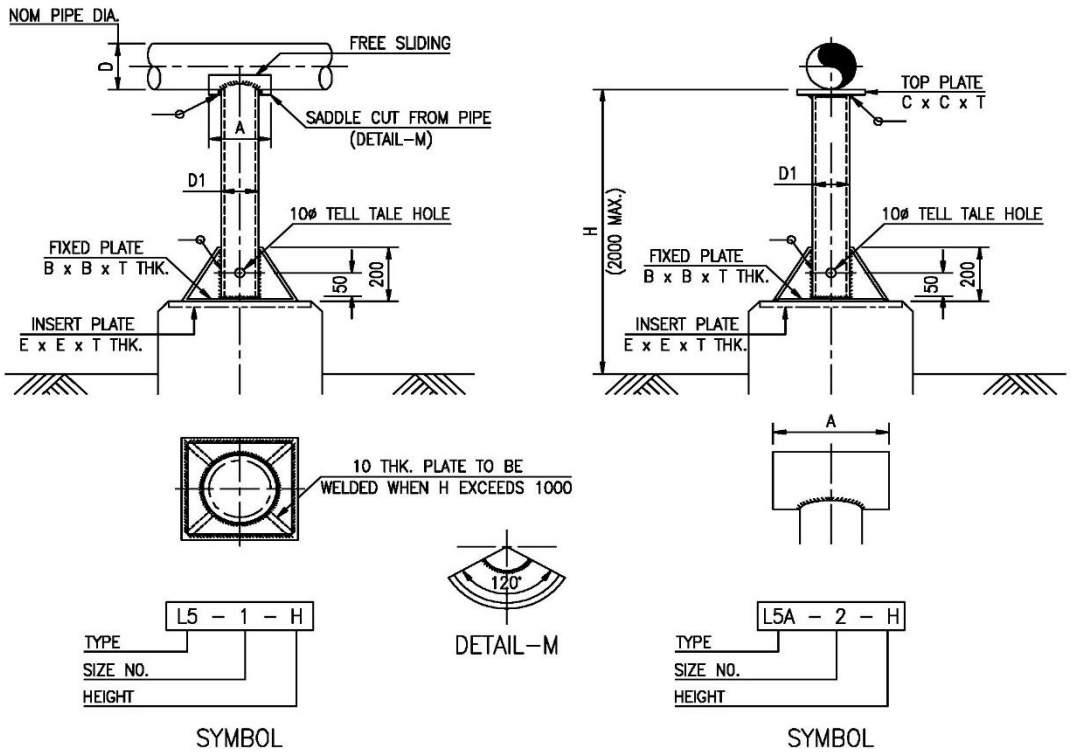
FOR TEMP. UP TO 400 °C ONLY

REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.
0	11.06.09	APPROVED	DK	GV	DDS

LOW SUPPORT SLIDING FORBARE & INSULATED PIPE SIZE 2" THRU 24" TYPE–L6

DRAWING NO. 1–08–009

SHEET NO. 1 OF 1



SIZE NO.	D	A	D1 (NOTE-1)	C	B	E	T
1	3/4"	2" NB x 100 Lg.	2" HEAVY IS :1239	150	150	200	12
	1"						
	1.1/2"	3" NB x 100 Lg.		200			
	2"						
2	3"	6" NB x 150 Lg.	2" HEAVY IS :1239	200	150	200	12
	4"						
3	6"	10" NB x 250 Lg.	3" HEAVY IS :1239	300	200	250	16
	8"						
4	10"	14" NB x 350 Lg.	4" HEAVY IS :1239	350	200	250	16
	12"						
5	14"	18" NB x 350 Lg.	6" HEAVY IS :1239	400	250	300	20
	16"						
6	18"	20" NB x 350 Lg.	8" SCH. 40	400	300	350	20
7	20"	24" NB x 350 Lg.	10" SCH. 40	450	350	400	20
	24"						
8	26"	30" NB x 350 Lg.	12" SCH. 40	550	400	500	20
	30"						
	36"	36" NB x 400 Lg.					

NOTES:-

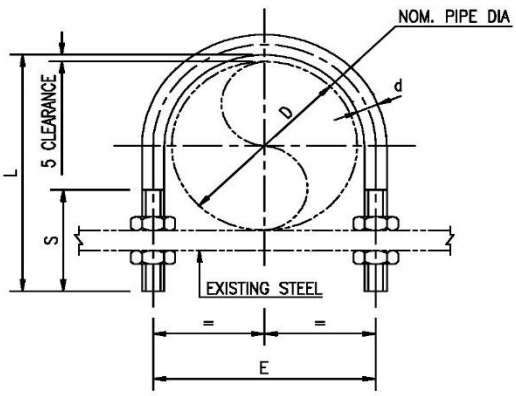
1. IN CASE SIZE AND/OR SCH. OF SUPPORT PIPE (D) LISTED IN THE TABLE IS NOT AVAILABLE, USE NEXT HIGHER SIZE AND/OR NEAREST EQUIVALENT THICKNESS AVAILABLE.
2. MATERIAL FOR SUPPORT PIPE & PLATE SHALL BE CARBON STEEL.

REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.
0	11.06.09	APPROVED	DK	GV	DDS

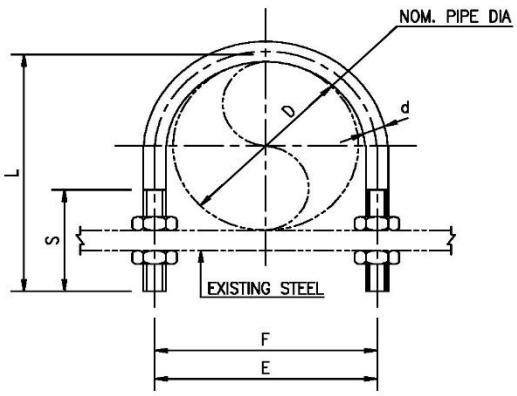
LOW SUPPORT SLIDING FOR BARE PIPE SIZE 3/4" THRU 36" TYPE-L5 & L-5A

DRAWING NO. 1-08-010

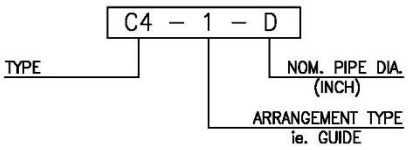
SHEET NO. 1 OF 1



GUIDE
ARRANGEMENT TYPE–1
(1/2" TO 24")



FIXED
ARRANGEMENT TYPE–2
(1/2" TO 1 1/2")



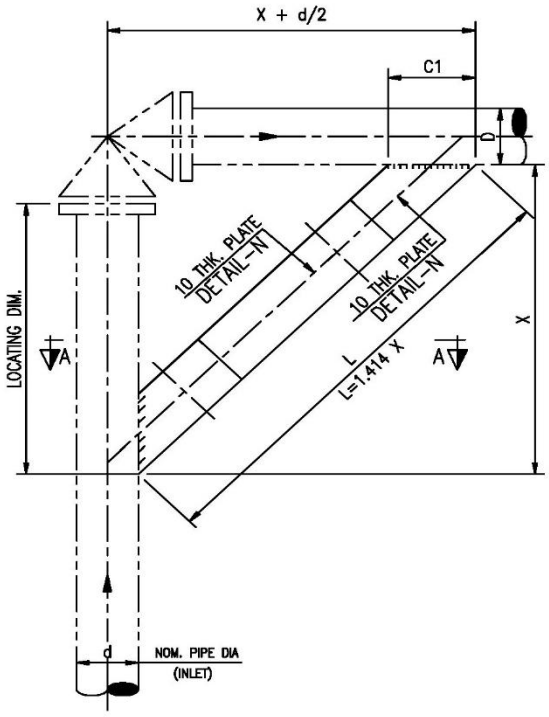
SYMBOL

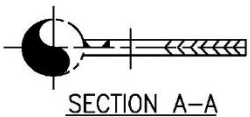
D	O.D. (mm)	'U' CLAMP				
		L	E	S	d	F
1/2"	21	65	30	50	6	24
3/4"	27	70	36	50	6	30
1"	33	75	45	55	8	37
1 1/2"	48	90	60	55	8	52
2"	60	105	72	60	8	64
3"	89	145	106	80	12	94
4"	114	170	130	80	12	119
6"	168	240	190	100	16	173
8"	219	290	242	100	16	226
10"	273	345	296	100	16	280
12"	324	420	351	130	20	331
14"	356	450	382	130	20	362
16"	408	500	435	130	20	414
18"	457	565	490	140	24	465
20"	508	620	540	140	24	515
24"	610	720	645	140	24	620

REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.
0	11.06.09	APPROVED	DK	GV	DDS

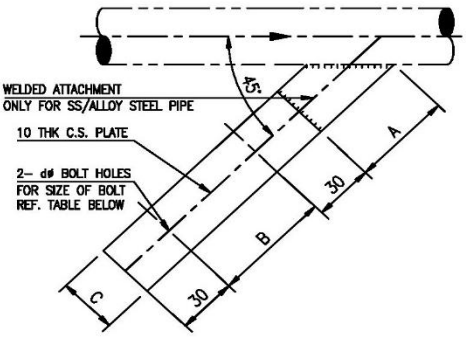
U–BOLT FOR BARE PIPE
(SIZE 1/2" TO 24")

DRAWING NO.
1–08–017
SHEET NO. 1 OF 1

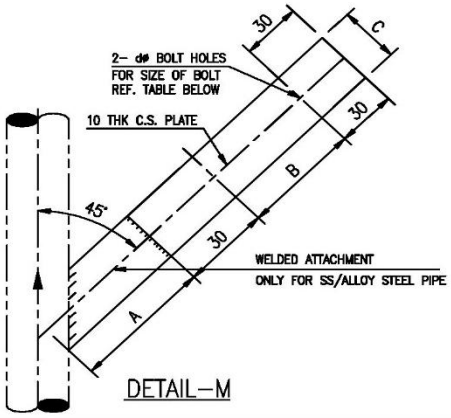




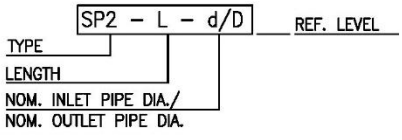
SECTION A–A



DETAIL–N



DETAIL–M



SYMBOL

NOTES:–

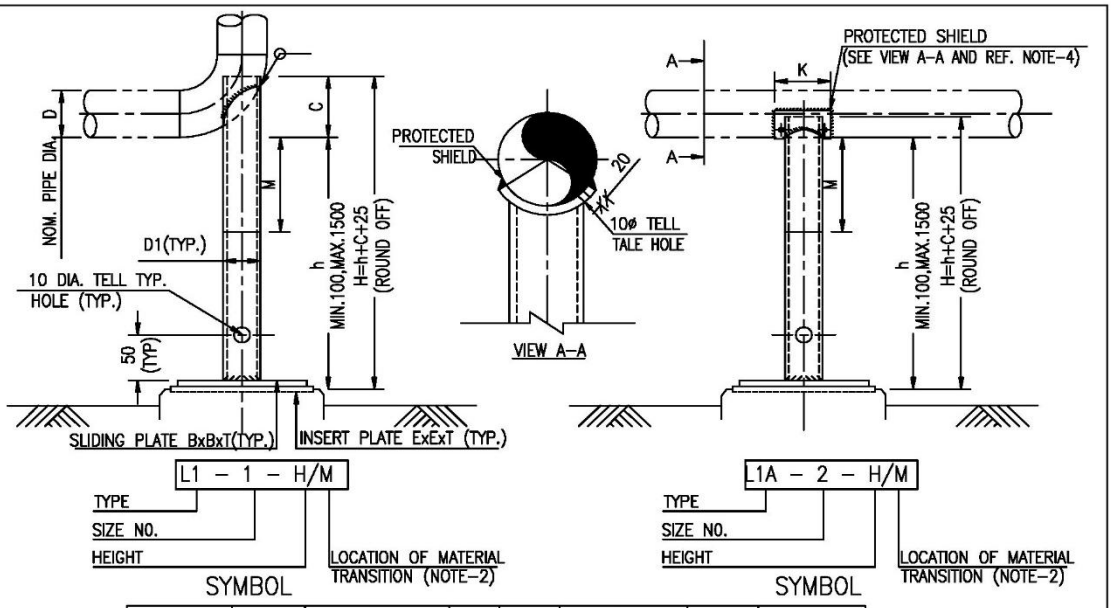
1. MATERIAL FOR WELDED ATTACHMENT SHALL BE EQUIVALENT TO PIPE MATERIAL.

D	BOLT SIZE dø	A	C	B MIN.	C1	D1
1" TO 4"	M12 X 50	75	50	150	71	14
6" TO 12"	M16 X 50	100	75	200	106	18

FOR TEMP. UP TO 400 °C ONLY

0	11.06.09	APPROVED	DK	GV	DDS
REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.

	SUPPORTING ARRANGEMENT FOR ANGLE AND RELIEF VALVES TYPE – SP2	DRAWING NO. 1–08–026
		SHEET NO. 1 OF 1



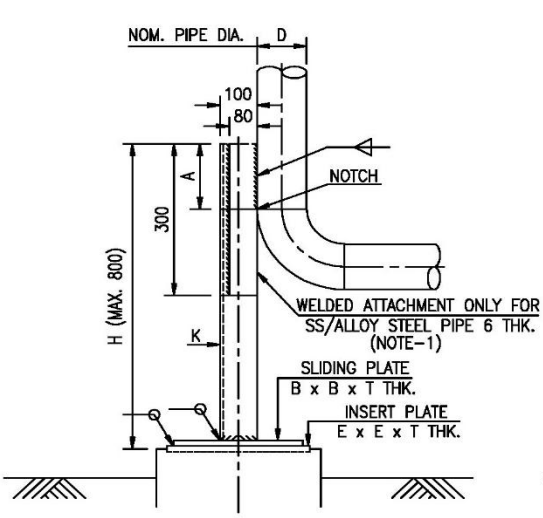
SIZE NO.	D	D1 (NOTE–3)	B	T	C (NOTE–5)	E	K (NOTE–4)
1	2"	2" S40/10S	150	10	70	250	160
	3"				115		
2	4"	3" S40/10S	200	10	137	300	190
	6"				174		
3	8"	4" S40/10S	200	12	205	300	215
	10"				262		
	12"				287		
4	14"	6" S40/10S	250	12	388	350	270
	16"				418		
5	18"	8" S40/10S	300	12	454	400	320
6	20"	10" S40/10S	350	12	554	450	375
	24"				615		
7	26"	12" S40/10S	400	16	675	500	425
	30"				800		
	36"				950		

NOTES:–

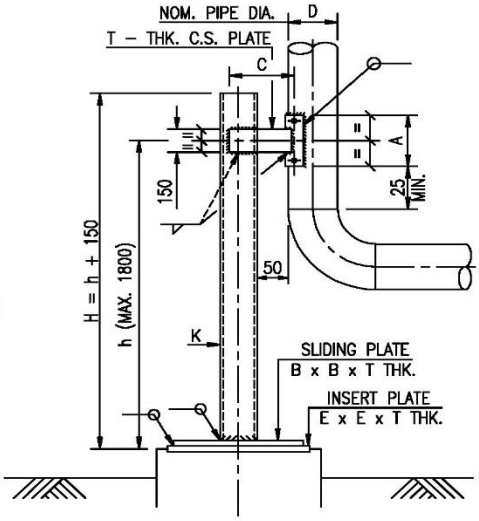
1. INSERT AND SLIDING PLATE MATERIAL SHALL BE CARBON STEEL WHERE DESIGN TEMP. IS >345°C WITH h < 200MM, SLIDING PLATE MATERIAL SHALL BE EUIVALENT TO PIPE MATERIAL.
2. DIMENSION "M" LOCATES THE POINT OF MATERIAL TRANSITION ON THE SUPPORT. THE STUB MATERIAL SHALL BE EQUIVALENT TO THAT OF LINE PIPE AND THE LOWER SUPPORT PIPE SHALL BE CARBON STEEL. MINIMUM VALUE OF M SHALL BE "INSULATION THICKNESS+25MM".
   A. FOR CARBON STEEL(CS) LINE PIPE, THE ENTIRE SUPPORT PIPE SHALL BE CS, THAT IS M=0.
   B. FOR ALLOY STEEL(AS) OR STAINLESS STEEL(SS) LINE –PIPE, SUPPORT PIPE SHALL CONSIST OF THE FOLLOWING–
   –FOR h LESS THAN OR EQUAL TO 500MM, ENTIRE SUPPORT PIPE MATERIAL SHALL BE EQUIVALENT TIO THAT OF LINE PIPE, THAT IS M=h.
   –FOR h GREATER THAN 500MM,SUPPORT PIPE SHALL BE COMPOSITE WITH M=INSULATION–THK.+25MM OR 100MM, WHICHEVER IS GREATER.
3. IN CASE SIZE AND/OR SCH. OF SUPPORT PIPE (D1) LISTED IN THE TABLE IS NOT AVAILABE USE NEXT HIGHER SIZE AND/OR NEAREST HIGHER THICKNESS AVAILABLE.
4. PROTECTION SHIELD (LENGTH=KMM) CUT FROM LINE–PIPE OR EQUIVALANT PLATE SHALL BE PROVIDED ON HORIZONTAL LINE AS FOLLOWS–
   A. FOR 150# AND 300# CLASS PIPEING
      CS AND AS LINES – 10" AND ABOVE
      SS LINES – 2" AND ABOVE
   B. FOR 600# AND HIGHER CLASS PIPING
      CS, AS AND SS LINES – 10" AND ABOVE
5. DIMENSION "C" IS TO BE MODIFIED IF OTHER THAN 1.5 D RADIUS ELBOWS ARE USED.
6. IN CASE CALCULATED h EXCEEDS THE MAX. VALUE, PEDESTAL SHALL BE RAISED ACCORDINGLY.

REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.
0	11.06.09	APPROVED	DK	GV	DDS

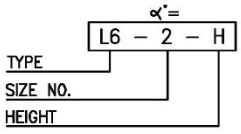
LOW SUPPORT SLIDING FOR BARE & INSULATED PIPE SIZE 2" THRU 36" TYPE–L1 AND L1A	DRAWING NO.	1–08–027
	SHEET NO.	1 OF 1



FOR PIPE SIZES 2" THRU 4"



FOR PIPE SIZES 6" THRU 24"



SYMBOL

NOTES:–

1. MATERIAL FOR WELDED ATTACHMENT SHALL BE EQUIVALENT TO PIPE MATERIAL.
2. PROTECTION SHIELD IS TO BE CUT FROM LINE PIPE.

SIZE NO.	D	K	A	T	C	E	B
1	2" TO 4"	CUT FROM ISMB 200	200	10	–	250	150
2	6" TO 10"	ISMC–125 2 NOS.	200	12	150	300	200
3	12" TO 24"	ISMC–225 2 NOS.	300	12	230	400	300

FOR TEMP. UP TO 400 °C ONLY

0	11.06.09	APPROVED	DK	GV	DDS
REV.	DATE	SUBJECT OF REVISION	PREPD.	CHKD.	APPD.

	LOW SUPPORT FIXED FOR BARE & INSULATED PIPE SIZE 2" THRU 24" TYPE–L6	DRAWING NO. 1–08–028
		SHEET NO. 1 OF 1

4. PIPING MATERIAL SPECIFICATION

GENERAL NOTES

- This specification describes the minimum requirements for the design, furnishing of materials, fabrication, and inspection and testing of pipes, fittings and valves. All material shall confirm to ASTM, API or BS standards. Design and fabrication shall confirm to ANSI / ASME for pressure piping, ANSI B 31.3 – Chemical Plant and petroleum Refinery Piping, and ANSI B 31.8 – Gas transmission and Distribution piping system.
-

DEFINITIONS

Shall	: This verbal form indicates requirements strictly to be followed in order to confirm to the standards and from which no deviation is permitted.
Should	: This verbal form indicates that among several possibilities one is particularly suitable without mentioning or excluding others or that a certain course of action is preferred but not necessarily required.
May	: This verbal form indicates a course of action permissible within the limits of this standard.
Can	: This verbal form is used for statements of possibility & capability, whether material, physical or casual.

CODES AND STANDARDS

The latest revision of the following shall be considered as part of this specification.

ASME B 16.5	Steel Pipe Flanges and Flanged Fittings
ASME B 16.9	Factory made Wrought Steel Butt welding Fittings
ASME B 16.11	Forged Steel Fittings, Socket Welding and Threaded
ASME B 16.20	Metallic Gaskets for Pipe Flanges.
ASME B 16.21	Non-Metallic Flat Gasket for Pipe Flanges
ASME B 16.47	Large Diameter Steel Flanges (26” throu 60”)
ASME B 31.3	Process Piping
ASME B 31.4	Pipeline Transportation system for Liquid hydrocarbons & other Liquids
ASME B 31.8	Gas Transmissions and Distribution Piping System
ASME B 36.10	Welded and Seamless Wrought Steel Pipe
ASME B 46.1	Surface Texture API 5L Line Pipe
API 6D	Pipeline Valves
API 590	Steel Line Blank
API 600	Steel Gate Valves Flanges and Butt welding Ends
API 602	Compact Steel Gate Valves
MSS SP 44	Steel Pipe line Flanges
MSS SP 75	Specification for High Test Wrought Butt Welding Fittings
MSS SP 97	Integrally Reinforced Forged Branch Outlet Fitting – Socket Welding, Threaded and Butt welding Ends
ASTM A 105	Forging, Carbon Steel for Piping Components
ASTM A 193	Alloy Steel and Stainless Steel bolting Materials for High temp Service.
ASTM A 194	Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service
ASTM A 320	Standard Specification for Alloy Steel and Stainless Steel Bolting Materials
ASTM A 216	Steel Casting, Carbon, Suitable for Fusion Welding, for High Temperature Service.

ASTM A 234	Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperature
ASTM A 285	Pressure Vessel Plates, Carbon Steel, Low and Intermediate Tensile Strength.
ASTM A 694	Forging, Carbon and Alloy Steel, for Pipe Flanges, Fitting, Valves and Parts for High Pressure Transmission Service.
ASTM A 333	Low temperature service seamless pipe.
ASTM A 350	Forged Carbon and Low Alloy Steel requiring Notch Toughness Testing for Piping Components
ASTM A 420	Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low Temperature Service.
ASTM A 860	Standard Specification for Wrought High Strength Low Alloy Steel Butt Welding Fittings

ABBREVIATIONS

Flange Facing

RTJ	Ring Type Joint
FF	Flat Face
RF	Raised Face

Fittings

PE	-	Plain End
BE	-	Bevel End
Bl/V	-	Butt Weld
PBE	-	Plain Both End
POE	-	Plain One End
TSE	-	Threaded Both End
TOE	-	Threaded One End
LR	-	Long Radius
SR	-	Short Radius

Connections

BW	-	Butt-Weld
FLGD	-	Flanged
SCRO	-	Screwed
SO	-	Slip-On
SW	-	Socket Weld
THRO	-	Threaded
WN	-	Weld Neck

Wall Thickness

SCH	-	Schedule in accordance with ANSI B 36.10 or B 36.19
STD	-	Standard Weight Wall Thickness
XS	-	Extra Strong Wall Thickness
XXS	-	Double Extra Strong Wall Thickness

Valve Description

BC	-	Bolted Cap
BB	-	Bolted Bonnet
ES	-	Extension Stem
FD	-	Full Dore
MO	-	Motor Operated
GO	-	Gear Operated
NRS	-	Non-Rising Stem (with inside screw)
OS&Y	-	Outside Screw and Yoke
RB	-	Reducer Bore
RS	-	Rising Stem
SC	-	Screwed Cap
UB	-	Union Bonnet
UC	-	Union Cap
WB	-	Welded Bonnet

Pipes Description

BE	-	Beveled End
CS	-	Carbon Steel
ERW	-	Electric Resistance Welded
EFW	-	Electric Fusion Welded
FS	-	Forged Steel
HFI	-	High Frequency Induction
KCS	-	Killed Carbon Steel
KFS	-	Killed Forged Steel
OH	-	Open Hearth
SAW	-	Submerged Arc Welded
SMLS	-	Seamless

Miscellaneous

BOP	-	Bottom of Pipe
ASME	-	American Standard Mechanical Engineering
ASTM	-	American Standard Test Material
CL	-	Centre Line
CC	-	Concentric Reducer
EC	-	Eccentric Reducer
CPLG	-	Coupling
EL	-	Elevation
FFL	-	Finished Ground

PIPING CLASSES DESCRIPTION

Piping Classes assigned for the project are based on the following 2-digit system

First Digit

Numerical, denoting the basic system rating or flange class i.e.

1 = ASME Class 150
3 = ASME Class 300
6 = ASME Class 600
9 = ASME Class 900

Second Digit

Letter, denoting the material

A	-	Carbon Steel
c	-	Stainless Steel
F	-	Fiberglass Reinforced plastic/epoxy (FRP)
G	-	Galvanized
p	-	Plastic (PEHD)
s	-	Stainless Steel
v	-	PVC

Third Digit

Sequential number to differentiate two or more piping classes of the same rating and same material but presenting some difference related to the handled fluid.

Fourth Digit

Letter, denoting the aboveground and underground

U = Underground

CITY GAS DISTRIBUTION PROJECT
STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS
TENDER NO. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

PIPING SPECIFICATION		AAVANTIKA GAS LIMITED	RATING	150#
1A1			CODE	ANSI B 31.8
TEMPERATURE	(0 TO 60 °C)		BASIC MATERIAL	
PRESSURE	(18.75 bar g)		CORROSION ALW	1.5 mm

BRANCH TABLE

HEADER SIZE	BRANCH SIZE 1/2"	3/4"	1"	1.1/2"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	32"	36"
1/2"	T																			
3/4"	T	T																		
1"	T	T	T																	
1.1/2"	T	T	T	T																
2"	S	S	S	T	T															
3"	S	S	S	S	T	T														
4"	S	S	S	S	T	T	T													
6"	S	S	S	S	W	T	T	T												
8"	S	S	S	S	W	W	T	T	T											
10"	S	S	S	S	W	W	T	T	T	T										
12"	S	S	S	S	W	W	W	T	T	T	T									
14"	S	S	S	S	W	W	W	T	T	T	T	T								
16"	S	S	S	S	W	W	W	W	T	T	T	T	T							
18"	S	S	S	S	W	W	W	W	T	T	T	T	T	T						
20"	S	S	S	S	W	W	W	W	W	T	T	T	T	T	T					
24"																				
28"																				
30"																				
32"																				
36"																				

LEGEND

T : TEE - BW

S: SOCKOLET - BW

W : WELDOLET - BW

PIPING SPECIFICATION		AAVANTIKA GAS LIMITED	RATING	300#
3A1			CODE	ANSI B 31.8
TEMPERATURE (0 TO 60 °C)			BASIC MATERIAL	
PRESSURE	(49 bar g)		CORROSION ALW	1.5 mm

BRANCH TABLE

HEADER SIZE \ BRANCH SIZE	1/2"	3/4"	1"	1.1/2"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	32"	36"
1/2"	T																			
3/4"	T	T																		
1"	T	T	T																	
1.1/2"	T	T	T	T																
2"	S	T	T	T	T															
3"	S	S	S	S	T	T														
4"	S	S	S	S	T	T	T													
6"	S	S	S	S	W	T	T	T												
8"	S	S	S	S	W	W	T	T	T											
10"	S	S	S	S	W	W	T	T	T	T										
12"	S	S	S	S	W	W	W	T	T	T	T									
14"	S	S	S	S	W	W	W	T	T	T	T	T								
16"	S	S	S	S	W	W	W	T	T	T	T	T	T							
18"	S	S	S	S	W	W	W	T	T	T	T	T	T	T						
20"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T					
24"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T	T				
28"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T	T	T			
30"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T	T	T	T		
32"																				
36"																				

LEGEND

T : TEE -BW

S: SOCKOLET - BW

W : WELDOLET- BW

CITY GAS DISTRIBUTION PROJECT
STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS
TENDER NO. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

PIPING SPECIFICATION			AAVANTIKA GAS LIMITED				RATING 600#
6A1							CODE ANSI B 31.8
TEMPERATURE (0 TO 60°C)							BASIC MATERIAL
DESIGN PRESSURE (98 bar g)							CORROSION ALLOWANCE 1.5 mm
ITEM	**SHORT CODE**	**SIZE FROM-THRU**	**DESCRIPTION**	**RATING AND/OR SCHED.**	**DIMENSION STANDARD**	**MATERIAL**	**REMARKS**
PIPELINE	PL	2"-4"	BE	6.4 mm	API 5L	API 5L Gr. B	
		6"-10"	BE	6.4 mm	API 5L	API 5L Gr. X42	
PIPES	P	0.50" - 0.75"	PE, SEAMLESS	S160	ANSI B36-10	ASTM A 106 Gr.B	
		1" - 1.50"	PE, SEAMLESS	S160	ANSI B36-10		
		2"	BE, SEAMLESS	S80	ANSI B36-10		
		3"	BE, SEAMLESS	STD	ANSI B36-10		
		4" - 10"	BE, SEAMLESS	XS	ANSI B36-10		
		12" - 14"	BE, SEAMLESS	Sch 60	ANSI B36-10	ASTM A 106 Gr.B	
ELBOWS 90 LR	E	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"	SW	3000#	ANSI B16-11		
		2" - 14"	BW, 1.5D		ANSI B16-9	ASTM A 234 Gr WPB	
ELBOWS 45 LR	E45	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"	SW	3000#	ANSI B16-11		
		2" - 14"	BW, 1.5D		ANSI B16-9	ASTM A 234 Gr WPB	
TEES EQUAL	T	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"	SW	3000#			
		2" - 14"	BW - ANSI B16-25		ANSI B16-9	ASTM A 234 Gr WPB	
TEES RED	TR	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"	SW	3000#			
		2" - 14"	BW - ANSI B16-25		ANSI B16-9	ASTM A 234 Gr WPB	
SOCKOLET	S	0.50" - 0.75"	SW	6000#	MSS-SP 97	ASTM A105	
		1" -1.50"	SW	3000#	MSS-SP 97	ASTM A105	
WELDOLETS	W	2" - 14"	BW - ANSI B16-25	XXS	MSS-SP97	ASTM A105	
CAPS	C	0.50" - 0.75"	SCRF	6000#	ASME B16-11	ASTM A105	
		1" - 1.50"	SCRF	3000#	ASME B16-11		
		2" - 14"	BW		ASME B16-9	ASTM A 234 Gr WPB	
PLUG	P	0.50" - 0.75"	SCRM	6000#	ASME B16-11	ASTM A 234 Gr WPB	
		1" - 1.50"	SCRM	3000#	ASME B16-11		
NIPPLES	NA	0.50" - 0.75"	PBE, SEAMLESS		ANSI B36-10	ASTM A 106 Gr.B	
	NB	1" -1.50"	PBE, SEAMLESS		ANSI B36-10	ASTM A 106 Gr.B	
FULL COUPLINGS	CF	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" -1.50"	SW	3000#			
HALF COUPLINGS	HC	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"	SW	3000#			

NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESS

4.1. TECHNICAL SPECIFICATION FOR BALL VALVES

4.1.1. SCOPE

- This specification provides minimum requirement for design, manufacturing, Inspection, Testing and supply of Carbon Steel Ball Valves covering sizes Y." NB through 36"NB (900mm) for ANSI pressure classes # 150 through # 900 to be used in cross country Gas pipeline(onshore) and City Gas distribution for handling non-sour hydrocarbon in liquid or gaseous phase

4.1.2. REFERENCE DOCUMENTS

- The following Standard includes provision which, through reference in this text constitute provision of this Standard. Latest revision of this standard shall be used unless otherwise specified

API 6D	Specification for Pipeline Valves .
API 605	Large Diameter Carbon steel Flanges
API 6FA	Specification for Fire Test for Valves .
API 5L	Specification for Line Pipe
API 1104	Specification for Welding Pipelines and related facilities.
ASME 16.10	Face to Face and Endto End Dimensions of Valves
ASME 16.20	Metallic gasket for pipe flanges - Ring joint or spiral wounds and jacketed
ASME 16.21	Non Metallic Gaskets for pipe flanges
ASME B 16.5	Steel Pipe Flanges and Flanged Fittings
ASME B 16.34	Valves - Flanged, Threaded and Welding Ends
ASME B 16.5	Steel Pipe Flanges and Flanged Fittings
ASME B 31.3	Process Piping
ASME B 31.8	Gas Transmission and Distribution Piping Systems
ASME Sec VIII Div .I/Div.II •	Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels
ASTM A370	Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
ASTM B 733	Auto catalytic Nickel Phosphorous Coating on Metals.
BS 6755-1	Testing of Valves . Specification for production pressure testing requirements
EN 1004511	Metallic products Charpy Impact test -test methods (U & V Notches)
BS 6755-2	Testing of Valves . Specification for fire type-testing requirement
EN 10204	Metallic Materials -Types of Inspection documents
MSS-SP-6	Standard Finishes for Contact Faces of Pipe Flanges and Connecting - end Flanges of Valves and Fittings
MSS-SP-25	Standard marking system for Valves, Fittings, Flanges and Union.
MSS-SP-44	Steel Pipeline Flanges
MSS-SP-53	Quality Std for Steel Casting & Forgings for Valves, Flanges & Fittings & Other Piping Components - Magnetic Particle Examination Method.

MSS-SP-55	Quality Standard for Steel casting of valves, Flanges, Fittings & other Piping components (Visual Method)
MSS-SP-72	Ball Valves with Flanged or Butt welding ends for General Service
ISO 5208	Industrial Valves - Pressure Testing of Valves
ISO 10497	Testing of Valves -fire type testing requirements
ISO 13623	Petroleum & Natural Gas Industry - pipeline transportation system
ISO 14313	Petroleum & Natural Gas Industry. Pipeline transportation system - pipeline Valves
SSPC-VIS-1	Steel Structures Painting Council Visual Standard.

In case of contradiction the most stringent shall apply

4.1.3. INSTRUCTIONS

- Eventual Interpretations and deviations to this specification by the manufacturer shall be requested by writing in his offer with detailed justification and approved by the purchaser or purchaser's representative before the eventual order to the manufacturer.
- The specifications of the steel used shall be mentioned by the material manufacturer and all potential sub contractors (such as forging plant, casting plant and fabrication unit etc) will be described in the offer. After order no change will be accepted except for justified. In that case the asked changes shall be supported by a technical file submitted to the purchaser and the purchaser's representative for approval.
- The manufacturer shall provide a technical description of the manufacturing methods that might influence the quality of material.
- The purchaser/ purchaser's representative keeps the right to audit the manufacturer's and sub contractors manufacturing and control methods. All costs for such an audit shall be borne by the manufacturer except the wages, travel expenditure, lodging and boarding of the auditors supported by the purchaser/ purchaser's representative.
- The purchaser/ purchaser's representative shall have at any time free access to all parts of the manufacturer's facilities and to all his sub contractors involved in the order manufacturing.
- A copy of ISO 9001 Certificate shall be included in the offer.
- An approval of documents can never be considered as acceptance of deviations or relaxation to requirements. A deviation is only possible after specific request to purchaser and purchaser's representative.
- Purchaser/ purchaser's representative may verify the control equipment of the manufacturer, its calibration and the points at which it is located. If during the production certain problem arises, the purchaser/ purchaser's representative may demand supplementary tests.

4.1.4. MATERIALS

- Material for major components of the valves shall be as indicated in Valve Data Sheet. In addition, the material shall also meet the requirements specified herein. Other components shall be as per Manufacturer's standard (suitable for service conditions as indicated in valve data sheet), which shall be subjected to approval by Purchaser / Purchaser's representative.
- Carbon steel used for the manufacture of valves shall be fully killed.
- The steel used shall be suitable for field welding to pipes, flanges or fittings manufactured under ASTM – 53, A – 105, A – 106, A – 234, A – 350, A – 352, A – 694, A – 420, A – 333, and API – 5L etc.
- When the ball of valve is manufactured out of C.S, it shall be subjected to 75µm (0.003") thick Electrolysis nickel plating as per ASTM B733 with following classification SC2, type II, class-2. For Ball made of S.S material, ENP is not mandatory. The hardness of plating shall be minimum 50 RC.
- For valves specified to be used for Gas service or High Vapor Pressure (HVP) liquid service; Charpy V-Notch test on each heat of base material shall be conducted as per API 6D, clause 7.5 for all

pressure containing parts such as body, end flanges and welding ends as well as bolting material for pressure containing parts. Unless specified otherwise, the Charpy V-notch test shall be conducted at 0°C & -10 °C. The Charpy V-notch test specimen shall be taken in the direction of principal grain flow and notched perpendicular to the original surface of plate or forging. The minimum average absorbed energy per set of three specimens shall be 35 J with an individual minimum per specimen of 27J. Test procedure shall conform to ASTM A 370 or ISO 148.

- For valves specified to be used for other hydrocarbon services, the Charpy V-notch requirements stated above are not applicable, unless required by the specified material standard as a mandatory requirement.
- When Low Temperature Carbon Steel (LTCS) materials are specified in Valve Data Sheet or offered by Manufacturer, the Charpy V-notch test requirements of applicable material standard shall be complied with.
- Valves shall be subjected to hardness test on base material for each heat for pressure containing parts. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10 based on minimum four (4) measurements representing the entire thickness.

4.1.5. DESIGN AND CONSTRUCTION

- Valve design shall be as per API 6D and suitable for the process conditions indicated in the Data Sheet. The ASME Boiler & Pressure Vessel Code, Section VIII, Division 1 shall be used to design the valve body. Allowable stress requirements shall comply with the provisions of ASME B31.3 and B31.8. In addition, corrosion allowance indicated in Valve Data Sheet shall be considered in valve design. However, the minimum wall thickness shall not be less than the minimum requirement of ASME B16.34.
- The manufacturer shall have valid license to use API monogram on valves manufactured as per API 6D.
- Fully welded valves shall be used for main line aboveground/underground services. Other aboveground valves may be of welded or bolted type with 2 piece/3 piece construction. Threaded body joints shall not be accepted.
- Ball shall be of single piece, solid type construction.
- Valves shall be Full bore (FB). Full bore valves shall be suitable for the passage of all types of pipeline scraper and inspection pigs on regular basis without causing damage to either the valve component or the pig. The full bore valve shall provide an unobstructed profile for pigging operations in either direction. Full bore valves shall be designed to minimize accumulation of debris in the seat ring region to ensure that valve movement is not impeded.
- Reduced bore valves shall be provided if specifically mentioned in data sheet. Valve body shall be manufactured by casting or forging
- All valves 4”NB and above shall be trunion mounting type. Valves below 4” shall be floating type unless specifically mentioned in data sheet otherwise.
- Valve seats shall be with primary metal to metal contact. O - Rings or other seals if used for drip tight sealing shall be encased in a suitable groove in such a manner that it can not be removed from seat ring and there is no extrusion during opening or closing operation at maximum differential pressure. The seat rings shall be designed so as to ensure sealing at low as well as high differential pressures. Seat design with PTFE inserts is not acceptable.
- All valves shall have two seating surfaces which in close position blocks the flow from both ends. The cavity between the seating surfaces is vented through a bleed connection provided on the body cavity i.e. the valves shall be Double Block & Bleed (DBB).
- Valves shall be designed to withstand a sustained internal vacuum of at least 1 (one) milli-bar in both open and closed positions.
- All valves of nominal valve size 200 mm (8”) NB & above shall have provision for secondary sealant injection under full line pressure for seat and stem seals. All sealant injection connections shall be

provided with an internal Non-return valve. Valve design shall have a provision to replace the sealant injection fitting under full line pressure.

- All valves shall be provided with a vent and drain connection. These connections shall be welded type as per Fig. 6.11 A/B. Body vent and drain shall be provided with valves (Ball or Plug type). All these vents & drain connections shall be provided with isolation ball valve as shown in Fig 6.11 A/B. The end connection of vent & drain line to valve body or isolation valves shall be welded type at underground location and threaded type for above ground location.
- Valve design shall ensure repair of stem seals/packing under full line pressure.
- Valve ends shall be either flanged/or butt welded or one end flanged and one end butt welded as indicated in the Valve Data Sheet. Flanges of the flanged end cast/forged body valves shall be integrally cast/ forged with the body of the valve. Face to face/end to end dimensions shall conform to API 6D.
- The length of butt welding ends shall be sufficient to allow welding and heat treatment without damage of the internal parts of the valves.
- Flanged end, if specified shall have dimensions as per ASME B 16.5 for valve sizes up to DN 600 mm (24”) excluding DN 550 mm (22”) and as per MSS-SP-44/ASME B16.47Series A for Valve sizes DN 550 mm (22 inches) and for DN 650mm (26”) and above. Flange face shall be either raised face or ring joint type as indicated in Valve Data Sheet. In case of RTJ flanges, the groove hardness shall be minimum 140 BHN. All flanged face shall have concentric serration with 125 AARH finish.
- Butt welding end preparation shall confirm to ASME B 16.25. Incase of difference in thickness of valve body & mating pipelines, the bevel end of valve shall be as per ASME B 31.8 or ASME B 31.4 as applicable. The end preparation shall take care of outside diameter of connecting pipe, wall thickness, material grade, SMYS & Special chemistry of welded material as indicated in the data sheet.
- The temperature and pressure range of the valves shall be in accordance with the indicated values on the relevant piping specification and valve data sheet.
- Wall thickness of parts used for the welding connection with the line pipe shall meet the following requirements:
- The maximum allowable stress in the material of butt-weld connection for butt welding shall be equal to 50% of the minimum yield strength guaranteed by the specification of steel used.
- The minimum wall thickness for butt welding connection must be greater than or equal to the largest value of either the calculated minimum thickness of butt welding connections or the nominal thickness of pipe as indicated on data sheet.
- If the butt welding connections has a yield strength lower than the yield strength of the pipe to which it is intended to be welded, the wall thickness in each zone of the butt welding connection is at least equal to the specified pipe wall thickness times the ratio of minimum yield strength guaranteed by the specification of the steel of the pipe to minimum yield strength guaranteed by the specification of the steel of the butt welding connection.
- The specified pipe wall thickness and grade with which the valve is intended to be used is specified in the data sheet.
- All valves under this specification shall be designed to withstand a field hydrostatic test pressure with non-corrosive water. After installation during 24 hours when the ball is partially or fully open at a pressure level
  P = 1.4 X MOP P = hydrostatic test pressure (bar) MOP = Maximum operating pressure at 38 ºC
- Valve shall be provided with ball position indicator and stops of rugged construction at the fully open and fully closed positions.
- Valves of nominal size, DN 200 mm (8”) and larger, shall be equipped with support foot and lifting lugs. Tapped holes and eyebolts shall not be used for lifting lugs. Height of support foot shall be kept minimum. The lifting lugs shall be stamped with safe working load.
- In order to avoid stress induced crack and soft seat damage during direct field welding operation to valve body, all valves shall be supplied with welded pups at both ends which shall be considered as an integral part of the valves and also the ID of the pup shall match with pipe ID. The pup piece

welding shall be carried out in controlled condition of temperature at manufacturer's workshop. Field welding of pup piece shall not be allowed. Material & length of pup piece shall be as per Data sheet.

- When indicated in Material Requisition, valves shall have locking devices to lock the valve either in full open (LO) or full close (LC) positions. Locking devices shall be permanently attached to the valve operator and shall not interfere with operation of the valve. Locking device shall be such that the valve shall operate when the differential pressure across the valve is ≤ 3bar.
- Valve design shall be such as to avoid bimetallic corrosion between carbon steel and high alloy steel components in the assembly. Accordingly, Suitable insulation shall be provided as required.
- The valve stem shall be capable of withstanding the maximum operating torque required to operate the valve against the maximum differential pressure as per the appropriate class. The combined stress shall not exceed the maximum allowable stresses specified in ASME Section VIII, Division 1. The design shall take into account a safety factor of 1.5 based on the maximum output torque of the operating mechanism. The valve Manufacturer shall guarantee that the breakaway torque after long periods of non- movement cannot exceed the normal short term breakaway torque by a factor more than 1.25, and that the safety factor specified above is not compromised.
- The valve stem shall have anti-blowout feature with antistatic device conforming to BS 5351
- When stem extension requirement is indicated in Valve Data Sheet, the valves shall have the following provisions:
- a) Valves provided with stem extension shall have water proof outer casing. The Length of stem extension shall be as indicated on the Valve Data Sheet. The length indicated corresponds to the distance between centreline of the valve opening and the centreline of the rim of the hand wheel on a vertical shaft or centreline of the hand wheel on a horizontal shaft.
- b) Manual override devices shall be provided on all valves
- c) Vent, drain and sealant connections shall be terminated adjacent to the valve operator by means of suitable piping anchored to the valve body.
- d) The stem extension shall be self-relieving
- e) Outer casing of stem extension shall have 3/8" or 1/2" NPT plugs at the top and bottom, for draining and filling with oil to prevent internal corrosion 6.24
- Operating Devices
- a) All valves of size > 12"NB shall be manually operated & hydraulically actuated. In case of manual operator, valve sizes, 100 mm (NPS 4") and below shall be wrench/ lever operated. For Valves from 6" - 12" shall be gear operated. Valve design shall be such that damage due to malfunctioning of the operator or its control gear train or power cylinder and other damaged parts can be replaced without the valve cover being removed.
- b) The power actuator shall be in accordance with the Purchaser Specification issued for the purpose and as indicated in the Valve and Actuator Data Sheet. Operating time shall be as indicated in Valve Data Sheet. Valve operating time shall correspond to full close to full open /full open to full close under maximum differential pressure corresponding to the valve rating. For actuated valves, the actuator's rated torque output shall be 1.25 times the break torque required to operate the ball valve under the maximum differential pressure corresponding to the Valve Class Rating.
- c) For the manual operator of all valves, the diameter of the hand wheel or the length of operating wrench shall be such that under the maximum differential pressure, the total force required to operate the valve does not exceed 350N. Manufacturer shall also indicate the number of turns of hand wheel (In case of gear operators) required for operating the valve from full open to full close position. The wrench length or hand wheel diameter shall be in accordance with API 6D requirements. The manufacturer shall indicate the number of turns of the hand wheel (for gear operators), required for operating the valve from fully open to the fully closed position.
- d) Direction of operation of hand wheel or wrench shall be in clock-wise direction while closing the valve. Hand wheels shall not have protruding spokes.
- e) Gear operators, when provided, shall have a self-locking provision and shall be fully encased in water proof/splash proof enclosure and shall be filled with suitable grease.

- Welding including repair welding of pressure retaining parts shall be as per welding procedure qualification specified in ASME Section IX. The procedure qualification shall also Include impact test and hardness test when required as per this specification and shall meet the requirements as specified therein.
- The welders involved in welding shall be qualified in accordance with ASME Section IX.
- Repair by welding is not permitted for forged body valves. However, repair by welding as per ASME B 16.34 is permitted for cast body valves. Repair shall be carried out before any heat treatment of casting is done. Repair welding procedure qualification shall also include impact test and hardness test when required as per this specification and shall meet the requirements as specified therein.
- The tolerance on internal diameter and out of roundness at the ends for welded ends valves shall be as per connected pipe specification as indicated in the Valve Data Sheet.
- When specified on the Valve Datasheet, Ball Valves shall be “fire safe” in accordance with API 6FA, for which qualifying certificates, covering the range of items offered, shall be supplied by the Manufacturer.

4.1.6. INSPECTION AND TESTS

- The Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his Works. Such inspection and tests shall be, but not limited to, the following:
- The valve manufacturer must deliver a Certificate EN 10204 3.2 stating the quality, the mechanical properties (yield strength, tensile strength, and impact test at 0 º C & -10 ºC), the chemical analysis the process of manufacture and the marking (for ex: - heat number of material) A new chemical analysis (upgradation) shall be done on specimen of valve in presence of TPIA.
- All valves shall be visually inspected. The external and internal surfaces of the valves shall be free from any arc strikes, gouges and other detrimental defects.
- Dimensional check on all valves shall be carried out as per the Purchaser’s approved drawings.
- Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.
- Pressure containing parts of all valves such as body, bonnet, flange, welding ends and balls etc shall be subjected to impact test on each heat of base material as per API 6D CL.7.5.
- Notch toughness properties Charpy V: The standard impact test temperature is 0 ºC & -10 ºC. The average value per series of 3 test specimen shall be equal to 35 J/cm². The minimum value per test specimen shall be equal to 35 J/cm²; this value may drop to 27 J/cm² per test specimen per series.
- Non Destructive Examination
- a) Non-destructive examination of individual valve material and component consisting of but not limited to castings, forgings, plates and assembly welds shall be carried out by the Manufacturer. All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with MSS-SP-53.
- b) Body castings of all valves shall be radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes, body casting shall be subjected to 100% radiography.
- c) All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34. All forgings shall be subjected to wet magnetic particle inspection on 100% of the internal surfaces. Method and acceptance shall comply with MSS-SP-53
- d) Bodies and bonnets made by welded assembly of segments of castings, forgings, combinations thereof shall be examined, as applicable, by methods of for cast components or for forged components and plates.
- Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.3 or ASME B31.8 as applicable and API 1104.
- a) All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.

- b) Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.
- c) After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm shall be rejected. Rejectable defects must be removed. Weld repair of bevel surface is not permitted.
- All valves shall be tested in compliance with the requirements of API 6D. During pressure testing, valves shall not have sealant lines and other cavities filled with sealant, grease or other foreign material. The drain, vent and sealant lines shall be either included in the hydrostatic shell test or tested independently. No leakage is permissible during hydrostatic testing. The body cavity self-relieving feature meeting the requirements of clause 6.8 of this specification shall also be checked.
- A supplementary air seat test as per API 6D, Appendix C, Para C3.3 Type II shall be carried out for all valves. A bubble tight seal is required without the use of any sealant. No leakage is allowed. Test pressure shall be held for at least 15 minutes.
- Valves shall be subjected to Operational Torque Test as per Appendix C, Para C.6, API 6D under hydraulic pressure equal to maximum differential pressure corresponding to the valve rating. For manually operated valves, it shall be established that the force required to operate the valve does not exceed the requirements stated in this specification.
- Power actuated valves shall be tested after assembly of the valve and actuator, at the valve Manufacturer's works. At least five Open-Close-Open cycles without internal pressure and five Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating shall be performed on the valve actuator assembly. The time for Full Open to Full Close shall be recorded during testing. If required, the actuator shall be adjusted to ensure that the opening and closing time is with in the limits stated in Valve Data Sheet. The Hand operator provided on the actuator shall also be checked after the cyclic testing, for satisfactory manual over-ride performance. These tests shall be conducted on minimum one valve out of a lot of five (5) valves of the same size, rating and the actuator model/type. In case, the tests do not meet the requirements, retesting/rejection of the lot shall be decided by the Purchaser's Inspector.
- a) The valve shall be subjected to at least 5 Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating.
- In case this valve fails to pass these tests, the valve shall be rejected and two more valves shall be selected randomly and subjected to testing as indicated above. If both valves pass these tests, all valves manufactured for the order (except the valve that failed) shall be deemed acceptable. If either of the two valves fails to pass these tests, all valves shall be rejected or each valve shall be tested at the option of manufacturer. Previously carried out prototype test of similar nature shall not be considered acceptable in place of this test.
- Purchaser reserves the right to perform stage wise inspection and witness tests as indicated above at Manufacturer's works prior to shipment. Manufacturer shall give reasonable access and facilities required for inspection to the Purchaser. Purchaser or Purchaser's representative reserves the right to require additional testing at any time to confirm or further investigate a suspected fault. The cost incurred shall be borne to Manufacturer.
- In no case shall any action of Purchaser or his inspector shall relieve the Manufacturer of his responsibility for material, design, quality or operation of valves.
- Inspection and tests performed/witnessed by the Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

4.1.7. TEST CERTIFICATES

- Manufacturer shall submit the following certificates:
- a) Mill test certificates relevant to the chemical analysis and mechanical properties of the materials used for the valve construction as per the relevant standards.
- b) Test certificates of hydrostatic and pneumatic tests complete with records of timing and pressure of each test.
- c) Test reports of radiograph and ultrasonic inspection.

- e) All other test reports and certificates as required by API 6D, this specification and data sheets. The certificates shall be valid only when signed by Purchaser's Inspector. Only those valves which have been certified by Purchaser's Inspector shall be dispatched from Manufacturer's works.

4.1.8. PAINTING, MARKING AND SHIPMENT

- Valve surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. Surface preparation shall be carried out by shot blasting to SP- 6 in accordance with "Steel Structures Painting Council - Visual Standard SSPC-VIS-1". For the valves to be installed underground, when indicated in Valve Data Sheet, the external surfaces of buried portion of the valve shall be painted with three coats of suitable coal tar epoxy resin with a minimum dry film thickness of 300 microns.
- All valves shall be marked as per API 6D. The units of marking shall be metric except nominal diameter, which shall be in inches.
- Valve ends shall be suitably protected to avoid any damage during transit. All threaded and machined surfaces subject to corrosion shall be well protected by a coat of grease or other suitable material. All valves shall be provided with suitable protectors for flange faces, securely attached to the valves. Bevel ends shall be protected with metallic or high impact plastic bevel protectors.
- All sealant lines and other cavities of the valve shall be filled with sealant before shipment.
- Packaging and shipping instructions shall be as per API 6D and procurement documentation. All valves shall be transported with ball in the fully open condition.

4.1.9. SPARES AND ACCESSORIES

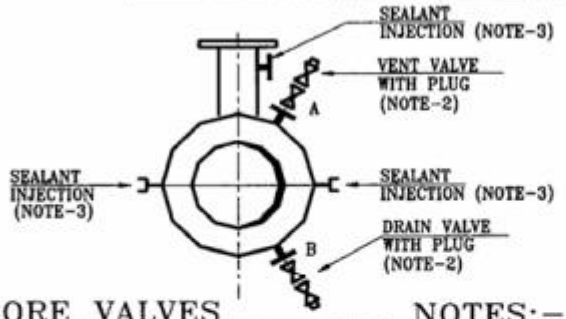
- Manufacturer shall furnish list of recommended spares and accessories for valves required during start-up and commissioning.
- Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of valves.
- Manufacturer shall quote for spares and accessories as per Material Requisition.

4.1.10. DOCUMENTATION

- At the time of bidding, Manufacturer shall submit the following documents:
- a) Filled in Data Sheet
- b) General arrangement/assembly drawings showing all features and relative positions and sizes of vents, drains, gear operator/ actuator, painting, coating and other external parts together with overall dimension.
- c) Sectional drawing showing major parts with reference numbers and material specification. In particular a blow up drawing of ball-seat assembly shall be furnished complying with the requirement of Clause 6.7 of this specification.
- d) Reference list of similar ball valves manufactured and supplied in last five years indicating all relevant details including project, year, client, location, size, rating, service etc.
- e) Torque curves for the power actuated valves along with the break torque and maximum allowable stem torque. In addition, sizing criteria and torque calculations shall also be submitted for power actuated valves.
- f) Clause wise list of deviations from this specification, if any.
- g) Descriptive technical catalogues of the manufacturer.
- h) Installation, Operational and Maintenance Manual.
- i) Copy of valid API 6D Certificate.
- j) Details of support foot including dimensions and distance from valve centerline to bottom of support foot
- Within three weeks of placement of order, the Manufacturer shall submit four copies of, but not limited to, the following drawings, documents and specifications for Purchaser's approval:
- a) Detailed sectional drawings showing all parts with reference numbers and material specifications.

- b) Assembly drawings with overall dimensions and features. Drawing shall also indicate the number of turns of hand wheel (in case of gear operators) required for operating the valve from full open to full close position and the painting scheme. Complete dimensional details of support foot (where applicable) shall be indicated in these drawings.
- c) Welding, heat treatment and testing procedures (Quality Assurance Plan).
- d) Details of corrosion resistant paint to be applied on the valves. Manufacturing of valves shall commence only after approval of the above documents. Once the approval has been given by Purchaser, any changes in design, material and method of manufacture shall be notified to Purchaser whose approval in writing of all changes shall be obtained before the valve is manufactured.
- Prior to shipment, Manufacturer shall submit to Purchaser one reproducible and six copies of the following:
- a) Test certificates as per clause 8.0 of this specification.
- b) Manual for installation, erection, maintenance and operation instructions including a list of recommended spares for the valves.
- CD containing all docs shall be submitted within 30 days from the approval date, Manufacturer shall submit to Purchaser one reproducible and six copies of the approved drawings, documents and specifications above.
- All documents shall be in English language only.

ABOVE GROUND INSTALLATION



FULL BORE VALVES

VALVE SIZE, DN(mm)	A, DN(mm)	B, DN(mm)
50 AND 150	–	15
200 TO 600	15	25
650 & ABOVE	15	50

REDUCED BORE VALVES

VALVE SIZE, DN(mm)	A, DN(mm)	B, DN(mm)
50 AND 200	–	15
250 TO 750	15	25
ABOVE 750	15	50

NOTES:–

1 ALL VALVES (BALL OR PLUG) AND PLUGS FOR A AND B SHALL BE APPROVED BY THE PURCHASER.

2 VALVES OF SIZE 50 mm SHALL BE MANUFACTURED AS PER API-6D.

3 SEALANT POINTS SHALL BE PROVIDED FOR FULL BORE VALVES OF NOMINAL VALVE SIZE 200 mm (8") & ABOVE AND REDUCED BORE VALVES OF NOMINAL VALVE SIZE, DN 250 mm (10") AND ABOVE ONLY. SEALANT LINES SHALL HAVE PROVISION TO REPLACE THE SEALANT INJECTION FITTING UNDER FULL LINE PRESSURE.

4 ALL VENT/DRAIN CONNECTION SHALL BE WELDED WITH THE BODY.

4.2. TECHNICAL SPECIFICATION FOR PIPING FLANGES

4.2.1. SCOPE

- This specification covers the requirements for the design, manufacture and supply of carbon steel flanges, to be installed in piping system handling natural gas and hydrocarbon liquid. This specification does not cover flanges, which are to be installed in pipeline system handling sour hydrocarbon (liquid/gas) service as defined in NACE standard MR-0175-98.

4.2.2. REFERENCE DOCUMENTS

- Reference has been made in this specification to the latest edition of the following codes, standards and specifications:

a) ASME B 31.8 : Gas Transmission and Distribution Piping System
b) ASME B 31.4 : Liquid transportation system for hydrocarbon liquid petroleum, gas, anhydrous ammonia and alcohols.
c) ANSI B 16.5 : Steel Pipe Flanges and Flanged Fittings
d) ANSI B 16.25 : Butt Weld ends
e) ANSI B 16.34 : Valves-Flanged, Threaded, and Welding \ Ends
f) ANSI B 16.47 : Large Diameter Steel Flanges
g) MSS-SP-44 : Steel Pipeline Flanges
h) ASTM A 105 : Specification for Forgings Carbon Steel
i) ASTM A 350 : Specification for Carbon and Low-Alloy Steel Forgings
j) ASTM A 370 : Mechanical Testing of Steel Products
k) API 590 : Steel Line Blanks
l) MSS-SP-25 : Standard marking system for valves, fittings, flanges and unions.
m) API 605 : Large Diameter Carbon Steel Flanges.

- In case of conflict between the requirement of this specification and the above-referred documents, the requirements of this specification shall govern.

4.2.3. MANUFACTURE / SUPPLIER QUALIFICATION

- Manufacturer / supplier who intend bidding for flanges must possess the records of a successful proof test for flanges in accordance with the provisions of relevant ANSI/MSS Standards. These records shall be submitted at the time of bidding.

4.2.4. MATERIAL

- The basic material for flanges shall be as indicated in the Purchase Requisition Additionally; the material shall also meet the requirements specified hereinafter.
- Steel used shall be fully killed, fine grain practice.
- Unless specified otherwise, Charpy V-notch test shall be conducted for each heat of steel, in accordance with the impact test provisions of ASTM A370.
- As per ASTM A 350 Table 4 & Table 5 Charpy V-Notch Energy Requirements for Standard Size [10 by 10 mm] specimens

Grade	Test Temperature, Deg C	Min. Impact Energy Required for Average of Each Set of Three Specimens, Joules	Min. Impact Energy permitted for One Specimen only of a Set, Joules
LF2 Class1	-45.6	20	16
LF2 Class2	-18	27	20

- The average absorbed impact energy values of three full-sized specimens shall be 35 joules and individual impact energy value shall not be less than 28 joules for full sized specimens at 0 °C.
- The minimum impact energy value of any one specimen of the three specimens analyzed as above shall not be less than 80% of the above mentioned average value.
- Hardness testing shall be carried out by Manufacturer / supplier in accordance with applicable ASTM.

4.2.5. DESIGN AND MANUFACTURE

- Flanges such as welding neck flanges and blind flanges shall conform to the requirements of ASME B16.5. Spectacle blind, spacer and blind shall conform to API 590.
- Type, face and face finish of flanges shall be as specified in Purchase Requisition.
- All butt weld ends shall be beveled as per ASME B16.25.
- Repair by welding on flanges is not allowed.
- Flanges shall be of forged construction and designed and manufactured in accordance with relevant ANSI/MSS Standards.

4.2.6. INSPECTION AND TESTS

- The Manufacturer / supplier shall perform all inspection and tests as per the requirements of this specification and the relevant codes at his works. Such inspection and tests shall be, but not limited to the following:
  - All flanges shall be visually inspected.
  - Dimensional check
  - Chemical composition and mechanical properties shall be checked as per relevant material specification.
  - All other test not specifically listed but is required as per applicable standard/ specification.
  - All flanges 12” NB, 300 Class and above should be ultrasonically tested.
- CONSULTANT shall also perform stage wise inspection and witness tests as indicated in Para 6.1 at Manufacturer / supplier’s works. Manufacturer / supplier shall give reasonable notice and shall provide without charges reasonable access and facilities required for inspection, to the Purchaser’s Representative
- Inspection and tests performed/witnessed by CONSULTANT shall in not any way relieve the Manufacturer / supplier’s obligation to supply flanges as per this specification.

4.2.7. TEST CERTIFICATES

- Manufacturer / supplier shall submit following certificates to CONSULTANT:
- a) Test certificates relevant to chemical analysis and mechanical properties of the material used for construction as per this specification and relevant standards.
- b) Test report on ultrasonic inspection.

4.2.8. MARKING

- Flanges surface shall be thoroughly cleaned, freed from rust and grease after all the required tests have been performed and accepted by CONSULTANT.
- Flanges shall be marked with the following data:
  - a) Manufacturer / supplier’s Name
  - b) Nominal diameter in inches
  - c) Rating of the flanges
  - d) Material
  - e) Tag numbers
- Flanges shall be suitably protected to avoid any damage during transit and storage.

4.3. TECHNICAL SPECIFICATION FOR GLOBE VALVES

4.3.1. SCOPE

- This specification provides minimum requirement for Design, Manufacturing, Inspection, Testing and Supply of Carbon steel Globe Valves covering sizes ½" NB(15mm) through 36"NB(900mm) for pressure class 150 # to class 900 # to be used in on-shore pipeline systems handling non- sour hydrocarbons in liquid or gaseous phase, including Liquid Petroleum Gas (LPG).

4.3.2. REFERENCE DOCUMENTS

- The following Standard includes provision which, through reference in this text constitute provision of this Standard. Latest revision of this standard shall be used unless otherwise specified.

API 6D	: Specification for Pipeline Valves.
API 6FA	: Specification for Fire Test for Valves.
API 1104	: Specification for Welding Pipelines and related facilities.
ASME 16.10	: Face to Face and End to End Dimensions of Valves
ASME 16.20	: Metallic gasket for pipe flanges – Ring joint or spiral wounds and jacketed.
ASME 16.21	: Non Metallic Gaskets for pipe flanges.
ASME B 16.5	: Steel Pipe Flanges and Flanged Fittings.
ASME B 16.34	: Valves - Flanged, Threaded and Welding Ends.
ASME B 31.3	: Process Piping.
ASME B 31.8	: Gas Transmission and Distribution Piping Systems.
ASME Sec VIII Div.I/Div.II	: Boiler and Pressure Vessel Code – Rules for Construction of Pressure Vessels.
ASTM A370	: Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
ASTM B 733	: Auto catalytic Nickel Phosphorous Coating on Metals.
BS 6755-1	: Testing of Valves. Specification for production pressure testing requirements.
BS 6755-2	: Testing of Valves. Specification for fire type-testing requirement.
BS 5352	: Specification for Steel, Wedge Gate, Globe and Check Valves 50 mm and smaller for the Petroleum, Petrochemical and Allied Industries
BS 1873	: Steel Globe and Globe Stop and Check Valves (Flanged and Butt- Welding Ends) for the Petroleum, Petrochemical and Allied Industries
EN 10204	: Metallic Materials – Types of Inspection documents.
MSS-SP-6	: Standard Finishes for Contact Faces of Pipe Flanges and Connecting - end Flanges of Valves and Fittings.
MSS-SP-25	: Standard marking system for Valves, Fittings, Flanges and Unio
MSS-SP-44	: Steel Pipeline Flanges.
MSS-SP-53	: Quality Standard for Steel Casting and Forgings for Valves, Flanges and Fittings and Other Piping Components – Magnetic Particle Examination Method.
ISO 5208	: Industrial Valves – Pressure Testing of Valves
ISO 10497	: Testing of Valves – fire type testing requirements.
ISO 13623	: Petroleum & Natural Gas Industry – pipeline transportation system.
ISO 14313	: Petroleum & Natural Gas Industry. Pipeline transportation system – pipeline Valves
SSPC-VIS-1	: Steel Structures Painting Council Visual Standard.

4.3.3. MATERIALS

- Material for major components of the valves shall be as indicated in Valve Data Sheet. In addition, the material shall also meet the requirements specified herein. Other components shall be as per Manufacturer's standard, which shall be subjected to approval by Purchaser.
- Carbon steel used for the manufacture of valves shall be fully killed.
- The carbon equivalent (CE) of valve end connections which are subject to further field welding by Purchaser shall not exceed 0.45% on check analysis for each heat of steel used
- Charpy V-Notch test on each heat of base material shall be conducted as per API 6D, for all pressure containing parts such as body, end flanges and welding ends as well as bolting material for pressure containing parts. Unless specified otherwise, the Charpy impact test shall be conducted at 0°C & -10°C. The Charpy impact test specimen shall be taken in the direction of principal grain flow and notched perpendicular to the original surface of plate or forging.
- The minimum average absorbed energy per set of three specimens shall be 35 J with an individual minimum per specimen of 28 J. No specimen shall exhibit less than 80 percent shear area.
- Valves shall be subjected to hardness test on base material for each heat for pressure containing parts. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10 based on minimum four (4) measurements representing the entire thickness.

4.3.4. DESIGN AND CONSTRUCTION

- Valves shall be designed, manufactured, tested, inspected and marked as per the manufacturing standards design codes and standards (Latest editions) indicated in the respective valve specification sheets. Any conflict between the technical specification, data sheets and referred standard codes shall be brought to the notice of the purchaser for clarifications, but generally technical specification, data sheets shall govern. No deviation to specification/ standard shall be permitted through vendor drawings approval. Approval of drawings shall be valid only for design features.
- Bonnet extension wherever specification refers the valve sheet to BS: 6364 shall be for "Non Cold Box Application" unless otherwise specified in the requisition.
- For heavy valves provisions shall be available for lifting by way of lugs, eye bolts and such standard devices.
- All flanged valves shall have flanges integral (except forged valves) with the valve body. Flange finish shall be as per valve specification sheet.
- For all weld end valves with bevel end as per ANSI B16. 25.
- If an overlay weld-deposit is used for the body seat ring and seating surface, the seat ring base material shall be at least equal to the corrosion resistance of the material of the shell.
- Valve body/ bonnet shall be forged/ cast as specified. Forging is acceptable in place of casting but not vice-versa.
- Material of construction of yoke shall be minimum equivalent to body/ bonnet material.
- Stem shall be forged or machined from forged / rolled bar. No casting is permitted.
- Stelliting / hard facing by deposition shall be minimum 1.6 mm. Renewable seat ring may be seal welded.
- As a pre qualification low temperature carbon steel, (LTCS), 3 ½ Ni steel (CRYO) & austenitic stainless (CRYO) valves shall be subjected to cryogenic test as per BS 6364 and test shall be witnessed and certified by purchaser inspection agency. The vendor has to submit test certificate for prototype valves along with the offer. Prototype test carried on a particular size, rating and design will qualify valves of sizes equal to and below the particular size of the same rating and design.
- For all austenitic stainless steel valves Inter Granular Corrosion (IGC) test shall have to be conducted as per following:

  - ASTM A 262 practice "B" with acceptance criteria of "60 Mills/ Year (Max.)" – For all materials forged, rolled, wrought and casting.

OR

- ASTM A 262 practice “E” with acceptance criteria of “No cracks as observed from 20X magnification” – For all materials other than castings. “Microscopic structure to be observed from 250X magnification” in addition.

- When specifically asked for in MR for high temperature application of some grades of austenitic stainless steel (e.g. SS 309, 310, 316, 316H etc.) ASTM A262 practice “C” with acceptance criteria of “15 Mils/ Year – (Max.)” shall have to be conducted.
- For the IGC test as described two sets of samples shall be drawn from each solution annealing lot, one set corresponding to highest carbon content and other set corresponding to highest pressure rating.
- Spiral wound bonnet gasket is to be provided with inner/ outer ring except when encapsulated gaskets type body- bonnet joints are employed. Outer ring may be avoided in case of Non- circular spiral wound gasket used in 150# valve provided the outermost layer of spiral touches the bolts ascertaining the centering.

4.3.5. OPERATION

- Generally, the valves are hand wheel or lever operated. Gear operation shall be provided as under:

Class	**Size Requiring- Gear Operator**
600 #	6” and Larger
1500 #	3” and Larger
2500 #	3” and Larger

- For sizes lower than these ranges, hand wheel shall be provided.
- Gear operator shall be totally enclosed bevel gear in grease case with grease nipples/ plugs with position indicators for open / close position.
- Gear operator shall be so designed to operate effectively with the differential pressure across the closed valve equal to the cold non-shock pressure rating.
- Hand wheel diameter shall not exceed 750 mm and lever length shall not exceed 500 mm. on both sides. Effort to operate shall not exceed 350N at hand wheel periphery. However failing to meet the above requirements vendor shall offer gear operated valve.

4.3.6. INSPECTION AND TESTS

- The Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his Works. Such inspection and tests shall be, but not limited to, the following:
- All valves shall be visually inspected.
- Dimensional check on all valves shall be carried out as per the Purchaser approved drawings.
- Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.
- Pressure containing parts of all valves such as body, bonnet, flange, welding ends and balls etc shall be subjected to impact test on each heat of base material as per API6D CL.3.7.
- All Valves shall be impact tested at 0°C. The average energy absorbed shall be 35J and min. 28J.
- Non Destructive Examination

  a) Non-destructive examination of individual valve material and component consisting of but not limited to castings, forgings, plates and assembly welds shall be carried out by the Manufacturer. All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with MSS-SP-53.

  b) Body castings of all valves shall be radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B 16.34.

c) All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34. All forgings shall be subject to wet magnetic particle inspection on 100% of the internal surfaces. Method and acceptance shall comply with MSS-SP-53

- Bodies and bonnets made by welded assembly of segments of castings, forgings, combinations thereof shall be examined, as applicable, by methods of 7.6 (b) for cast components or 7.6 (c) for forged components and plates.
- Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.3 or ASME B31.8 as applicable and API 1104.
- Welds which in Purchaser's opinion cannot be inspected by radiographic methods, shall be checked by ultrasonic or magnetic particle methods and acceptance criteria shall be as per ASME VIII, Division 1, Appendix 12 and Appendix 6, respectively.

  a) All finished wrought weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.

  b) Weld ends of all cast valves subject to welding in 0field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B 16.34.

  c) After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm are rejected, as are the defects between 6.35 mm and 1.59 mm that are separated by a distance less than 50 times their greatest length. Rejectable defects must be removed. Weld repair of bevel surface is not permitted.
- All valves shall be tested in compliance with the requirements of API 6D. During pressure testing, valves shall not have sealant lines and other cavities filled with sealant, grease or other foreign material. The drain, vent and sealant lines shall be either included in the hydrostatic shell test or tested independently. No leakage is permissible during hydrostatic testing.
- A supplementary air seat test as per API 6D shall be carried out for all valves. A bubble tight seal is required without the use of any sealant. No leakage is allowed. Test pressure shall be held for at least 15 minutes.
- Valves shall be subjected to Operational Torque Test as per clause C4 of API 6D under hydraulic pressure equal to maximum differential pressure corresponding to the valve rating. For manually operated valves, it shall be established that the force required to operate the valve does not exceed the requirements stated in this specification.
- Power actuated valves shall be tested after assembly of the valve and actuator, at the valve Manufacturer's works. At least five Open-Close-Open cycles without internal pressure and five Open Close-Open cycles with maximum differential pressure corresponding to the valve rating shall be performed on the valve actuator assembly. The time for Full Open to Full Close shall be recorded during testing.
- If required, the actuator shall be adjusted to ensure that the opening and closing time is with in the limits stated in Valve Data Sheet. The Hand operator provided on the actuator shall also be checked after the cyclic testing, for satisfactory manual over-ride performance.
- These tests shall be conducted on minimum one valve out of a lot of five (5) valves of the same size, rating and the actuator model/type. In case, the tests do not meet the requirements, retesting/rejection of the lot shall be decided by the Purchaser's Inspector.
- Subsequent to successful testing, one (1) valve out of the total ordered quantity shall be randomly selected by the Company Representative for cyclic testing as mentioned below:

  a) The valve shall be subjected to at least 500 Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating.

  b) Subsequent to the above, the valve shall be subjected to hydrostatic test and supplementary air seat test. In case this valve fails to pass these tests, the valve shall be rejected and two more valves shall be selected randomly and subjected to testing as indicated above. If both valves pass these tests, all valves manufactured for the order (except the valve that failed) shall be

deemed acceptable. If either of the two valves fails to pass these tests, all valves shall be rejected or each valve shall be tested at the option of manufacturer. Previously carried out prototype test of similar nature shall not be considered acceptable in place of this test.

- Purchaser reserves the right to perform stage wise inspection and witness tests as indicated at Manufacturer's works prior to shipment. Manufacturer shall give reasonable access and facilities required for inspection to the Purchaser. Purchaser reserves the right to require additional testing at any time to confirm or further investigate a suspected fault. The cost incurred shall be to Manufacturer's account. In no case shall any action of Purchaser or his inspector shall relieve the Manufacturer of his responsibility for material, design, quality or operation of valves. Inspection and tests performed/witnessed by the Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

4.3.7. TEST CERTIFICATES

- Manufacturer shall submit the following certificates:

  a) Mill test certificates relevant to the chemical analysis and mechanical properties the materials used for the valve construction as per the relevant standards.

  b) Test certificates of hydrostatic and pneumatic tests complete with records of timing and pressure of each test.

  c) Test reports of radiograph and ultrasonic inspection.

  d) Test report on operation of valves conforming to this specification.

  e) All other test reports and certificates as required by API 6D, this specification and data sheets.

- The certificates shall be valid only when signed by Purchaser's Inspector. Only those valves which have been certified by Purchaser's Inspector shall be dispatched from Manufacturer's works.

4.3.8. PAINTING, MARKING AND SHIPMENT

- Valve surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. Surface preparation shall be carried out by shot blasting to SP-6 in accordance with "Steel Structures Painting Council - Visual Standard SSPC-VIS-1". For the valves to be installed underground, when indicated in Valve Data Sheet, the external surfaces of buried portion of the valve shall be painted with three coats of suitable coal tar epoxy resin with a minimum dry film thickness of 300 microns.
- All valves shall be marked as per API 6D. The units of marking shall be metric except nominal diameter, which shall be in inches.
- Valve ends shall be suitably protected to avoid any damage during transit. All threaded and machined surfaces subject to corrosion shall be well protected by a coat of grease or other suitable material. All valves shall be provided with suitable protectors for flange faces, securely attached to the valves. Bevel ends shall be protected with metallic or high impact plastic bevel protectors.
- All sealant lines and other cavities of the valve shall be filled with sealant before shipment. 9.5 Packaging and shipping instructions shall be as per API 6D and procurement documentation. All valves shall be transported with ball in the fully open condition.

4.3.9. SPARES AND ACCESSORIES

- Manufacturer shall furnish list of recommended spares and accessories for valves required during startup and commissioning.
- Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of valves.
- Manufacturer shall quote for spares and accessories as per Material Requisition.

4.3.10. DOCUMENTATION

- At the time of bidding, Manufacturer shall submit the following documents:

- a) Filled Data Sheet
- b) General arrangement/assembly drawings showing all features and relative positions and sizes of vents, drains, gear operator/ actuator, painting, coating and other external parts together with overall dimension.
- C) Sectional drawing showing major parts with reference numbers and material specification. In particular a blow up drawing of ball-seat assembly shall be furnished complying with the requirement of clause 4.5 of this specification.
- d) Reference list of similar ball valves manufactured and supplied in last five years indicating all relevant details including project, year, client, location, size, rating, service etc.
- e) Torque curves for the power actuated valves along with the break torque and maximum allowable stem torque. In addition, sizing criteria and torque calculations shall also be submitted for power actuated valves.
- f) Clause wise list of deviations from this specification, if any.
- g) Descriptive technical catalogues of the manufacturer.
- h) Installation, Operational and Maintenance Manual.
- i) Copy of valid API 6D Certificate.
- j) Details of support foot including dimensions and distance from valve centerline to bottom of support foot.
- k) Quality Assurance Plan enclosed with this tender duly signed, stamped and accepted.

- With in two weeks of placement of order, the Manufacturer shall submit four copies of, but not limited to, the following drawings, documents and specifications for Purchaser's approval:
  - a) Detailed sectional drawings showing all parts with reference numbers and material specifications.
  - b) Assembly drawings with overall dimensions and features. Drawing shall also indicate the number of turns of hand wheel (in case of gear operators) required for operating the valve from full open to full close position and the painting scheme. Complete dimensional details of support foot (where applicable) shall be indicated in these drawings.
  - c) Welding, heat treatment and testing procedures.
  - d) Details of corrosion resistant paint to be applied on the valves.
- Manufacturer of valves shall commence only after approval of the above documents. Once the approval has been given by Purchaser, any changes in design, material and method of manufacture shall be notified to Purchaser whose approval in writing of all changes shall be obtained before the valve is manufactured.
- CD containing all docs shall be submitted within 30 days from the approval date, Manufacturer shall submit to Purchaser one reproducible and six copies of the approved drawings, documents and specifications as listed.
- Prior to shipment, Manufacturer shall submit to Purchaser one reproducible and six copies of the following:
  - a) Test certificates as per clause 8.0 of this specification.
  - b) Manual for installation, erection, maintenance and operation instructions including a list of recommended spares for the valves.
- All documents shall be in English language only.

4.3.11. GUARANTEE

- Manufacturer shall guarantee that the material and machining of valves and fittings comply with the requirements in this specification and in the purchase order.
- Manufacturer is bound to replace or repair all valve parts which should result defective due to inadequate engineering or to the quality of materials and machining.
- If valve defect or malfunctioning cannot be eliminated, Manufacturer shall replace the valve without delay.

- Any defect occurring during the period of Guarantee shall be attended to by making all necessary modifications and repair of defective parts free of charge to the Purchaser as per the relevant clause of the bid document.
- All expenses shall be to Manufacturer's account.

4.4. TECHNICAL SPECIFICATION FOR SEAMLESS FITTINGS

4.4.1. SCOPE

- This specification covers the minimum requirements for the design, manufacture and supply of following fittings in size NB 600mm and smaller to be installed in natural gas or liquid hydrocarbon pipelines and piping system
- Fittings such as tees, elbows, caps etc. shall conform to the requirements of MSSSP-75, latest edition. Dimensions standard for Screwed/SW fittings shall be as per ANSI B16.11.
- All requirements contained in the above standards shall be fully valid unless cancelled, replaced or amended by more requirements as stated in this specification.
- This specification does not cover the above-mentioned items, which are to be installed in pipeline handling sour hydrocarbon (liquid/gas) service as defined in NACE standard MR-0175-98.

4.4.2. REFERENCE DOCUMENTS

- Reference has also been made in this specification to the latest edition of the following codes, standards and specifications:

a) ASME B 31.8	: Gas Transmission and Distribution Piping System
b) ASME B 31.4	: Liquid transportation system for hydrocarbon liquid petroleum gas, anhydrous ammonia and alcohols
c) ANSI B 16.25	: Butt – Welding Ends
d) ASME B 16.9	: Factory made wrought steel butt welding fittings
e) ASME B 16.11	: Forged Steel Fittings, Socket Welding and Threaded
f) ASTM A 370	: Mechanical Testing of Steel Products
g) ASTM Part-1	: Steel Piping, Tubing, Fittings
h) MSS-SP-25	: Standard marking system for valves, fittings, flanges and unions.
i) MSS-SP-75	: Specification for High Test Wrought Welding Fittings
j) MSS-SP-97	: Forged carbon steel branch outlet fittings – socket welding, threaded and butt welding ends.

- In case of conflict between the requirement of MSS-SP-75, & above reference documents and this specification, the requirements of this specification shall govern.

4.4.3. MANUFACTURE'S QUALIFICATION

- Manufacturer who intends bidding for fittings must possess the records of a successful proof test in accordance with the provisions of relevant MSS-SP-75 and/or ANSI B16.9/ANSI B16.11 as applicable. These records shall be submitted at the time of bidding.

4.4.4. MATERIAL

- The basic material for fittings shall be as indicated in the Purchase Requisition Additionally, the material shall also meet the requirements specified hereinafter.
- Steel used shall be fully killed.
- Each heat of steel used for the manufacture of fittings shall have carbon equivalent (CE) not greater than 0.45
- Carbon contents on check analysis shall not exceed 0.22%.

- Unless specified otherwise, Charpy V-notch test shall be conducted for each heat of steel, in accordance with the impact test provisions of ASTM A370 at temperature of 0ºC. The average absorbed impact energy values of three full-sized specimens shall be 35 joules.
- The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 80% of the above mentioned average value.
- Hardness testing shall be carried out by Manufacturer in accordance with applicable ASTM code.

4.4.5. DESIGN AND MANUFACTURE

- Fittings such as tees, elbows and reducers shall be seamless type and shall conform to ASME B16.9 for sizes 50mm (2") NB and above ASME B16.11 for sizes below 50mm (2") NB.
- Fittings such as weldolets, sockolets, etc. shall be manufactured in accordance with MSS-SP-75.
- Stub-in or pipe-to-pipe connection shall not be used in the manufacture of tees. Tees shall be manufactured by forging or extrusion methods. The longitudinal weld seam shall be kept at 90º from the extrusion. Fittings shall not have any circumferential joints.
- All butt weld ends shall be bevelled as per ASME B16.25.
- Repair by welding on parent metal of the fittings is not allowed.

4.4.6. INSPECTION AND TESTS

- The Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his works. Such inspection and tests shall be, but not limited to the following:
- Visual inspection.
- Dimensional checks as per MSS-SP-75 for fittings/applicable standards.
- Chemical composition, mechanical properties and hardness examination.
- All finished wrought weld ends shall be 100% ultrasonically tested for lamination type defects. Any lamination larger than 6.35 mm shall not be acceptable.
- All other tests not specifically listed but are required as per applicable standard/ specification.
- Purchaser's Inspector may also perform stage wise inspection and witness tests as at manufacturer's works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide without charges reasonable access and facilities required for inspection to the Purchaser's Inspector Inspection and tests performed/witnessed by Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and test.

4.4.7. TEST CERTIFICATES

- Manufacturer shall produce the certificates (in original) for all, including, but not limited, the following tests:
- a) Certificates of chemical analysis and mechanical properties of the material used for construction as per this specification and relevant standards.
- b) Certificates of required non-destructive tests inspections.
- c) Certificates of all other tests as required in this specification.
- d) In case any of the said certificates is not available during the final test, the supply shall be considered incomplete.

4.4.8. PAINTING, MARKING AND SHIPMENT

- All fittings shall be marked as per MSS-SP-25.
- All loose material and foreign material i.e. rust, grease, etc. shall be removed from the inside and outside of the fittings.
- Ends of all fittings shall be suitably protected to avoid any damage during transit. Metallic bevel protectors shall be used for fittings of size 18" and larger each item shall be marked with indelible paint with the following data:

- a) Manufacturer marking
- b) Material Specification
- c) Size & Sch.
- d) Heat No.

4.4.9. WARRANTY

- Manufacturer will reimburse purchaser for any fitting furnished on this order that fails under field hydrostatic test if such failure is caused by a defect in the fitting, which is outside the acceptance limits of this specification. The reimbursement cost shall include fitting, labour and equipment rental for finding, excavation, cutting out and installation of replaced fitting in position. The field hydrostatic test pressure will not exceed that value which will cause a calculated hoop stress equivalent to 100% of specified minimum yield strength for the pipe with which the fitting is to be attached without impairing its serviceability.

4.4.10. DOCUMENTATION

- All documents shall be in English Language.
- At the time of bidding bidder shall submit the following documents:
  - a) Reference list of previous supplies of similar fittings of similar specification.
  - b) Clause wise list of deviation from this specification, if any.
  - c) Brief description of the manufacturing and quality control facilities of the Manufacturer's work.
  - d) Manufacturer's qualification requirement as per section 3.0 of this specification.
  - e) Quality Assurance Plan (QAP).
- Within two weeks of placement of order, the manufacturer shall submit four copies of method of manufacture and quality control procedure for raw material and finished product. Once the approval has been given by Purchaser, any change in material, method of manufacture and quality control procedure shall be notified to Purchaser whose approval in writing of all changes shall be obtained before the fittings are manufactured.
- Within four weeks from the approval date, Manufacturer shall submit six copies of the approved documents as stated in Para 10.3 of this specification.
- Prior to shipment, Manufacturer shall submit six copies of test certificates as listed in this specification.

4.5. TECHNICAL SPECIFICATION FOR ASSORTED PIPES

4.5.1. GENERAL

- All pipes and their dimensions, tolerances, chemical composition, physical properties, heat treatment, hydro test and other testing and marking requirements shall conform to the latest codes and standards. Deviation(s), if any, shall be clearly highlighted in the offer.
- TESTING
  - Test reports shall be supplied for all mandatory tests as per the applicable Material specifications. Test reports shall also be furnished for any supplementary tests as specified
  - Material test certificates (physical property, chemical Composition & treatment report) shall also be furnished for the pipes supplied.

- MANUFACTURING PROCESSES
  - Steel made by Acid Bessemer Process shall not be acceptable.
  - All longitudinally welded pipes other than IS:3589 should employ automatic welding.

- Pipe shall be supplied in single or double random length of 4 to 7 and 7 to14 meters, respectively Seamless and E.R.W. pipes shall not have any circumferential seam joint in a random length. However, in case of E.FS.W. pipe, in one random length one welded circumferential seam same quality as longitudinal weld is permitted. This weld shall be at least 2.5 m from either end.
- The longitudinal seams of the two portions shall be staggered by 90°. Single random length in such cases shall be 5 to 7m.
- Unless otherwise mentioned in the respective material code, E.FS.W. pipes < 36" shall not have more than one longitudinal seam joint and E.FS.W. pipes >36" shall not have more than two longitudinal seam joints.
- Pipe with screwed ends shall have NPT external taper pipe threads conforming to ASME/ ANSI B1.20.1upto 1.5" NB & IS:554 for 2" to 6" NB.
- Pipe with bevelled ends shall be in accordance with ASME B16.25.
- Galvanized pipes shall be coated with zinc by hot dip process conforming to IS: 4736/ ASTM A 153.
- All austenitic stainless steel pipes shall be supplied in solution annealed condition.
- I.G.C. Test for Stainless Steels
    - For all austenitic stainless steel pipes, intergranular corrosion test shall have to be conducted as per following:
    - ASTM A262 practice "B "with acceptance criteria of "60 mils/ year (max.)" OR ASTM 262 practice "E" with acceptance criteria of "No cracks as observed from 20X magnification" & "Microscopic structure to be observed from 250X magnification".
    - When specifically asked for high temperature application of some grades of austenitic stainless steel (eg .SS 309, 310, 316, 316H etc.), ASTM A262 practice "C" with acceptance criteria of "15 mils/ year (max.)" shall have to be conducted.
    - For the IGC test as described, two sets of samples shall be drawn from each solution annealing lot; one set corresponding to highest carbon content and the other corresponding to the highest pipe thickness. When testing in is conducted as per Practice "E", photograph of microscopic structure shall be submitted for record.
- All welded pipes indicated as 'CRYO' & 'LT' in shall be impact tested per requirement and acceptance criteria of ASME B31.3. The impact test temperature shall be —196° C & 0° C for stainless steel and carbon steel, respectively, unless specifically mentioned otherwise in MR.
- Specified heat treatment for carbon steel & alloy steel and solution annealing for stainless steel pipes shall be carried out after weld repairs. Number of weld repairs at the same spot shall be restricted to maximum two by approved repair procedure.
- For black or galvanised pipes to IS: 1239, the minimum percentage of elongation shall be 20%.

4.5.2. IBR PIPES

- IBR Documentation
- Pipes under purview of IBR shall be accompanied with IBR certificate original in Form IIIA, duly approved and counter signed by IBR authority local authority empowered by the Central Boiler Board of India. Photocopy of the original certificate duly attested by the local boiler inspector where the supplier is located is the minimum requirement for acceptance.
- For materials 1 1/4 Cr- 1/2 Mo (ASTM A335 Gr. P11 A691 Gr. 1 1/4 Cr) & 2 1/4 Cr-iMo (ASTM A335r.P22/ A691 Gr. 2 1/4 Cr.), from Ill-A approved by IBR shall include the tabulation of E , S & Sr values for the entire temperature range given below. Et, S & Sr values shall be such that throughout the temperature range.

  E t / 1.5 ≥ Sa
  Sr/1.5 ≥ Sa
  Sc ≥ Sa

  where,

  Sa : Allowable stress at the working metal temperature.
  Et : Yield point (0.2% proof stress at the working metal temperature.

Sc : The average stress to produce elongation of 1% (creep) in 1, 00,000 hrs at the working metal temperature.

Sr : The average stress to produce rupture in 1,00,000 hrs. at the working metal temperature and in no case more than 1.33 times the lowest stress to produce rupture at this temperature.

SA (psi)	Temperature (°F)											
Material	500	600	650	700	750	800	850	900	950	1000	1050	1100
A335 Gr. P11	17200	16700	16200	15600	15200	15000	14500	12800	9300	6300	4200	2800
A 691 Gr. 1½ Cr	18900	18300	18000	17600	17300	16800	16300	15000	9900	6300	4200	2800
A335 Gr. P2/ A691 Gr. 2 1/4 Cr	17900	17900	17900	17900	17900	17800	14500	12800	10800	7800	5100	3200

Note : Sa values given above are as per ASME B31.3-1999. Values shall be as per the latest edition prevailing.

- For carbon steel pipes under IBR, the chemical composition shall conform to the following:
  Carbon (max.): 0.25%
  Others (S, P, Mn): As prescribed in IBR regulation.
  The chemical composition as indicated in this clause is not applicable for pipes other than IBR services.

4.5.3. HYDROSTATIC TEST

- All pipes shall be hydrostatically tested.
- The mill test pressure shall be as follows:
  - Seamless, E.R.W. & Spiral Welded

- Carbon Steel

Material Standard	Test Pressure Standard
ASTM A 106 Gr. B	ASTM A 530
API 5L Gr. B, Seamless	API 5L
API 5L, E.R.W.	API 5L
API 5L, Spiral	API 5L
ASTM A333 Gr.3 & 6, Seamless	ASTM A 530
ASTM A 333 Gr. 3 & 6, E.R.W.	ASTM A 530

- Seamless Alloy Steel

Material Standard	Test Pressure Standard
ASTM A335 GR.P1, P12, P11, P22, P5 P9	ASTM A 530
ASTM A268 TP 405, TP41O	ASTM A 530

- Seamless Stainless Steel

Material Standard	Test Pressure Standard
ASTM A312 GR.TP304,304L,304H, 316,316L, 316H, 321,347	ASTM A 530

- Seamless Nickel Alloy

Material Standard	Test Pressure Standard
ASTM B161 UNS No.2200	ASTM B161
ASTM B165 UNS No.4400	ASTM B165
ASTM B167 UNS No.6600	ASTM B167
ASTM B407 UNS No. 8800	ASTM B407

- Welded Nickel Alloy

Material Standard	Test Pressure Standard
ASTM B725 UNS No.2200,4400	ASTM B725
ASTM B517 UNS No.6600	ASTM B517
ASTM B514 UNS No.8800	ASTM B514

- Electric Fusion Welded
  - Carbon Steel & Alloy Steel E.FS.W. (16” & above)

Material Standard	Test Pressure Standard
API 5L Gr.B	P=2ST / D
ASTM A 671 Gr. CC65, 70 (Cl.32) ASTM A 672 Gr.C60,65,70 (Cl.12,22) ASTM A 671 Gr.CF60,65,66,70 (Cl.32) ASTM A 691 Gr. ½ Cr, 1Cr, 1 1/4Cr ,2 1/4Cr,5Cr,9Cr (Cl.42)	S=90% OF SMYS (except for API 5L Gr.B) S=85% of SMYS for API 5L Gr.B T=Nominal Wall Thickeness D=O.D. of pipe

  - Stainless Steel E.FS.W. (2” to 6”)
    - The hydrostatic test pressure in kg /cm² for the following materials shall be as given below:
      Material Gr.1: ASTM A312 TP304/ 304H/ 316/ 316H/ 321/347 welded
      Material Gr.2: ASTM A312 TP 304L/ 316L welded

Size	Pipe Schedule: S 10		Pipe Schedule: S 40		Pipe Schedule: S 80	
	Material Gr.1	Material Gr.2	Material Gr.1	Material Gr.2	Material Gr.1	Material Gr.2
2”	100	80	155	130	230	190
3”	80	60	155	130	230	190
4”	80	50	155	130	230	190
6”	65	35	90	75	155	130

  - Stainless Steel E.FS.W. (8” and above)

Material Standard	Test Pressure standard

ASTM A358 TP 304L,304,304H,316L,316,316H,321,347 (Classes 1, 3 & 4)	P=2ST/D S=85% of SMSYS T=Nominal wall thickness D=O.D. of pipe
ASTM A358 TP 304L, 304, 304H, 316L, 316 316H, 321, 347 (Classes 2 & 5)	P=2ST/D S=72% of SMYS T=Nominal Wall thickness D=O.D. of pipe

- Carbon Steel Pipes to IS Standards

Material Standard	Test Pressure Standard
IS : 1239	IS : 1239
IS : 3589	IS : 3589

4.5.4. MARKING AND DESPATCH

- All pipes shall be marked in accordance with the applicable codes, standards and specifications. In addition, the purchase order number, the item code & special conditions like “IBR”, “ CRYO”, “NACE”, etc., shall also be marked.
- Pipes under “IBR”, “CRYO”, & “NACE” shall be painted in red stripes, light purple brown stripes & canary yellow stripes, respectively, longitudinally throughout the length for easy identification.
- Paint or ink for marking shall not contain any harmful metal or metallic salts such as zinc, lead or copper which cause corrosive attack on heating.
- Pipes shall be dry, clean and free from from moisture, dirt and loose foreign materials of any kind.
- Pipes shall be protected from rust, corrosion and mechanical damage during transportation, shipment and storage.
- Rust preventive used on machined surfaces to be welded shall be easily removable with petroleum solvent and the same shall not be harmful to welding.
- Both ends of the pipe shall be protected with the following material:
  - Plain end : Plastic cap
  - Bevel end : Wood, Metal or Plastic cover
  - Threaded end : Metal or Plastic threaded cap
- End protectors to be used on bevelled ends shall be securely and tightly attached with belt or wire.
- Steel end protectors to be used on galvanised pipes shall be galvanized.

4.6. TECHNICAL SPECIFICATION FOR GASKETS

Abbreviations:

AARH : Average Arithmetic Root Height
BHN : Brinnel Hardness Number
CS : Carbon Steel
MR : Material Requisition
PMI : Positive Material Identification
RTJ : Ring Type Joint

TECHNICAL NOTES FOR GASKETS

- GENERAL
  - All gaskets shall conform to the codes/standards and technical specifications as given. Vendor shall strictly comply with technical specification and no deviations shall be permitted.

- Process of manufacture, dimensions and tolerances not specified in specification shall be in accordance with the requirements of the manufacturer's standards.

- Testing
  - Test reports shall be supplied for all mandatory tests for gaskets as per the codes & standards specified in this technical specification.
  - Chemical composition and hardness of RTJ gaskets shall also be furnished in the form of test reports on samples.
  - For Spiral wound material following shall be furnished:
    a) Manufacturer's test certificate for filler material and spiral material as per the relevant material specifications.
    b) Manufacturer's test certificate for raw materials and tests for compressibility/ seal-ability & recovery as per the relevant material specifications.
- Full face gaskets shall have bolt holes punched out.
- Filler material for spiral wound gaskets shall not have any colour or dye.
- All spiral wound gaskets shall be supplied with Outer ring. Material of the outer ring shall be CS unless otherwise specified.
- For spiral wound gaskets, material of Inner Compression ring shall be same as Spiral Strip material. In addition to the requirements as per code and standard as specified in the technical specification. Inner rings shall be provided for the following:
  - Sizes 26" and above.
  - Class 900 and above.
- Hardness of metallic RTJ gaskets shall not exceed the values specified below:

Ring Gasket	Material Maximum Hardness (BHN)
Soft Iron	90
Carbon steel	120
5Cr.1/2Mo	130

- Face finish of metallic RTJ gaskets shall be 32 to 63 AARH.
- Gaskets of different types and sizes shall be placed in separate shipping containers and each container clearly marked with the size, rating, material specification and item code.
- All items shall be inspected and approved by JP Kenny / owner / TPI
- Any additional requirements specified in this technical specification, shall be fully complied with.
- Non-metallic ring gaskets as per ASME B16.21 shall match flanges to ASME B16.5 upto 24" (except 22" size) and to ASME B 16.47B above 24" unless specified otherwise. For 22" size, the matching flange standard shall be ASME B 16.47B unless specified otherwise.
- Spiral wound gasket as per ASME B16.20 shall match flanges to ASME B16.5 upto 24" (except 22"size) and to ASME B16.47B above 24" unless specifically mentioned otherwise. For 22" size, the matching flange standard shall be ASME B 16.47B unless specified otherwise.

4.7. TECHNICAL SPECIFICATION FOR BOLTS & NUTS

- The process of manufacture, heat treatment, chemical & mechanical requirements and marking for all stud bolts, bolts, jack screws & nuts shall be in accordance with the codes/standards and specifications given in the requisition. The applicable identification symbol in accordance with the material specification shall be stamped on each bolt and nut. Vendor shall strictly comply with MR/PR stipulations and no deviations shall be permitted.
- Testing
  i. Test reports shall be supplied for all mandatory tests as per the relevant material specifications.
  ii. Material test certificate shall also be furnished. (Heat Analysis, Product Analysis and Mechanical Requirement)

iii. PMI shall be performed as per the scope and procedures defined in the Specification for PMI at Vendor's Works.

iv. Stress Rupture Test as detailed in ASTM A453 shall be carried out for all ASTM A453 bolting material irrespective of the temperature.

- All bolting shall be as per ANSI B 18.2.1 for studs, M/c bolts and jackscrews and ANSI B18.2.2 for nuts.
- Threads shall be unified (UNC for 1" dia and 8UN for > 1" dia) as per ANSI B.1.1 with class 2A fit for studs, M/c bolts and jackscrews and class 2B fit for nuts.
- Stud bolts shall be threaded full length with two heavy hexagonal nuts. Length tolerance shall be in accordance with the requirement of ANSI B 16.5.
- The nuts shall be double chamfered, semi-finished, heavy hexagonal type and shall be made by the hot forged process and stamped as per respective material specification.
- Heads of jackscrews and m/c bolts shall be heavy hexagonal type. Jackscrew end shall be rounded.
- Each size of studs & rn/c bolts with nuts and jackscrews shall be supplied in separate containers marked with size and material specifications. 'CRYO' shall be marked additionally in case 'CRYO' is specified in the requisition.
- All items shall be inspected and approved (stage wise) by JP Kenny.
- The heat treatment for stud bolts & nuts shall be as per code unless mentioned otherwise.
- All austenitic stainless steel bolts, nuts, screws shall be supplied in solution annealed condition unless specified otherwise in the material specification.
- Stud bolts, nuts & jackscrews shall be impact tested wherever specified in the material specification and also where the material specification is indicated as "CRYO". For S.S. nuts and bolts minimum impact energy absorption shall be 27 Joules and test temperature shall be - 196°C unless mentioned otherwise. For other materials impact energy and test shall be as per respective code.
- Bolts/nuts of material of construction B7M/ 2HM shall be 100% Hardness tested as per supplementary requirement S3 of ASTM A 193.
- When specified as galvanized, the studs, M/C bolts and nuts shall be 'hot dip zinc coated' in accordance with requirements of 'class C' of 'ASTM A 153'. As an alternative, electro galvanizing as per IS 1573, 'Service Grade Number 2' is also acceptable.
- All Stud Bolts of Bolt diameter size 1" and above shall be provided with three nuts irrespective of whatever has been specified elsewhere in the MR.

4.8. VENDOR LIST

Sr. No	Description	Name of the Vendor
1	Valves- Steel	Flow Chem
		L&T Valves
		Micro finish valves pvt ltd
		Steel strong valves India ltd
		Oswal Industries ltd
		Nylon Valves p ltd
		Petro Valves
		GM Engineering
		Virgo Valves
		Zed Valves Co. Pvt Ltd
		Leader Valves
		Valve tech Industries
2	Pressure Guage	Waree
		Ani Instruments
		Baumer

		Wika
3	Welding Electrode	Lincoln
		Bohler
4	Pipe Fittings (Seamless/ welded)	Vivial forge Pvt Ltd
		Teekay Tube
		AM Forge Industries
		Pipefit Engineers pvt Ltd
		CD engineering co. Gaziabad
		CHW forge pvt ltd, Gaziabad
		Sanghvi forging and engineering Vadodra
		Goodluck engineering co/ Goodluck India Ltd Gaziabad
		Utsav Enginbeering pvt ltd
		Jindal Forging Pvt ltd
		Shakti Forge Industries
		United forge Industry
		Sky Forge Pvt Ltd
		Sawan engineers pvt ltd
		Dee piping system
		Sidharth and Gautam India
		MS Fittings manufacturers pvt ltd
		Gujarat Infra pipes pvt ltd
		Topaz piping industries
		Kunj Forging
5	Flanges (Forged)	Echjay Industries pvt ltd
		CD Industries
		CHW forge
		Metal forgings Pvt Ltd
		Punjab Steel works
		AN forge Industries
		JAV forging Pvt Ltd
		CD Engineering co
		Goodluck engineering co/ Goodluck India Ltd Gaziabad
		Utsav Enginbeering pvt ltd
		Jindal Forging Pvt ltd
		Shakti Forge Industries
		AM Engineers
		Kunj Forging
		Vivial forge Pvt Ltd
		JK Forging
		Sanghvi forging and engineering Vadodra
		Sawan engineers pvt ltd
		Pipefit Engineers pvt Ltd
6	Stud, Bold with Nut	Multi thread fastners, Baroda
		Darukhanwala

		Precision engineers, Baroda
		Unbrako
		TVS
7	Insulation Joint	IGP Engineers
		V K Vikram
		Advance Electronics
		Oceaneering Products
		BVM Engineers Vadodara
		Goodrich Gasket Pvt Ltd
		Nupros INC
8	Cathodic Protection	Mitcorr cathodic protection pvt ltd
		MS AMR engineering products
		Corrsolutions
		Corrxperts Pvt Ltd
		AMC projects
		Show & Sons Enterprises
		Consultech Cathodic protection engineers
		Afcon
		Central Electronics Ltd
		Corosion control service pvt ltd
		Corrtech International Pvt Ltd
Note: In addition to above approved vendor list, if material/service is to be procured from some other party, then approval is to be taken from EIC on submission of requisite documents such as, previous track record of supply of subject material to reputed Hydrocarbon company (GAIL/HPCL/BPCL/IOCL/PSU-JV/CGD etc)		

5. SUBMITTALS BY CONTRACTOR

5.1. GENERAL

5.1.1 Within two weeks from the date of commissioning, CONTRACTOR shall submit four copies of the list of all as-built drawings, construction documents, design & detail engineering copy etc.

5.1.2 All drawings and documents shall be in English and shall follow metric system. 1 Original + 1 Xerox + 1 Pendrive of each submission shall be as follows unless otherwise specified. List of required documents shall include but not limited to the following:

a. Drawings issued for execution/ construction
b. Final/ As built drawings execution/ construction
c. Operation/ Maintenance manual, vendor data, OEM Certificates
d. Supplied materials TC.

5.2. DRAWINGS AND DOCUMENTS

As a part of the contract, drawings and documents shall be furnished which shall include but not limited to the following:

a. Site Construction activity report dossiers
b. As Build/Isometric of CGS Station Piping
c. As Build/Isometric of Pipe Support
d. Bill of material, material requisitions and purchase requisitions
e. Quality assurance / Quality control procedures
f. Detailed construction drawings (including as built status)
g. Detailed commissioning report including various measurement data.
h. Vendor drawings and catalogues, test certificates
i. Operation and maintenance manuals of supplied materials
j. Miscellaneous (EQT/PQT/WQT/WPS Documents)

6. HEALTH, SAFETY & ENVIRONMENT

6.1 BIDDER shall develop a health, safety and environment (HSE) plan that addresses the HSE risks specific to the work and the management of controls to eliminate, reduce or mitigate risks.

6.2 BIDDER shall ensure its personnel are:

- Medically, physically and mentally fit to carry out the duties to which they are assigned in respect of the work.
- Technically competent and experienced in the tasks assigned to them.
- Aged eighteen years or above.
- Specifically trained for hazardous material transportations.

6.3 BIDDER shall arrange related PPE (i.e. Hard hat, Safety Shoes, Uniform, Hand Gloves, Gumboots, Ladders, Safety Belts, safety goggles etc.) to his manpower and ensure to wear it during the operation job.

6.4 BIDDER personnel shall not smoke or resort to misuse of drugs, medicines or alcohol while on duty. BIDDER shall also ensure that in no case the ability of his employees to carry out their assigned duty is impaired using the substances mentioned herein.

6.5 BIDDER shall ensure the safety of Man and Machine all the times. The BIDDER shall always remain liable to OWNER for any loss or damage caused to building plant and machinery, due to carelessness, negligence, inexperienced act of default of the BIDDER, his agents, representative or employees.

6.6 BIDDER shall provide relevant training (Technical / Fire and Safety, etc.) to his personnel from time to time for better functioning of the station at his cost and risk, without affecting Operations. OWNER may provide special training, to be required; hence, BIDDER shall direct his personnel for such trainings.

6.7 Bidder shall apply and obtain work permit from OWNER for the work to be performed. After completion of work a joint inspection shall be done at work place.

6.8 Bidder shall submit documents required for the establishing competences a person deputed to execute job including medical fitness if job requirement.

6.9 Bidder's Representative should not be without Identity Card at OWNER sites / office as well as sites. The I Card shall be provided by Bidder.

6.10 Bidder shall keep First-Aid Kit available during the execution of work.

7. PRS AND PENALTY

7.1 The following critical parameter describes the system performance and service level expectations and requirements during the Implementation phase of contract. The service level includes target performance measures, unacceptable measures and the related penalties for not meeting required service levels.

Sr. No	Parameter	Service Level Agreement	Penalty
1	Commissioning of CGS Station Piping	Six Month from date of issuance of Sub Orders (POs) against Contract NOTE: ***In SAP terminology, Contract is issued followed by issuance of Purchase Orders.***	In case contractor fails to complete the work/ services within stipulated period then unless such failure is due to force majeure as defined in Bid document, **there will be reduction in order price @ 0.5% respective of Purchase Order value for each week of delay or part thereof subject to maximum of 5% of individual Purchase Order value (excluding taxes and duties).** Owner may without prejudice to any methods of recovery, deduct the amount of such PRS from any money due or which may at any time become due to contractor from its obligations or liabilities under the contract or by recovery against the performance bank guarantee. Both Owner and contractor agree that the above percentage of price reduction are genuine pre-estimates of the loss/damage which Owner would have suffered on account of delay/ breach on the part of contractor and the said amount will be payable on demand without there being any proof of the actual loss/damage caused by such delay/ breach. Owner decision in the matter of applicability of price reduction shall be final and binding
2	HR Compliances	Statutory/Legal requirement	Rs 1000 per instance
3	HSE Compliance	AGLs HSE requirement	Rs 500 per instance* during the execution of job
4	Use of Equipment /Instruments	Meeting Calibration requirement	Rs 500 equipment /Instruments observed without calibration
5	Up-keeping of First Aid Kit & its availability	AGLs HSE requirement	Rs 200 per instance
6	Manpower Competency	Deployment of Man Power as per required Skill Set	Rs 500 against non-availability of skilled manpower per instance
Note: Penalties specified at Sr. No. 2,3,4, 5 & 6 related to HSE/Poor Workmanship shall be duly applicable to over and above the penalty specified at Sr. No. 1			

SECTION IV

PAYMENT TERMS & SPECIAL CONDITIONS

1. TERMS OF PAYMENT

Supply Portion

1. Above ground piping, hook-up and associated connectivity work
   - 80% on Installation and alignment, welding, painting, NDT, Hydro test, pneumatic testing along with supports, vent drains installation etc. to complete the weld joints.
   - 10% on completion of pre-commissioning (Nitrogen purging etc.), Commissioning, handing over including closing of punch points and submission of final documents and as built drawing
   - 10% on contract closure.
2. Pipe/Valve MS Support & Supply Items
   - 90% against Material receipt at site, MRIR (Material Receipt & Inspection Report) to be submitted along with the Invoice, Installation, Hydro test & Pneumatic Testing.
   - 10% on contract closure.
3. OTHER WORKS (NOT COVERED ABOVE)
   - 90% progressively on completion of individual item work on pro-rata basis as certified in monthly progress bill.
   - 10% on contract closure.

 # Claims regarding idle charges shall not be considered

2. MODE OF PAYMENT

2.1. Payment will be made by way of normal banking channels.

2. 2 Deduction at source
Purchaser will release the payment after off-setting all dues to the Purchaser payable by the seller under the contract. Deduction will be effected at source as per the law in force.

3.0 PERFORMANCE BANK GUARANTEE:
Within 15 days from the date of award of Order, the Bidder shall furnish Performance Guarantee in the form of Bank Guarantee to the PURCHASER, for an amount equivalent to 10% of the Order value (Excluding taxes & duties). Performance Bank guarantee shall be valid for a period of 3 months beyond the expiry of the Warrantee/Guarantee period.

SECTION VI

GENERAL CONDITIONS OF CONTRACT (GCC)

1 DEFINITIONS

1.1 All the initial capitalized terms used in the Agreement shall have the meaning as described to such terms hereunder:

1.2 'Agreement' or 'Contract' means the agreement entered into between the Owner and the Contractor, including all attachments and appendices thereto and all documents incorporated by reference therein, as modified, reinstated or amended from time to time.

1.3 'Completion Schedule' or 'Delivery Schedule' means a schedule approved by the Owner for completion of all obligations of the Contractor under the Agreement.

1.4 'Consultant' means the person or firm or body corporate appointed by the Owner for the purposes of providing services as determined by him in connection with this Agreement.

1.5 'Contract Documents' mean all the documents referred to in the Agreement for discharging the requisite obligations by respective party.

1.6 'Contract Price' means the price payable to the Contractor under the Contract for the full and proper performance of all its contractual obligations.

1.7 'Day', 'Month' or 'Year' means calendar day, calendar month or calendar year.

1.8 'Engineer' means an authorized representative of the Owner, if any, to which the Owner has entrusted various tasks in relation to the carrying out of his Project and in particular the implementation of the relevant Agreement. The Engineer is fully empowered to represent the Owner. For avoidance of doubt, Consultant may be an Engineer. In case the Agreement does not specify the intervention by the Engineer, the rights and obligations are exercised and borne by the Owner, mutatis mutandis.

1.9 'Effective Date' means a date on which Contractor's obligations will commence and thereupon Delivery Schedule and/or Completion Schedule will be drawn up.

1.10 'Goods' means all of the equipment, machinery, and/or other materials which the Contractor is required to supply to the Owner under the Agreement.

1.11 'GCC' means the GENERAL CONDITIONS OF CONTRACT contained in this section.

1.12 'Inspector' means any person or outside Agency nominated by Owner to inspect equipment, stage wise as well as final, before dispatch, at Contractor's works and/or on receipt at Site as per terms of the Agreement.

1.13 'Notification of Award' means date which is earlier of either a Fax of Intent (FOI) or Letter of Intent (LOI) or Letter of Award (LOA) issued to a successful bidder for award of the work pursuant to bidding process.

1.14 'Purchaser' /or 'Owner' means the organization purchasing the Goods / services, i.e. Aavantika Gas Ltd. (AGL).

1.15 'Services' or 'Ancillary Services' means those services ancillary to the supply of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training and other such obligations of the Contractor covered under the scope of the Agreement.

1.16 'Site' or 'Owner's stores' means the place or places named in tender document.

1.17 'SCC' means the SPECIAL CONDITIONS OF CONTRACT forming a part of the Contract Documents.

1.18 'Supplier' or 'Seller' or 'Contractor' means the individual person or firm or body corporate supplying the Goods and Ancillary Services under the Agreement.

1.19 'Bid' or 'Tender' shall have the same meaning.

2 INTERPRETATION OF CONTRACT DOCUMENT

2.1 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.

2.2 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 Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.

2.3 Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain WORK or provide 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.

2.4 The materials, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the JOB SPECIFICATIONS contained herein and CODES referred to. Where the job specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

3 CONFIDENTIALITY

3.1 The Contractor cannot, without agreement of the Owner, disclose nor enable third parties to benefit from the documents drawn up in the course of his obligations under the Agreement or information received from the Owner / Consultant / Engineer/ Inspector.

3.2 Further, Contractor is not allowed to publish copy or transmit to third parties the documents that are transmitted to him by Owner/ Consultant/ Engineer/ Inspector. The Owner/ Consultant retains the right to claim damages from the Contractor in the case where these documents have been used without such written consent.

3.3 However, these obligations do not apply to documents for which it can be demonstrated that

- Such documents were already public before these were communicated to the other party, or have become public since without any fault or negligence of the party concerned, or
- Such documents were already in its possession without having obtained them directly or indirectly from the other party, or
- Such documents were obtained from an independent source that had neither direct nor indirect secrecy commitment to the other party.

3.4 Regarding the application of this clause, the experts appointed by the Owner/ Engineer are not considered as third parties, and for this reason they have to respect, towards the Contractor, the same obligations as the Owner in these matters.

3.5 Any document, other than the Agreement itself, enumerated in GCC shall remain the property of the Owner and shall be returned (all copies) to the Owner on completion of the Contractor's obligations under the Agreement, if so required by the Owner.

4 CONTRACT PERFORMANCE BANK GUARANTEE

4.1 Within 15 days of the award of work order, the successful bidder shall furnish the performance guarantee in the form as provided in the Bid documents.

4.2 Within 15 days from the date of award of Work Order, the Bidder shall furnish Performance Guarantee in the form of Bank Guarantee to the AGL, for an amount equivalent to 10% of Contract Order value (Excluding taxes & duties).

4.3 The Contract Performance Bank Guarantee shall be valid for a period of Three (3) Months beyond the expiry of Contract including the defect liability period.

4.4 Failure of the successful bidder to comply with the requirements of this clause shall constitute sufficient ground for the annulment of the award and forfeiture of the bid security.

4.5 In the event that completion of work is delayed beyond the scheduled completion date for any reason whatsoever, the contractor shall have the validity of the Contract Performance Bank Guarantee suitably extended to cover the period of delay.

4.6 The proceeds of the Contract Performance Bank Guarantee shall be payable to the Owner as compensation for any loss or damage resulting from the Contractor's failure to complete its obligations under the Agreement.

4.7 The Contract Performance Bank Guarantee shall be denominated in the currency of the Agreement and shall be in one of the following forms:

4.8 A bank guarantee issued by a scheduled / Nationalized bank is acceptable to the Owner,in the form provided in the bid documents. The Contract Performance Bank Guarantee will be discharged by the Owner and returned to the Contractor not later than One hundred eighty (180) days following the date of completion of all the Contractor's performance obligations under the Contract, including any warranty obligations.

4.9 The contractor shall submit a written request for release of Contract performance Bank Guarantee, on successful completion of defect liability period.

5 INSPECTIONS AND TESTS

5.1 Refer SCC Clause 4.0.

6 TRANSPORTATION

6.1 Transportation of all items covered in the scope of contractor, will be arranged by contractor at his own cost including insurance and storage. Contractor will also be responsible for taking delivery of free issue material from Owner's store and Transportation to place of work including its coverage for transit insurance.

7 GUARANTEE/ WARRANTY/ DEFECT LIABILITY PERIOD

7.1 The Contractor warrants that the work carried out under the Agreement are meeting the requirement of the Bid document and will rectify/ repair any defective work on receipt of instructions from Owner/ Consultant.

7.2 The Owner shall promptly notify the Contractor in writing of any claims arising under this warranty.

7.3 Upon receipt of such notice, the Contractor shall, within a reasonable period, repair or replace the defective Goods or parts thereof, free of cost to the Owner. The Contractor may take over the replaced parts/ Goods at the time of their replacement. No claim whatsoever shall lie on the Owner for the replaced parts/ goods thereafter. In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected / replaced Goods or item or material shall be extended to a further period of twelve (12) Months from the date of such repair/replacement if put to use immediately or eighteen (18) Months. Defect liability period shall be 12 months from the date of handing over of the system to AGL.

7.4 If the Contractor, having been notified, fails to remedy the defect(s) within a reasonable period, the Owner may proceed to take such remedial action as may be necessary, at the Contractor's risk and expense and without prejudice to any other rights which the Owner may have against the Contractor under the Agreement.

8 PRICES

8.1 Prices charged by the Contractor for Goods delivered and all Services performed under the Agreement shall be on firm price basis and not vary from the prices quoted by the Contractor in its bid, with the exception of any price adjustments authorized as per tender document.

9 TAXES, DUTIES, ETC.

9.1 The Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes, duties, etc. now or hereafter imposed, increased, modified, from time to time in respect of Works and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions or annuities now or hereafter imposed by any Central or State Government authorities which are imposed with respect to or covered by the wages, salaries, or other compensations paid to the persons employed by the Contractor and the Contractor shall be responsible for the compliance with all applicable Central, State, Municipal and local laws and regulations, and requirement of any Central, State or local Government agency or authority.

9.2 Contractor further agrees to defend, indemnify and hold Owner harmless from any liability or penalty, which may be imposed by the Central, State or Local authorities by reason or any violation by Contractor or Sub-Contractor of such laws, suits or proceedings that may be brought against the Owner arising under, growing out of, or by reason of the work provided for by this Contract, by third parties, or by Central or State Government authority or any administrative sub-division thereof.

9.3 Tax deductions will be made as per the rules and regulations in force in accordance with acts prevailing from time to time.

10 STATUTORY VARIATION

10.1 All statutory variations, change in law or imposition of any new taxes/ duties/ levies by any Central Government/ State Government/ Civil Agencies shall be to Contractor's account except for statutory variations in GST, which shall be reimbursed by Owner against documentary evidence submitted by the Contractor.

11 PAYMENT

11.1 Contractor shall submit his monthly bills to the respective Engineer-In-Charge of Owner, attaching all the required documentary proof confirming there upon that all statutory obligations as per rules are being observed. Un-disputed payment shall be made to the contractor through Finance Department against Bills, duly certified by respective Owner's Engineer-In-Charge within 30 (Thirty) days, if found in order. No interest shall be paid in case of delay in payments.

11.2 Payment shall be released after applicable tax deductions at source as per rules & acts enforced during the tenancy of the contract.

12 SUBCONTRACTING

12.1 The Contractor shall notify the Owner in writing of all subcontracts awarded under this Agreement if not already notified in the Contractor's bid and incorporated in the Agreement. Such notification and incorporation shall not relieve the Contractor from any liability or obligation under the Agreement. Such sub-contract shall be limited to certain bought-out items and sub-assemblies, which are not in line of Contractor's manufacturing or proposed manufacturing unit of authorized Contractor.

12.2 Such purchased and subcontracted items shall have to be necessarily in full compliance with the terms and conditions of the Agreement and do not relieve the Contractor of any of his contractual obligations. The Contractor shall be solely responsible for any action, deficiency or negligence of his sub-contractors.

12.3 For any subcontract, the Owner is entitled to demand from the Contractor, for approval of the list of sub- contractors, the Contractor intends to involve and of the orders he may entrust to them. Approval by the Owner cannot give rise to any legal bond between the Owner and the sub-contractors and leaves full responsibility only to the Contractor.

12.4 In the event where the warranty agreed between the Contractor and his sub-Contractors exceeds in scope or in period those required under the Agreement, the Contractor undertakes to make the Owner the full and direct beneficiary of such warranty.

13 DELAYS IN THE CONTRACTOR'S PERFORMANCE

13.1 Delivery of the Goods and performance of Services shall be made by the Contractor in accordance with the time schedule prescribed by the Owner in the Completion Schedule.

13.2 If the CONTRACTOR refuses or fails to execute the WORK or any separate part thereof with such diligence as will ensure its completion within the time specified in the CONTRACT or extension thereof or fails to perform any of his obligation under the CONTRACT or in any manner commits a breach of any of the provisions of the CONTRACT it shall be open to the OWNER at its option by written notice to the CONTRACTOR:

13.2.1 TO DETERMINE THE CONTRACT in which event the CONTRACT shall stand terminated and shall cease to be in force and effect on and from the date appointed by the OWNER on that behalf, whereupon the CONTRACTOR shall stop forthwith any of the CONTRACTOR's work then in progress, except such WORK as the OWNER may, in writing, require to be done to safeguard any property or WORK, or installations from damage, and the OWNER, for its part, may take over the work remaining unfinished by the CONTRACTOR and complete the same through a fresh contractor or by other means, at the risk and cost of the CONTRACTOR, and any of his sureties if any, shall be liable to the OWNER for any excess cost occasioned by such work having to be so taken over and completed by the OWNER over and above the cost at the rates specified in the schedule of quantities and rate/prices.

13.2.2 WITHOUT DETERMINING THE CONTRACT to take over the work of the CONTRACTOR or any part thereof and complete the same through a fresh contractor or by other means at the risk and cost of the CONTRACTOR. The CONTRACTOR and any of his sureties are liable to the OWNER for any excess cost over and above the cost at the rates specified in the Schedule of Quantities/ rates, occasioned by such works having been taken over and completed by the OWNER.

13.3 In such events of above sub-clauses:

13.3.1 The whole or part of the Contract Performance Security furnished by the CONTRACTOR is liable to be forfeited without prejudice to the right of the OWNER to recover from the CONTRACTOR the excess cost referred to in the sub clause aforesaid, the OWNER shall also have the right of taking possession and utilising in completing the works or any part thereof, such as materials equipment and plants available at work site belonging to the CONTRACTOR as may be necessary and the CONTRACTOR shall not be entitled for any compensation for use or damage to such materials, equipment and plant.

13.3.2 The amount that may have become due to the CONTRACTOR on account of work already executed by him shall not be payable to him until after the expiry of Six (6) calendar months reckoned from the date of termination of CONTRACT or from the taking over of the WORK or part thereof by the OWNER as the case may be, during which period the responsibility for faulty materials or workmanship in respect of such work shall, under the CONTRACT, rest exclusively with the CONTRACTOR. This amount shall be subject to deduction of any amounts due from the CONTRACT to the OWNER under the terms of the CONTRACT authorised or required to be reserved or retained by the OWNER.

13.4 Before determining the CONTRACT provided in the judgement of the OWNER, the default or defaults committed by the CONTRACTOR is/are curable and can be cured by the CONTRACTOR if an opportunity given to him, then the OWNER may issue Notice in writing calling the CONTRACTOR to cure the default within such time specified in the Notice.

13.5 The OWNER shall also have the right to proceed or take action above, in the event that the CONTRACTOR becomes bankrupt, insolvent, compounds with his creditors, assigns the CONTRACT in favour of his creditors or any other person or persons, or being a company or a corporation goes into voluntary liquidation, provided that in the said events it shall not be necessary for the OWNER to give any prior notice to the CONTRACTOR.

13.6 Termination of the CONTRACT as provided above shall not prejudice or affect their rights of the OWNER which may have accrued upto the date of such termination.

13.7 Except as provided under GCC or for the reasons solely attributable to the Owner, a delay by the Contractor in the performance of its delivery obligations shall render the Contractor liable to the imposition of liquidated damages pursuant to GCC, unless an extension of time is agreed upon without the application of liquidated damages.

14 CONTRACTOR REMAINS LIABLE TO PAY COMPENSATION IF ACTION NOT TAKEN UNDER CLAUSE 13

14.1 In any case in which become exercisable and the same had not been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any further case of default by the CONTRACTOR for which by any clause or clauses hereof he is declared any of the powers conferred upon the OWNER BY CLAUSE 13 thereof shall have liable to pay compensation amounting to the whole of his Contract Performance Security, and the liability of the CONTRACTOR for past and future compensation shall remain unaffected. In the event of the OWNER putting in force the power under above sub- clause vested in him under the preceding clause he may, if he so desired, take possession of all or any tools, and plants, materials and stores in or upon the works or the site thereof belonging to the CONTRACTOR or procured by him and intended to be used for the execution of the WORK or any part thereof paying or allowing for the same in account at the CONTRACT rates or in case of these not being applicable at current market rates to be certified by the ENGINEER-IN-CHARGE whose certificate thereof shall be final, otherwise the ENGINEER-IN-CHARGE may give notice in writing to the CONTRACTOR or his clerk of the works, foreman or other authorised agent, requiring him to remove such tools, plant, materials or stores from the premises (within a time to be specified in such notice), and in the event of the CONTRACTOR failing to comply with any such requisition, the ENGINEER-IN-CHARGE may remove them at the Contractor's expense or sell them by auction or private sale on account of the CONTRACTOR and at his risk in all respects without any further notice as to the date, time or place of sale and the certificate of the ENGINEER-IN-CHARGE as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the CONTRACTOR.

15 TERMINATION FOR DEFAULT

15.1 Save for the cases provided for in Clause, if the Contractor fails to fulfil any of his obligations, the Owner reserves the right, after simple summons to comply and without prejudice to any other measures provided for in the Contract Documents, to offset the Contractor's deficiency by substituting Contractor by another third party to the Contractor for the purpose of carrying out those obligations, at the Contractor's expense, risk and peril, or to terminate the Agreement without prejudice to the Owner's rights of receiving reparation for the resulting damage.

15.2 The Owner may terminate the Agreement when the Contractor's situation at any time after Notification of the Award is found to have become so precarious that there is every indication that he will not be able to fulfil his obligations. Such indications may be, for example, the Contractor's filing for bankruptcy or composition, or going into receivership or liquidation, or any similar procedures under applicable legislation.

16 CHANGE IN CONSTITUTION

16.1 Where the CONTRACTOR is a partnership firm, the prior approval of the OWNER shall be obtained in writing, before any change is made in the constitution of the firm. Where the CONTRACTOR is an individual or a Hindu undivided family business concern, such approval as aforesaid shall, likewise be obtained before such CONTRACTOR enters into any agreement with other parties, where under, the reconstituted firm would have the right to carry out the work hereby undertaken by the CONTRACTOR. In either case if prior approval as aforesaid is not obtained, the CONTRACT shall be deemed to have been allotted in contravention of clause 12 hereof and the same action may be taken and the same consequence shall ensure as provided in the said clause.

17 MEMBERS OF THE OWNER NOT INDIVIDUALLY LIABLE

17.1 No Director, or official or employee of the OWNER/ CONSULTANT shall in any way be personally bound or liable for the acts or obligations of the OWNER under the CONTRACT or answerable for any default or omission in the observance or performance of any of the acts, matters or things, which are herein contained

18 CONTRACTOR'S OFFICE AND STORE AT SITE

18.1 The CONTRACTOR shall provide and maintain an office and at the site for the accommodation of his Engineer and staff and such office shall be open at all reasonable hours to receive instructions, notice or other communications.

18.2 The contractor shall provide and maintain stores at site with sufficient covered area and lock & key arrangement for receiving, proper stocking and issue/return of all material under his scope of work as defined in the tender document. Further, the contractor shall maintain proper documentation of stocks and receipt & issue of material and update the same on daily basis by deploying dedicated resources as specified by the Engineer-In-Charge. The space so provided shall be in addition to and distinctly separate from the free-issue material by the Purchaser for proper identification and verification of both types of stocks at any time.

19 CONTRACTOR TO INDEMNIFY THE OWNER

19.1 The contractor shall indemnify the Owner and every member, officer and employee of the Owner, also Engineer-In-Charge and his staff against all action, proceedings, claims, demands, costs and expenses whatsoever arising out of all action, proceedings, claims, demands, costs and expenses which may be made against the Owner for or in respect of or arising out of any failure by the contractor in the performance of his obligations under the contract. The Owner shall not be liable for or in respect of consequence of any accident or injury to any workmen or other person in the employment of the contractor or his sub-contractor and contractor shall indemnify and keep the Owner indemnified against all such damages and compensations and against all claims, proceedings, claims, demands, costs and expenses whatsoever in respect thereof or in relation thereof.

19.2 If any action is brought before a Court, Tribunal or any other Authority against the Owner or an officer or agent of the OWNER, for the failure, omission or neglect on the part of the CONTRACTOR to perform any acts, matters, covenants or things under the CONTRACT, or damage or injury caused by the alleged omission or negligence on the part of the CONTRACTOR, his agents, representatives or his SUB- CONTRACTOR's, or in connection with any claim based on lawful demands of SUB-CONTRACTOR's workmen, Contractors or employees, the CONTRACTOR, shall in such cases indemnify and keep the OWNER and/or their representatives harmless from all losses, damages, expenses or decrees arising out of such action.

19.3 If Owner have to pay any money in respect of such claims or demands as aforesaid the amount so paid and the costs incurred by the Owner shall be charged to and paid by the Contractor and the Contractor shall not be at liberty to dispute or question the right of the Owner to make such payments notwithstanding the same may have been made without the consent or authority or in law or otherwise to the contrary.

20 SAFETY REGULATIONS

20.1 In respect of all labour, directly or indirectly employed in the WORK for the performance of CONTRACTOR's part of this agreement, the CONTRACTOR shall at his own expense arrange for all the safety provisions as per safety codes and abide by all labour laws, fire and statutory regulations and keep the Owner indemnified in respect thereof.

21 OTHER AGENCIES AT SITE

21.1 The CONTRACTOR shall have to execute the WORK in such place and conditions where other agencies will also be engaged for other works. No claim shall be entertained due to WORK being executed in the above circumstances

22 LIENS

22.1 The OWNER shall have lien on all materials, equipments including those brought by the CONTRACTOR for the purpose of erection, testing and commissioning of the WORK.

22.2 If, at any time there should be evidence or any lien or claim for which the OWNER might have become liable and which is chargeable to the CONTRACTOR, the OWNER shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify the OWNER against such lien or claim and if such lien or claim be valid, the OWNER may pay and discharge the same and deduct the amount so paid from any money which may be or may become due and payable to the CONTRACTOR. If any lien or claim remain unsettled after all payments are made, the CONTRACTOR shall refund or pay to the OWNER all money that the latter may be compelled to pay in discharging such lien or claim including all costs and reasonable expenses. OWNER reserves the right to do the same

23 TERMINATION FOR OWNER'S CONVENIENCE

23.1 The Owner, by written notice sent to the Contractor, may terminate the Agreement, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Owner's convenience, the extent to which performance of the Contractor under the Agreement is terminated, and the date upon which such termination becomes effective.

23.2 The Goods that are complete and ready for shipment/ dispatch as on the date of Contractor's receipt of notice of termination shall be accepted by the Owner on the terms and prices mutually agreed at that time.

23.3 For the remaining Goods, the Owner may elect:

(a) To have any portion completed and delivered at the Agreement terms and prices and / or

(b) To cancel the remainder and pay to the Contractor an agreed amount for partially completed Goods and Services and for materials and parts previously procured by the Contractor; and/or

(c) To pay any reasonable and demonstrable otherwise non recoverable expenses incurred by the Contractor.

24 PAYMENT IF THE CONTRACT IS TERMINATED

24.1 If the CONTRACT shall be terminated as per Bid pursuant to Clause no. 15 of GCC, the CONTRACTOR shall be paid by the OWNER in so far as such amounts or items shall not have already been covered by payments of amounts made to the CONTRACTOR for the WORK executed and accepted by ENGINEER-IN-CHARGE prior to the date of termination at the rates and prices provided for in the CONTRACT and in addition to the following:

a) The amount payable in respect of any preliminary items, so far as the Work or service comprised therein has been carried out or performed and an appropriate portion as certified by ENGINEER-IN-CHARGE of any such items or service comprised in which has been partially carried out or performed.

b) Any other expenses which the CONTRACTOR has spent for performing the WORK under the CONTRACT subject to being duly recommended by ENGINEER-IN-CHARGE and approved by OWNER for payment, based on documentary evidence of his having incurred such expenses.

24.2 The CONTRACTOR will be further required to transfer the title and provide the following in the manner and as directed by the OWNER.

a) Any and all completed works.

b) Such partially completed WORK including drawings, information and CONTRACT rights as the CONTRACTOR has specially performed, produced or acquired for the performance of the CONTRACTOR.

25 NO WAIVER OF RIGHTS

25.1 Neither the inspection by the OWNER or any of their officials, employees, or agents nor any order by the OWNER for payment of money or any payment for or acceptance of the whole or any part of the Work by the OWNER nor any extension of time, nor any possession taken by OWNER shall operate as a waiver of any provision of the CONTRACT, or of any power herein reserved to the OWNER, or any right to damages herein provided, nor shall any waiver of any breach in the CONTRACT be held to be a waiver of any other subsequent breach.

26 PLANNING

26.1 Unless otherwise stated in the Agreement, the Contractor shall furnish to Owner not later than fifteen (15) Days from date of Notification of Award the following:

26.2 A bar chart, or similar, including the network of activities if required on account of the complexity of the Agreement, showing the time-scale of the main steps in the carrying out of his obligations, and showing at least :

- The dates at which the Contractor has to supply the information's and documents stipulated by the award,
- The dates at which the main orders for materials and equipment (bought out items) must normally be placed, and the required Completion dates for these,
- The method by which the Goods and /or Services are carried out outside the Site so that the contractual time-limits can be met,

26.3 The organizational chart, with names, of the team in control of the studies and the carrying out of the work. The Contractor describes the liaisons between said team and his existing structure. Contractor will state the skills and experience of the personnel involved regarding similar projects. This organizational chart also shows the links with his sub-contractors.

26.4 This planning does not relieve the Contractor of any of its obligations including Completion Schedule.

26.5 The details of site office and site stores for stocking the material in his scope of work as well as the free issued material.

27 PROGRESS

27.1 The planning (bar chart or similar physical progress forecast and quantities of manpower) established as per Clause 26 shall be used as a reference to regularly monitor the progress of the Contractor's obligations. In particular, the latter requires furnishing to the Owner in principle monthly, the actual physical progress computed by the method referred to in GCC Clause 26.

27.2 The planning is to be updated regularly by the Contractor, and is reviewed when the Owner so requests, any time particular circumstances significantly affect the elements that were taken into account when the planning was established.

27.3 If the work progress rate is deemed insufficient to meet the prescribed time-limits, the Owner will notify this to the Contractor and will demand that Contractor defines, in writing and within fifteen (15) Days, the measures he intends to take in order to improve the rate of progress, which measures have to receive the prior approval of the Owner.

27.4 The Owner and/or Consultant reserve the right to have the progress of studies, procurement, work or any other contractual services monitored by any person of their choice, without this right in any way diluting the Contractor's obligations.

28 WORK IN MONSOON AND DEWATERING

28.1 Unless otherwise specified elsewhere in the tender, the execution of the WORK may entail working in the monsoon. The CONTRACTOR must maintain a minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered for such work in monsoon.

28.2 During monsoon and other period, it shall be the responsibility of the CONTRACTOR to keep the construction work site free from water logging at his own cost.

29 WORK ON SUNDAYS AND HOLIDAYS

29.1 For carrying out Work on Sundays, and Holidays, the CONTRACTOR will approach the ENGINEER-IN- CHARGE or his representative at least two days in advance and obtain permission in writing. The CONTRACTOR shall observe all labour laws and other statutory rules and regulations in force. In case of any violations of such laws, rules and regulations, consequence if any, including the cost thereto shall be exclusively borne by the CONTRACTOR and the OWNER shall have no liability whatsoever on this account.

30 SETTLEMENT OF DISPUTES

30.1 The rules of procedure for arbitration proceedings shall be as per Indian Arbitration and Conciliation Act 1996 or as amended.

30.2 If any dispute or difference arising between the Parties in respect of or concerning or connected with the interpretation or implementation of this Agreement or otherwise arising out of this Agreement, the parties hereto shall promptly and in good faith negotiate with a view to bring out and amicable resolution and settlement.

30.3 If, after thirty (30) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Owner or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.

30.4 In the event, no amicable resolution or settlement is reached within a period of 30 days from the date on which such dispute or difference arose, such dispute or difference shall be referred for adjudication by sole Arbitrator to be appointed by the Managing Director (MD) of AGL, in accordance with the Arbitration and Conciliation Act, 1996 and rules made there under or any statutory modification in case the Arbitrator so appointed is related to AGL in any manner whatsoever.

30.5 The Arbitration proceedings shall be held in Indore and shall be conducted in English Language. The decision of such arbitration shall be binding and conclusive upon the Parties. The Parties to the arbitration shall equally share the costs and expenses of any such arbitration.

30.6 It is hereby clarified that the Courts at Indore alone shall have jurisdiction to try and entertain any and all suits or other proceedings in respect of, relating to or otherwise arising out of this Agreement.

30.7 Notwithstanding any reference to arbitration herein, the parties shall continue to perform their respective obligations under the Agreement unless they otherwise agree.

31 LIMITATION OF LIABILITY

31.1 Except in cases of wilful negligence or wilful misconduct, and in the case of infringement, the Contractor shall not be liable to the Owner, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits provided that this exclusion shall not apply to any obligation of the Contractor to pay PRS to the Owner and the aggregate liability of the Contractor to the Owner, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

32 GOVERNING LANGUAGE

32.1 The Agreement shall be written in English language unless specified otherwise in the SCC. All correspondence and other documents pertaining to the Agreement which are exchanged by the parties shall be written in the same language. In case, any document/brochure etc. is written in any other language then its English translation shall govern.

33 APPLICABLE LAW

33.1 The Contract shall be governed and interpreted in accordance with the applicable laws of India and Courts at Indore shall have exclusive jurisdiction.

34 NOTICES

34.1 Any notice given by one party to the other pursuant to this Agreement shall be sent to the other party in writing by registered mail or facsimile and confirmed in writing to the other party's address specified in the Agreement.

34.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

35 INSURANCE

35.1 General

CONTRACTOR shall at his own expense arrange secure and maintain insurance with reputable insurance companies to the satisfaction of the OWNER as follows:

CONTRACTOR at his cost shall arrange, secure and maintain insurance as may be necessary and to its full value for all such amounts to protect the WORKS in progress from time to time and the interest of OWNER against all risks as detailed herein. The form and the limit of such insurance, as defined here in together with the under works thereof in each case should be as acceptable to the OWNER. However, irrespective of work acceptance the responsibility to maintain adequate insurance coverage at all times during the period of CONTRACT shall be that of CONTRACTOR alone. CONTRACTOR's failure in this regard shall not relieve him of any of his responsibilities and obligations under CONTRACT.

Any loss or damage to the work/ material, during transportation, storage, erection and completion of work till such time the WORK is taken over by OWNER, shall be to the account of CONTRACTOR. CONTRACTOR shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/or replacement of the parts of the Work damaged or lost. CONTRACTOR shall provide the OWNER with a copy of all insurance policies and documents taken out by him in pursuance of the CONTRACT. Such copies of document shall be submitted to the OWNER immediately upon the CONTRACTOR having taken such insurance coverage. CONTRACTOR shall also inform the OWNER at least thirty days in advance regarding the expiry cancellation and/or changes in any of such documents and ensure revalidation/renewal etc., as may be necessary well in time.

All costs on account of insurance liabilities covered under CONTRACT will be to CONTRACTOR's account and will be included in VALUE OF CONTRACT. However, the OWNER may from time to time, during the currency of the CONTRACT, ask the CONTRACTOR in writing to limit the insurance coverage risk and in such a case, the parties to the CONTRACT will agree for a mutual settlement, for reduction in VALUE OF CONTRACT to the extent of reduced premium amounts.

CONTRACTOR as far as possible shall cover insurance with Indian Insurance Companies.

i) EMPLOYEES STATE INSURANCE ACT:

The CONTRACTOR agrees to and does hereby accept full and exclusive liability for the compliance with all obligations imposed by the Employee State Insurance Act 1948 and the CONTRACTOR further agrees to defend, indemnify and hold OWNER harmless for any liability or penalty which may be imposed by the Central, State or Local authority by reason of any asserted violation by CONTRACTOR or SUB- CONTRACTOR of the Employees' State Insurance Act, 1948, and also from all claims, suits or proceeding that may be brought against the OWNER arising under, growing out of or by reasons of the work provided for by this CONTRACTOR, by third parties or by Central or State Government authority or any political sub- division thereof.

The CONTRACTOR agrees to fill in with the Employee's State Insurance Corporation, the Declaration Forms, and all forms which may be required in respect of the CONTRACTOR's or SUB- CONTRACTOR's employees, who are employed in the WORK provided for or those covered by ESI from time to time under the Agreement. The CONTRACTOR shall deduct and secure the agreement of the SUB- CONTRACTOR to deduct the employee's contribution as per the first schedule of the Employee's State Insurance Act from wages and affix the Employee's Contribution Card at wages payment intervals. The CONTRACTOR shall remit and secure the agreement of SUB-CONTRACTOR to remit to the State Bank of India, Employee's State Insurance Corporation Account, and the Employee's contribution as required by the Act. The CONTRACTOR agrees to maintain all cards and Records as required under the Act in respect of employees and payments and the CONTRACTOR shall secure the agreement of the SUB-CONTRACTOR to maintain such records. Any expenses incurred for the contributions, making contributions or maintaining records shall be to the CONTRACTOR's or SUB-CONTRACTOR's account.

The OWNER shall retain such sum as may be necessary from the total VALUE OF CONTRACT until the CONTRACTOR shall furnish satisfactory proof that all contributions as required by the Employees State Insurance Act, 1948, have been paid. This will be pending on the CONTRACTOR when the ESI Act is extended to the place of work.

ii) WORKMEN COMPENSATION AND OWNER'S LIABILITY INSURANCE:

Workmen Compensation, Mediclaim policy and Owner's Liability Insurance shall be taken by the CONTRACTOR at its own cost covering all its employees (except those who are covered in ESI scheme against submission of documentary evidence) policy, who are engaged in the performance of this CONTRACT. If any of the work is sublet, the CONTRACTOR shall require the SUB-CONTRACTOR to provide workman's Compensation and Owner's liability insurance for the latter's employees if such employees are not covered under the CONTRACTOR's Insurance.

The policy shall indicate:

1. Work Order No.
2. Complete scope of work
3. Site/ location details
4. Details of workmen to be insured
5. Validity period of the insurance coverage

iii) **ACCIDENT OR INJURY TO WORKMEN**:

The PURCHASER shall not be liable for or in respect of any damages or compensation payable as per law in respect or in consequence of any accident or injury to any workman or other person in the Employment of the CONTRACTOR or any SUB-CONTRACTOR save and except an accident or injury resulting from any act or default of the PURCHASER, his agents or servants and the CONTRACTOR shall indemnify and keep indemnified the PURCHASER against all such damages and compensation (save and except and aforesaid) and against all claims, demands, proceeding, costs, charges and expenses, whatsoever in respect or in relation thereto.

iv) TRANSIT INSURANCE

Open transit policy of all items to be transported by the CONTRACTOR to the SITE of WORK, shall be taken by the CONTRACTOR and monthly declaration of the materials to be transported or transported to be declared to the insurance agency. This will include the materials to be supplied by the CONTRACTOR to AGL site and or any free issue materials issued by AGL, to be transported to site for execution of work. The cost of transit insurance should be borne by the CONTRACTOR and the quoted price shall be inclusive of this cost.

v) COMPREHENSIVE AUTOMOBILE INSURANCE

This insurance shall be in such a form as to protect the Contractor against all claims for injuries, disability, disease and death to members of public including PURCHASER's men and damage to the property of others arising from the use of motor vehicles during on or off the `site' operations, irrespective of the Ownership of such vehicles.

vi) Comprehensive General Liability INSURANCE

This insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of member of public or damage to property of others due to any act or omission on the part of the Contractor, his agents, his employees, his representatives and Sub-Contractor's or from riots, strikes and civil commotion.

Contractor shall take suitable Group Personal Accident Insurance Cover for taking care of injury, damage or any other risks in respect of his Engineers and other Supervisory staff who are not covered under Employees State Insurance Act.

The policy shall cover third party liability. The third party (liability shall cover the loss/ disablement of human life (person not belonging to the Contractor) and also cover the risk of damage to others materials/ equipment/ properties during construction, erection and commissioning at site. The value of third party liability for compensation for loss of human life or partial/full disablement shall be of required statutory value but not less than Rs. 2 lakhs per death, Rs. 1.5 lakhs per full disablement and Rs. 1 lakh per partial disablement and shall nevertheless cover such compensation as may be awarded by Court by Law in India and cover for damage to others equipment/ property as approved by the Purchaser. However, third party risk shall be maximum to Rs. 10(ten) lakhs to death.

The Contractor shall also arrange suitable insurance to cover damage, loss, accidents, risks etc., in respect of all his plant, equipments and machinery, erection tools & tackles and all other temporary attachments brought by him at site to execute the work.

Any such insurance requirements as are hereby established as the minimum policies and coverage's which Contractor must secure and keep in force must be complied with, Contractor shall at all times be free to obtain additional or increased coverage's at Contractor's sole expenses.

vii) CONTRACTOR'S ALL RISK INSURANCE POLICY (CAR)

The contractor shall take all risk insurance policy at its own cost to cover physical loss or damage to the works at the site occurring prior to acceptance of work or part thereof taken over by the owner at its sole discretion with an extended maintenance coverage for the contractor's liability including Third Party Liability in respect of any loss or damage during the warranty period. Endorsements to the policy shall include coverage for faulty workmanship and materials.

Contractor will be required to take insurance coverage of minimum 1.5 times the order value to cover the cost of free issue material/items issued by the Owner and the cost of materials being procured by the CONTRACTOR. The policy shall be taken for individual work order.

The policy shall indicate:

1. Work Order No.
2. Complete scope of work
3. Site/ location details
4. Type of risks covered
5. Validity period of the insurance coverage

The policy shall indicate complete scope of work, site, location details of work, type of risks covered and validity of the insurance

viii) ANY OTHER INSURANCE REQUIRED UNDER LAW OR REGULATIONS OR BY OWNER:

CONTRACTOR shall also carry and maintain any and all other insurance(s), which he may be required under any law or regulation from time to time without any extra cost to OWNER. He shall also carry and maintain any other insurance which may be required by the OWNER

36 DAMAGE TO PROPERTY OR TO ANY PERSON OR ANY THIRD PARTY

36.1 CONTRACTOR shall be responsible for making good to the satisfaction of the OWNER any loss or any damage to structures and properties belonging to the OWNER or being executed or procured or being procured by the OWNER or of other agencies within in the premises of all the work of the OWNER, if such loss or damage is due to fault and/or the negligence or wilful acts or omission of the CONTRACTOR, his employees, agents, representatives or SUB-CONTRACTORs.

36.2 The CONTRACTOR shall take sufficient care in moving his plants, equipments and materials from one place to another so that they do not cause any damage to any person or to the property of the OWNER or any third party including overhead and underground cables and in the event of any damage resulting to the property of the OWNER or of a third party during the movement of the aforesaid plant, equipment or materials the cost of such damages including eventual loss of production, operation or services in any plant or establishment as estimated by the OWNER or ascertained or demanded by the third party shall be borne by the CONTRACTOR. Third party liability risk shall be Rupees One lakh for single accident and limited to Rupees Ten lakhs.

36.3 The CONTRACTOR shall indemnify and keeps the OWNER harmless of all claims for damages to property other than OWNER's property arising under or by reason of this agreement, if such claims result from the fault and/or negligence or wilful acts or omission of the CONTRACTOR, his employees, agents, representative of SUB-CONTRACTOR.

37 DATE OF COMING INTO EFFECT

37.1 The date of coming into effect shall be the date of Notification of Award unless otherwise specified in SCC.

38 EXECUTION OF WORK

38.1 The CONTRACTOR shall be responsible for ensuring that works throughout are executed in the most substantial, proper and workmanlike manner with the quality of material and workmanship in strict accordance with the SPECIFICATIONS and to the entire satisfaction of the ENGINEER- IN-CHARGE. The CONTRACTOR shall provide all necessary materials equipment labour etc. for execution and maintenance of WORK till completion unless otherwise mentioned in the CONTRACT.

39 CONSTRUCTION AIDS, EQUIPMENTS, TOOLS & TACKLES

39.1 CONTRACTOR shall be solely responsible for making available for executing the WORK, all requisite CONSTRUCTION EQUIPMENTS, Special Aids, Barges, Cranes and the like, all Tools, Tackles and Testing Equipment and Appliances, including imports of such equipment etc. as required. In case of import of the same the rates applicable for levying of Custom Duty on such Equipment, Tools, & Tackles and the duty drawback applicable thereon shall be ascertained by the CONTRACTOR from the concerned authorities of Government of India. It shall be clearly understood that OWNER shall not in any way be responsible for arranging to obtain Custom Clearance and/or payment of any duties and/or duty draw backs etc. for such equipment so imported by the CONTRACTOR and the CONTRACTOR shall be fully responsible for all

taxes, duties and documentation with regard to the same. Bidder in his own interest may contact, for any clarifications in the matter, concerned agencies/Dept./Ministries of Govt. of India. All clarifications so obtained and interpretations thereof shall be solely the responsibility of the CONTRACTOR

40 CARE OF WORKS

40.1 From the commencement to completion of the WORK, the CONTRACTOR shall take full responsibility for the care for all works including all temporary works and in case any damages, loss or injury shall happen to the WORK or to any part thereof or to any temporary works from any cause whatsoever, shall at his own cost repair and make good the same so that at completion the WORK shall be in good order and in conformity in every respects with the requirement of the CONTRACT and the ENGINEER-IN- CHARGE's instructions

41 ALTERATIONS IN SPECIFICATIONS, DESIGN AND EXTRA WORKS

41.1 The WORK covered under this CONTRACT having to be executed by the CONTRACTOR on a lump sum firm price. The OWNER will not accept any proposals for changes in VALUE OF CONTRACT or extension in time on account of any such changes which may arise to the CONTRACTOR's scope of WORK as a result of detailed Engineering and thereafter during the execution of WORK. The only exception to this will be a case where the OWNER requests in writing to the CONTRACTOR to upgrade the SPECIFICATIONS or the size of any major pieces of equipments, plant or machinery beyond what is normally required to meet the scope of WORK as defined in the CONTRACT DOCUMENT.

41.2 In such cases, a change order will be initialed by the CONTRACTOR at the appropriate time for the OWNER's prior approval giving the full back-up data for their review and for final settlement of any impact on price within 30 (thirty) days thereafter

42 OWNER MAY DO PART OF WORK

42.1 Upon failure of the CONTRACTOR to comply with any instructions given in accordance with the provisions of this CONTRACT the OWNER has the alternative right, instead of assuming charge of entire WORK, to place additional labour force, tools, equipments and materials on such parts of the WORK, as the OWNER may designate or also engage another CONTRACTOR to carry out the WORK. In such cases, the OWNER shall deduct from the amount which otherwise might become due to the CONTRACTOR, the cost of such work and material with ten percent (10%) added to cover all departmental charges and should the total amount thereof exceed the amount due to the CONTRACTOR, the CONTRACTOR shall pay the difference to the OWNER.

43 POSSESSION PRIOR TO COMPLETION

43.1 The ENGINEER-IN-CHARGE shall have the right to take possession of or use any completed or partially completed WORK or part of the WORK. Such possession or use shall not be deemed to be an acceptance of any work completed in accordance with the CONTRACT agreement. If such prior possession or use by the ENGINEER-IN- CHARGE delays the progress of WORK, equitable adjustment in the time of completion will be made and the CONTRACT agreement shall be deemed to be modified accordingly.

44 SUSPENSION OF WORKS

44.1 Subject to the provisions of sub-para (ii) of this clause, the CONTRACTOR shall, if ordered in writing by the ENGINEER-IN-CHARGE, or his representative, temporarily suspend the WORKS or any part thereof for such written order, proceed with the WORK therein ordered to be suspended until, he shall have received a written order to proceed therewith. The CONTRACTOR shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the WORKS aforesaid. An extension of time for completion, corresponding with the delay caused by any such suspension of the WORKS as aforesaid will be granted to the CONTRACTOR should he apply for the same provided that the suspension was not consequent to any default or failure on the part of the CONTRACTOR

44.2 In case of suspensions of entire WORK, ordered in writing by ENGINEER-IN-CHARGE, for a period of more than two months, the CONTRACTOR shall have the option to terminate the CONTRACT

45 CARE OF WORKS

45.1 Defects prior to taking over:

If at any time, before the WORK is taken over, the ENGINEER-IN-CHARGE shall:

a) Decide that any works done or materials used by the CONTRACTOR or by any SUB-CONTRACTOR is defective or not in accordance with the CONTRACT, or that the works or any portion thereof are defective, or do not fulfil the requirements of CONTRACT (all such matters being hereinafter, called `Defects' in this clause), and

b) As soon as reasonably practicable, gives to the CONTRACTOR notice in writing of the said decision, specifying particulars of the defects alleged to exist or to have occurred, then the CONTRACTOR shall at his own expenses and with all speed make good the defects so specified.

In case CONTRACTOR shall fail to do so, the OWNER may take, at the cost of the CONTRACTOR, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by the OWNER will be recovered from the amount due to the CONTRACTOR. The decision of the ENGINEER-IN-CHARGE with regard to the amount to be recovered from the CONTRACTOR will be final and binding on the CONTRACTOR. As soon as the WORK has been completed in accordance with the CONTRACT (except in minor respects that do not affect their use for the purpose for which they are intended and except for maintenance thereof provided in tender document and have passed the tests on completion, the ENGINEER-IN-CHARGE shall issue a certificate (hereinafter called Completion Certificate) in which he shall certify the date on which the WORK have been so completed and have passed the said tests and the OWNER shall be deemed to have taken over the WORK on the date so certified. If the WORK has been divided into various groups in the CONTRACT, the OWNER shall be entitled to take over any group or groups before the other or others and there upon the ENGINEER-IN-CHARGE shall issue a Completion Certificate which will, however, be for such group or groups so taken over only. In such an event if the group /section/ part so taken over is related, to the integrated system of the work, notwithstanding date of grant of Completion Certificate for group/ section/ part. The period of liability in respect of such group/ section/ part shall extend 12 (twelve) months from the date of completion of WORK.

45.2 Defects after taking over:

In order that the CONTRACTOR could obtain a COMPLETION CERTIFICATE he shall make good, with all possible speed, any defect arising from the defective materials supplied by the CONTRACTOR or workmanship or any act or omission of the CONTRACT or that may have been noticed or developed, after the works or groups of the works has been taken over, the period allowed for carrying out such WORK will be normally one month. If any defect be not remedied within a reasonable time, the OWNER may proceed to do the WORK at CONTRACTOR's risk and expense and deduct from the final bill such amount as may be decided by the OWNER.

If by reason of any default on the part of the CONTRACTOR a COMPLETION CERTIFICATE has not been issued in respect of any portion of the WORK within one month after the date fixed by the CONTRACT for the completion of the WORK, the OWNER shall be at liberty to use the WORK or any portion thereof in respect of which a completion certificate has not been issued, provided that the WORK or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completing these works for the issue of Completion Certificate.

46 REPLACEMENT OF DEFECTIVE PARTS AND MATERIALS

46.1 If during the progress of the WORK, OWNER shall decide and inform in writing to the CONTRACTOR, that the CONTRACTOR has manufactured any plant or part of the plant unsound or imperfect or has furnished plant inferior to the quality specified, the CONTRACTOR on receiving details of such defects or deficiencies shall at his own expenses within 7 (seven) days of his receiving the notice, or otherwise within such time as may be reasonably necessary for making it good, proceed to alter, re-construct or remove such work and furnish fresh equipments upto the standards of the specifications. In case the CONTRACTOR fails to do so, OWNER may on giving the CONTRACTOR 7 (seven) days' notice in writing of his intentions to do so, proceed to remove the portion of the WORK so complained of and at the cost of CONTRACTOR's, perform all such works or furnish all such equipments provided that nothing in the clause shall be deemed to deprive the OWNER of or affect any rights under the CONTRACT, the OWNER may otherwise have in respect of such defects and deficiencies.

46.2 The CONTRACTOR's full and extreme liability under this clause shall be satisfied by the payments to the OWNER of the extra cost, of such replacements procured including erection/installation as provided for in the CONTRACT; such extra cost being the ascertained difference between the

price paid by the OWNER for such replacements and the CONTRACT price portion for such defective plants and repayments of any sum paid by the OWNER to the CONTRACTOR in respect of such defective plant. Should the OWNER not so replace the defective plant the CONTRACTOR's extreme liability under this clause shall be limited to the repayment of all such sums paid by the OWNER under the CONTRACT for such defective plant.

47 DEFENCE OF SUITS

47.1 If any action is brought before a Court, Tribunal or any other Authority against the Owner or an officer or agent of the OWNER, for the failure, omission or neglect on the part of the CONTRACTOR to perform any acts, matters, covenants or things under the CONTRACT, or damage or injury caused by the alleged omission or negligence on the part of the CONTRACTOR, his agents, representatives or his SUB- CONTRACTOR's, or in connection with any claim based on lawful demands of SUB-CONTRACTOR's workmen or employees, the CONTRACTOR, shall in such cases indemnify and keep the OWNER and/or their representatives harmless from all losses, damages, expenses or decrees arising out of such action.

48 DEDUCTIONS FROM THE CONTRACT PRICE

48.1 All costs, damages or expenses which OWNER may have paid or incurred, which under the provisions of the CONTRACT, the CONTRACTOR is liable/will be liable, will be claimed by the OWNER. All such claims shall be billed by the OWNER to the CONTRACTOR regularly as and when they fall due. Such claims shall be paid by the CONTRACTOR within 15 (fifteen) days of the receipt of the corresponding bills and if not paid by the CONTRACTOR within the said period, the OWNER may, then, deduct the amount from any moneys due i.e., Contract Performance Security or becoming due to the CONTRACTOR under the CONTRACT or may be recovered by actions of law or otherwise, if the CONTRACTOR fails to satisfy the OWNER of such claims.

49 COMPLETION CERTIFICATE

49.1 Application For Completion Certificate:

When the CONTRACTOR fulfils his obligation under Clause 45.1 he shall be eligible to apply for COMPLETION CERTIFICATE.

The ENGINEER-IN-CHARGE shall normally issue to the CONTRACTOR the COMPLETION CERTIFICATE within one month after receiving any application therefore from the CONTRACTOR after verifying from the completion documents and satisfying himself that the WORK has been completed in accordance with and as set out in the construction and erection drawings, and the CONTRACT DOCUMENTS.

The CONTRACTOR, after obtaining the COMPLETION CERTIFICATE, is eligible to present the final bill for the WORK executed by him under the terms of CONTRACT.

49.2 Completion certificate

Within one month of the completion of the WORK in all respects, the CONTRACTOR shall be furnished with a certificate by the ENGINEER-IN-CHARGE of such completion, but no certificate shall be given nor shall the WORK be deemed to have been executed until all scaffolding, surplus materials and rubbish is cleared off the SITE completely nor until the WORK shall have been measured by the ENGINEER-IN- CHARGE whose measurement shall be binding and conclusive. The WORKS will not be considered as complete and taken over by the OWNER, until all the temporary works, labour and staff colonies are cleared to the satisfaction of the ENGINEER-IN-CHARGE.

If the CONTRACTOR fails to comply with the requirements of this clause on or before the date fixed for the completion of the WORK, the ENGINEER-IN-CHARGE may at the expense of the CONTRACTOR remove such scaffolding, surplus materials and rubbish and dispose off the same as he thinks fit and clean off such dirt as aforesaid, and the CONTRACTOR shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realised by the sale thereof.

49.3 Completion certificate documents

For the purpose of Clause 49.2 the following documents will be deemed to form the completion documents:

i) The technical documents according to which the WORK was carried out.

ii) Four (4) sets of construction drawings showing therein the modification and correction made during the course of execution and signed by the ENGINEER-IN-CHARGE.

iii) COMPLETION CERTIFICATE for `embedded' and `covered' up work.

iv) Certificates of final levels as set out for various works.

v) Certificates of tests performed for various WORKS.

vi) Material appropriation, Statement for the materials issued by the OWNER for the WORK and list of surplus materials returned to the OWNER's store duly supported by necessary documents.

50 FINAL DECISION AND FINAL CERTIFICATE

50.1 Upon expiry of the period of liability and subject to the ENGINEER-IN-CHARGE being satisfied that the WORKS have been duly completed by the CONTRACTOR and that the CONTRACTOR has in all respect duly made-up any subsidence and performed all his obligations under the CONTRACT, the ENGINEER- IN-CHARGE shall (without prejudice to the rights of the OWNER to retain the provisions of relevant Clause hereof) otherwise give a certificate herein referred to as the FINAL CERTIFICATE to that effect and the CONTRACTOR shall not be considered to have fulfilled the whole of his obligations under CONTRACT until FINAL CERTIFICATE shall have been given by the ENGINEER-IN- CHARGE notwithstanding any previous entry upon the WORK and taking possession, working or using of the same or any part thereof by the OWNER.

51 CERTIFICATE AND PAYMENTS ON EVIDENCE OF COMPLETION

51.1 Except the FINAL CERTIFICATE, no other certificates or payments against a certificate or on general account shall be taken to be an admission by the OWNER of the due performance of the CONTRACT or any part thereof or of occupancy or validity of any claim by the CONTRACTOR.

52 CONTRACTOR’S RESPONSIBILITY

52.1 The contractor shall depute his supervisor for supervision of the services, as per the scope of services mentioned and to receive instructions from Engineer-In-Charge or his representative.

52.2 Contractor shall make the salary payment to his personnel on or before 7th of every month and provide acknowledgement of salary slip by his personnel to the Owner. In case of default by the contractor, Owner will hold the release of contractor’s payment till the contractor makes the payment of salary to his personnel or Owner may take suitable action at the risk & cost of Contractor.

52.3 Accommodation/ Transportation/ Conveyance/ Medical: The Contractor shall make his own arrangement for the accommodation & medical assistance to his personnel at respective locations and subsequent transportation / conveyance arrangement for them from their place of residence to work place or any other place as required and Owner shall have no obligation in this respect. The Owner shall not be responsible for providing any medical assistance to the contractor personnel.

52.4 Discipline: The Contractor shall be responsible for the discipline and good behaviour of all his personnel deployed in the services and should any complaint be received against any of his employee, he shall arrange to replace such person(s) within 24 hours of notice issued by the Engineer-in-Charge at his own cost. The decision of the Engineer-in-Charge in this matter shall be final and binding on the Contractor.

52.5 Gate pass/ Identity Card/ Uniform: The Contractor shall arrange for the gate pass, uniforms & requirement of supply/ renewal of identity cards to his workforce as per design to be approved by OWNER at his own cost, if so required by OWNER for security or for any other reasons. Contractor’s personnel shall be required to carry their respective Identity Cards while on duty and

produce on demand.

53 MODIFICATION IN CONTRACT

53.1 All modifications leading to changes in the Contract with respect to technical and/or commercial aspects shall be considered valid only when accepted in writing by Owner by issuing amendment to the Contract. Issuance of acceptance or otherwise in such cases, shall not be any ground for extension of agreed completion date and also shall not affect the performance of contract in any manner except to the extent mutually agreed through a modification of Contract.

53.2 Owner shall not be bound by any printed conditions or provisions in the Contractor's Bid Forms or acknowledgment of Contract, invoices, packing list or any other documents, which imposes any conditions at variance with or supplemental to Contract.

54 RIGHT TO GET SERVICES CARRIED OUT THROUGH OTHER AGENCIES

54.1 Nothing contained herein shall restrict OWNER from accepting similar services from other agencies at its sole discretion and at the risk and cost of the contractor, if the contractor fails to provide the said services any time not up to the satisfaction of Engineer-in-Charge.

55 SUB-LETTING OF CONTRACT

55.1 No part of this contract, nor any share or interest therein, in any manner or extent, will be transferred or assigned or sub-let, directly or indirectly, to any person / firm or organisation by the contractor without written consent of Owner.

56 EMPLOYMENT LIABILITY OF CONTRACTOR

56.1 The Contractor shall indemnify Owner & shall be solely and exclusively responsible for any liability arising due to any difference or dispute between him and his employee / Third Party for the execution of this contract at any time during / after the contract period is over. All workmen engaged by the contractor shall be on his roll and be paid by him and Owner shall have no responsibility towards them.

56.2 The Contractor shall be directly responsible and indemnify the Owner against all charges, claims, dues, etc. arising out of disputes relating to the dues and employment of personnel deployed by him.

56.3 The Contractor shall indemnify the Owner against all losses or damages caused to it on account of acts of the personnel deployed by the contractor.

56.4 The Contractor shall ensure regular and effective supervision of the personnel deployed by him.

57 COMPLIANCE OF LAWS

57.1 The contractor deploying contract labour shall obtain license from appropriate licensing authority as per prevailing rules & regulation and as modified from time to time during contract period.

57.2 The contractor (which shall include the contracting firm / company) shall be solely liable to obtain and to abide by all necessary licenses from the concerned authorities as provided under the various Labour Laws / legislations including labour license from the competent authority under the Contract Labour ("Regulation & Abolition") Act 1970 and Acts made thereafter.

57.3 The Contractor shall also be bound to discharge obligations as provided under various statutory enactments including the Employees Provident Fund and Miscellaneous Provisions Act 1952, ESI Act 1948, Contract Labour ("Regulation & Abolition") Act 1970, Minimum Wages Act 1948, payment of wages Act 1936, Workmen's Compensation Act 1923 and other relevant Acts, Rules & Regulations in force from time to time.

57.4 The Contractor shall be responsible for necessary contributions towards PF, Family Pension, ESIC or any other statutory payments to Government Agencies as applicable under the laws in respect of the contract and of personnel deployed by the contractor for rendering services to Owner and shall deposit the required amount with the concerned statutory authorities on or before due dates. The contractor shall obtain a separate PF number from the concerned Regional Provident Fund Commissioner and submit necessary proof of having deposited the employees as well as the Owner's contribution to the Provident Fund. The contractor shall also

be responsible for payment of any administration / inspection charges thereof, wherever applicable, in respect of personnel deployed by him relating to the work of Owner.

57.5 The Contractor shall not engage / deploy any person of less than 18 years under this contract, and the person(s) to be deployed should be physically and mentally fit.

57.6 The installations where job is to be carried out are live and have hydrocarbon environment. Contractor shall comply with all safety and security rules and regulations and other rules laid down by Owner for its operation. Contractor shall follow best Engineering practice and relevant international safety standards. It shall be duty / responsibility of the Contractor to ensure the compliance of fire safety, security and other operational rules and regulations by his personnel. Disregard to these rules by the Contractor's personnel will lead to the termination of the Contract in all respects and shall face penal / legal consequences.

57.7 Personnel protective items like safety helmets, safety shoes, hand gloves, eye protection, cotton working overalls / dresses (not synthetic materials) and other required materials for the safety of the contractor's personnel shall be arranged by the contractor himself. However firefighting equipments shall be arranged by Owner.

57.8 The Contractor shall arrange for life insurance for all his personnel deployed on the job as per the relevant Acts, rules and regulations, etc. In case by virtue of provisions of Workers Compensation Act, 1923 or any other law in force, Owner has to pay compensation for a workman employed by the Contractor due to any cause whatsoever, the amount so paid shall be recovered from the dues payable to the Contractor and/or security deposit with Owner. General third party insurance for CNG Station shall be arranged by Owner.

58 THE ENGINEER-IN-CHARGE

58.1 Issue the contractor from time to time during the running of the Contract such further instructions as shall be necessary for the purpose of proper and adequate execution of the Contract and the Contractor shall carry out and bound by the same.

58.2 During the currency of this Contract, OWNER can increase and / or decrease the number of the services required & quantity of work /services shown in from the Schedule of Rates.

58.3 Order the Contractor to remove or replace any workmen whom the Owner considers incompetent or unsuitable and opinion of the Owner representative as to the competence of any workman engaged by the contractor shall be final and binding on the Contractor. Key personnel can be deployed at site only after getting approval from the OWNER.

59 REPATRIATION AND TERMINATION

59.1 OWNER shall reserve the right, at any time during the currency of the contract without assigning any reason thereof to terminate it by giving 30 days' notice to contractor, and upon expiry of such notice period the contractor shall vacate the site / office provided to him by Owner immediately.

59.2 Goods procured by the Contractor, but not utilised till date of termination will be the responsibility of the Contractor and no claim will be entertained by the Owner for the same.

59.3 Also Owner will not be responsible for any cost incurred by the Contractor including but not limited to repatriation of the workers, lease amount deposit for accommodation provided to the workers, etc. In case Owner has to incur expenses due to the same, the same shall be recovered from the dues payable to the contractor and / or security deposit held with OWNER.

60 INDEMNITY

60.1 Contractor shall exclusively be liable for non-compliance of the provisions of any act, laws rules and regulations having bearing over engagement of workers directly or indirectly for execution of Contract and the Contractor hereby undertake to indemnify the Owner against all actions, suits, proceedings, claims, damages demands, losses, etc. which may arise under Minimum Wages Act 1948, payment of wages Act 1936, Workmen's Compensation Act 1923, Personnel Injury (Compensation Insurance) Act, ESI Act, Fatal accident Act, Industrial Dispute Act, Shops and Establishment Act, Employees Provident Fund Act, Family Pension and deposit Linked Insurance schemes or any other act or statutes not herein specifically mentioned but having

direct or indirect application for the persons engaged under this contract.

61 CONTRACTOR'S SUB-ORDINATE STAFF AND THEIR CONDUCT

61.1 Contractor, on or after award of the Contract shall Name and Depute a qualified engineer having sufficient experience in carrying out work of similar nature, to whom the equipments, mater ials, if any, shall be issued and instructions for works given. The Contractor shall also provide to the satisfaction of the Engineer-In-Charge. sufficient and qualified staff to superintend the execution of the Contract, foremen and leading hands including those specially qualified by previous experience to supervise the types of works comprised in the Contract in such manner as will ensure work of the best quality, expeditious working.

Whenever in the opinion of the Engineer-In-Charge additional properly qualified supervisory staff is considered necessary, they shall be employed by the Contractor without additional charge on accounts thereof.

61.2 If and whenever any of the Contractor's assistants, foremen, or other employees shall in the opinion of Engineer-In- Charge be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties of that in the opinion of the Owner or the Engineer-In-Charge, it is undesirable for administrative or any other reason for such person or persons to be employed in the works, the Contractor, is so directed by the Engineer-In-Charge, shall at once remove such person or persons from employment thereon. Any person or persons so removed from the works shall not again be employed in connection with the Contract without the written permission of the Engineer-In-Charge. Any person so removed from the Contract shall be immediately re-placed at the expense of the Contractor by a qualified and competent substitute. Should the Contractor be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection herewith.

61.3 The Contractor shall be responsible for the proper behaviour of all the staff, foremen, workmen, and others, and shall exercise a proper degree of control over them and in particular and without prejudice to the said generality, the Contractor shall be bound to prohibit and prevent any employees from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighborhood and in the event of such employee so trespassing, the Contractor shall be responsible therefore and relieve the Owner of all consequent claims or actions for damages or injury or any other grounds whatsoever. The decision of the Engineer -In-Charge upon any matter arising under this clause shall be final. The Contractor shall be liable for any liability to Owner on account of deployment of Contractor's staff etc. or incidental or arising out of the execution of Contract.

61.4 The Contractor shall be liable for all acts or omissions on the part of his personnel, staff, foremen and workmen / labour and others in his employment, including misfeasance or negligence of whatever kind in the course of their work or during their employment, which are connected directly or indirectly with the Contract.

62 JURISDICTION

62.1 The contract shall be governed by and constructed according to the laws in force in India and the Courts at Indore alone shall have jurisdiction to try and entertain any and all suits or other proceedings in respect of, relating to or otherwise arising out of this Contract.

63 FORCE MAJEURE

63.1 In the event of either party being rendered unable by Force Majeure to perform any obligation required to be performed by it under this agreement, the relative obligation of the party affected by such Force Majeure shall, after notice under this article be suspended for the period during which such cause lasts.

63.2 The term Force Majeure as employed herein shall mean act of god, war/hostilities, riot/civil commotion, earthquake, Tsunami, fire, flood, tempest, lightening or other natural disaster, restriction imposed by the government or other statutory bodies, acts and regulations or any of its authorised agencies.

63.3 Upon such occurrence, contractor shall immediately inform the Owner and only in case Owner decides, contractor shall stop the Work. In case of any emergency, contractor shall activate Emergency Response Plan (ERP) as per Owner's approved procedures.

63.4 Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing within forty eight

(48) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of its claim.

63.5 Time for performance of the relative obligation suspended by the Force Majeure shall then stand extended for the period for which such cause lasts.

64 General Terms & Conditions of Works Contract

1. SUBMISSION OF TENDER

A. The contractor shall make all arrangements at his own cost to transport the required materials outside and inside the working places and leaving the premises in a neat and tidy condition after completion of the job to the satisfaction of Owner. All materials except those agreed to be supplied by the Owner shall be supplied by the contractor at his own cost and the rates quoted by the Contractor should be inclusive of all royalties, rents, taxes, duties, statutory levies, if any, etc.

2. STATUTORY LEVIES

A. The Contractor accepts full and exclusive liability for the payment of any and all taxes, duties, cess, levies and statutory payments payable under all or any of the statutes. Variations of taxes and duties arising out of the amendments to the Central I State enactments, in respect of sale of goods I services covered under this bid shall be to AGL's account, so long as:

- They relate to the period after the opening of the price bid, but before the contracted completion period (excluding permitted extensions due to delay on account of the contractors, if any) or the actual completion period, whichever is earlier; and
- The vendor furnishes documentary evidence of incurrence of such variations, in addition to the invoices/documents for claiming Input Tax credit, wherever applicable.

B. The rates quoted should be inclusive of all taxes. However, wherever the tax is to be deducted at source, the same will be deducted from the bills of the Contractor and paid to the concerned authorities. The proof of such payments of tax will be furnished to the contractor.

The Vendor shall comply with all the provisions of the GST Act I Rules I requirements like providing of tax invoices, payment of taxes to the authorities within the due dates, filing of returns within the due dates etc. to enable AGL to take Input Tax Credit. In case of imports, vendor shall provide import documents and invoice fulfilling the requirement of Customs Act and Rules. Vendor will be fully responsible for complying with the Customs provisions to enable AGL to take input Tax Credit.

In case, AGL is not able to take Input Tax Credit due to any noncompliance/default/negligence of the seller of goods I service provider, the same shall be recovered from the pending bills/dues (including security deposit, BG etc.).

Vendor shall be responsible to indemnify the AGL for any loss, direct or implied, accrued to the AGL on account of supplier/service provider failure to discharge his statutory liabilities like paying taxes on time, filing appropriate returns within the prescribed time etc.

65 General Terms & Conditions For Supply

1. PRICE

a. Unless otherwise agreed to in the terms of the Purchase Order, the price shall be firm and not subject to escalation for any reason whatsoever till the execution of entire order, even though it might be necessary for the order execution to take longer than the delivery period specified in the order.

b. Price shall be exclusive of GST (CGST, SGST, IGST as applicable), Customs Duty and applicable cess, which are leviable by law on sale of finished goods to AGL. The nature and extent of such levies shall be shown separately

2. TAXES & DUTIES:

a. GST (CGST, SGST, IGST as applicable), Customs Duty and applicable Cess as applicable shall be reimbursed for the materials consigned to AGL as per limits indicated in the offer against documentary evidence to be furnished by the Supplier. AGL shall pay only those taxes, duties and levies as indicated by Supplier at the time of bid submission/as agreed subsequently

(prior to opening of priced bids). Taxes I Duties and/or Levies not indicated by supplier in Bid, but payable, shall be to Supplier's account. In case of any increase/decrease applicable in GST (CGST, SGST, IGST as applicable) Custom Duty and applicable Cess indicated with reference to limits mentioned in the offer I bid or new taxes I duties I levies imposed by the Indian Government through Gazette notification after the date of submission of last Price bid but prior to Contractual Delivery Date, the AGL shall reimburse/adjust the increase/decrease in taxes & duties on satisfactory supporting documents.

b. Supplier shall be responsible for availing all applicable concessions in taxes, duties, levies etc. as per terms of Purchase Order. Any loss, direct or implied, accrued to AGL on account of supplier's failure to avail concessions shall be borne by Supplier.

3. CUSTOMS DUTY (CD) VARIATION

a. The prices mentioned in offer are subject to Customs Duty (CD) variation. In case of any increase in rates of Customs Duty, IGST and applicable Cess by the Indian Government through Gazette notification after the submission of last priced offer but within the time schedule for import of materials, as mentioned. AGL shall reimburse the increase in taxes & duties at actuals against satisfactory supporting documents.

b. All downward variations in the rates of all such duties shall be to AGL's account and same shall be calculated on actual CIF value of imported materials. Supplier shall submit all relevant documents to AGL for the proof of duty paid by them within one month from the date of Bill of Entry (BOE).

c. Custom Duty variation shall be paid by AGL up to the limit of maximum CIF value of imported components as indicated in the offer.

d. Rate of Custom Duty along with tariff number considered by Supplier in the prices shall be indicated in the offer.

The Vendor shall comply with all the provisions of the GST Act I Rules I requirements like providing of tax invoices, payment of taxes to the authorities within the due dates, filing of returns within the due dates etc. to enable AGL to take Input Tax Credit. In case of imports, vendor shall provide import documents and invoice fulfilling the requirement of Customs Act and Rules. Vendor will be fully responsible for complying with the Customs provisions to enable AGL to take Input Tax Credit.

In case, AGL is not able to take Input Tax Credit due to any noncompliance / default / negligence of the seller of goods I service provider, the same shall be recovered from the pending bills/dues (including security deposit, BG etc.).

Vendor shall be responsible to indemnify the AGL for any loss, direct or implied, accrued to the AGL on account of supplier/service provider failure to discharge his statutory liabilities like paying taxes on time, filing appropriate returns within the prescribed time etc.

66 General Terms & Conditions of contract for Consultancy Services

A STATUTORY LEVIES, TAXES AND DUTIES

1 The Consulting-firm accepts full and exclusive liability for payment of all taxes under any Statute as applicable in performance of the service and quoted price should include all such taxes & duties, if applicable which will be quoted separately.

2 All Domestic Consulting-firm's should have GST registration and to provide a copy of such registration certificate and classification of service along with bid document unless exempted for which necessary document support is provided.

3 In case of Foreign Consultants, where the service is provided from the establishment within India, clause 1 and as applicable to Indian Bidder in 2 would apply. Where the service is provided from the establishment situated outside India, GST tax will be paid by the Owner as recipient of service as per existing Act & Rules.

4 The Owner may claim Input Tax credit. The bidder should quote GST separately. Bidder should provide tax invoice as per the act I rules to enable owner to claim Input Tax Credit.

5 All taxes & duties payable outside India in respect of performance of the contract shall be borne & paid by the Consultant. The Consulting-firm shall bear and pay all the liabilities in respect of non-observance of all legal formalities as per various statutory provisions.

6 Unless specifically provided for in the tender documents or any Special Conditions, Variations of taxes i.e. GST quoted in price bid arising out of the amendments to the Central I State enactment, in respect of services covered under this bid shall be to Owner's account, so long as:

(i) They relate to the period from the date I time of opening of the bid, but before the contractual completion period (excluding permitted extensions due to delay on account of the Consulting-firm, if any) or the actual completion period, whichever is earlier; and

(ii) The consultant furnishes documentary evidence of incurrence of such variations, in addition to the invoices and filing required returns for claiming Input Tax credit, wherever applicable.

7 The Consultant shall bear and pay all liabilities in respect of statutory variations in taxes and duties and imposition of new taxes and duties that may be imposed after the delivery and payment schedule execution dates, as originally stipulated, in case the delivery dates are extended due to reasons attributable to Consultant.

The Vendor shall comply with all the provisions of the GST Act I Rules I requirements like providing of tax invoices, payment of taxes to the authorities within the due dates, filing of returns within the due dates etc. to enable AGL to take Input Tax Credit.

In case, AGL is not able to take Input Tax Credit due to any noncompliance/default/negligence of the seller of goods / service provider, the same shall be recovered from the pending bills/dues (including security deposit, BG etc.).

Vendor shall be responsible to indemnify the AGL for any loss, direct or implied, accrued to the AGL on account of supplier/service provider failure to discharge his statutory liabilities like paying taxes on time, filing appropriate returns within the prescribed time etc.

SECTION VI

FORMS AND FORMATS

FORM F-1
BIDDER'S GENERAL INFORMATION

To

Aavantika Gas Limited

202 – B, 2nd Floor, NRK Business Park,
Vijay Nagar Square, A.B. Road,
Indore (M.P), Pin – 452010

1-1 Bidder Name: _____

1-2 Number of Years in Operation: _____

1-3 Address of Registered Office: _____

City_____ District _____
State _____ PIN/ZIP_____

1-4 Operation Address

if different from above: _____
_____

City_____ District _____
State _____ PIN/ZIP_____

1-5 Telephone Number: _____

(Country Code) (Area Code) (Telephone Number)

1-6 E-mail address: _____

1-7 Website: _____

1-8 Fax Number: _____

(Country Code) (Area Code) (Telephone Number)

1-9 ISO Certification, if any {If yes, please furnish details}

1-10 Bid Currency _____

1-11 Port of shipment / Dispatch Point _____

1-12 Whether Supplier / Manufacturer _____

Dealer/Trader/Contractor

1-13 Type of Material Supplies : _____

1-14 Banker's Name : _____

1-15 Branch : _____

1-16 Branch Code : _____

1-17 Bank account number : _____

1-18 GSTN No.: _____

1-19 State / UT.: _____

1-20 PAN No. : _____

1-21 Whether SSI Registrant Or not : _____

1-22 EPF No. _____

(SIGNATURE OF BIDDER WITH SEAL)

NOTE:

1. Bidders have to submit the supporting document confirming the above registrations.

F – 2 BID FORM

To
Aavantika Gas Limited
202 – B, 2nd Floor, NRK Business Park,
Vijay Nagar Square, A.B. Road,
Indore (M.P), Pin – 452010
Dear Sir,

After examining/reviewing the Bidding Documents for supply of intended material/works/services, including technical specifications, drawings, General and Special Conditions of Contract and Price schedule etc. the receipt of which is hereby duly acknowledged, we, the undersigned, are pleased to bid to execute the whole of the Job for the item in conformity with, the said Bidding Documents, including Corrigendum / Addenda Nos……

We confirm that this bid is valid for a period of Three (3) months from the date of opening of Techno-Commercial Bid, and it shall remain binding upon us and may be accepted by any time before the expiration of that period.

If our bid is accepted, we will provide the performance guarantee equal to 10% (ten per cent) of each Delivery Order, for the due performance with in fifteen days of such award. Until a final Contract is prepared and executed, the bid together with your written acceptance thereof in your notification of award shall constitute a binding Contract between us.

We understand that Bidding Document is not exhaustive and any action and activity not mentioned in Bidding Documents but may be inferred to be included to meet the intend of the Bid Documents shall be deemed to be mentioned in Bidding Documents unless otherwise specifically excluded and we confirm to perform for fulfillment of Agreement and completeness of the Work in all respects within the time frame and agreed price.

We understand that you are not bound to accept the lowest priced or any bid that you may receive.

SEAL AND SIGNATURE
DATE:

Duly authorized to sign bid for and on behalf of

_____

(SIGNATURE OF WITNESS)

WITNESS NAME:
ADDRESS:

F – 3

AANNUAL TURNOVER

Bidder must fill in this form

Annual Turnover data for the last 3 years:

Year		Amount (in INR)
Year 1:		
Year 2:		
Year 3:		

1. The information supplied should be the Annual Turnover of the bidder
2. A brief note should be appended describing thereby details of turnover as per audited results.

SEAL AND SIGNATURE OF THE BIDDER

F – 3 B
FINANCIAL
STATUS

Bidder must fill this form

FINANCIAL DATA FOR LAST AUDITED FINANCIAL YEAR

Description	For the year of
	Amount (in INR)
1. Current assets	
2. Current Liabilities (including secured and un-secured short term loans & working capital loans)	
3. Working Capital (Current Assets-Current liabilities)	
4. Net Worth Owners funds (Paid up share capital and Free Reserves & Surplus) (NW)	

1. Attached are copies of the audited balance sheets, including all related notes and income statement for the last Audited Financial year, as indicated above, complying with the following conditions.
   - All such documents reflect the financial situation of the bidder
   - Historic financial statements must be audited by a certified accountant.
   - Historic financial statements must be complete, including all notes to the financial statements.
   - Historic financial statements must correspond to accounting periods already completed and audited (no statement for partial periods shall be requested or accepted)

SEAL AND SIGNATURE OF BIDDER

F – 3 C
FORMAT FOR CERTIFICATE FROM BANK IF BIDDER'S WORKING CAPITAL IS INADEQUATE / NEGATIVE

(To be provided on Bank's letter head)

To, **Date:**
M/s Aavantika Gas Limited

Dear Sir,

This is to certify that M/s---------- (name of the Bidder with address) (hereinafter referred to as Customer) is an existing Customer of our Bank.

The Customer has informed that they wish to bid for Aavantika Gas Limited Tender No.---------- dated---------- for---------- (Name of the supply/work/services/consultancy) and as per the terms of said Tender Document they have to furnish a certificate from their Bank confirming the availability of line of credit.

According M/s---------- (name of the Bank with address) confirms availability of line of credit to M/s----------(name of the Bidder) for at least an amount of Rs…….

It is also confirmed that the net worth of the Bank is more than Rs. 100 Crores (or Equivalent USD) and the undersigned is authorized to issue this certificate.

Yours truly,

For……(Name & address of Bank)

(Authorized signatory)
Name of the signatory:
Designation:
Email Id:
Contact No.:
Stamp:

Note:
This Declaration Letter for line of credit shall be from single bank only. Letters from multiple banks shall not be applicable. However, banking syndicate will be acceptable wherein a group of banks can jointly provide line of credit to the bidder.

F-4

PROFORMA FOR BANK GUARANTEE FOR EARNEST MONEY DEPOSIT/ BID SECURITY

(To be stamped in accordance with the Stamp Act)

Ref.....

Bank Guarantee No.....
Date.....

To
Aavantika Gas Limited,
Second Floor 202-B, NRK Business Park,
Vijay Nagar Square, AB Road,
Indore-452010,

Dear Sir(s),
In accordance with Invitation for Bid under your reference No_____ M/s._____having their Registered / Head Office at _____ (hereinafter called the Tenderer) wish to participate in the said bidding for _____ .

As an irrevocable Bank Guarantee against Earnest Money for the amount of _____ is required to be submitted by the Bidder as a condition precedent for participation in the said bidding which amount is liable to be forfeited on the happening of any contingencies mentioned in the Bidding Document.

We, the _____ Bank at _____ having our Head Office _____ (Local Address) guarantee and undertake to pay immediately on demand without any recourse to the bidder by AAVANTIKA GAS Ltd., the amount_____ _____ without any reservation, protest, demur and recourse. Any such demand made by AAVANTIKA GAS Ltd., shall be conclusive and binding on us irrespective of any dispute or difference raised by the Bidder.

This guarantee shall be irrevocable and shall remain valid upto _____ [this date should be valid for 2 months in excess of bid validity]. If any further extension of this guarantee is required, the same shall be extended to such required period on receiving instructions from M/s._____ whose behalf this guarantee is issued.

In witness whereof the Bank, through its authorized officer, has set its hand and stamp on this _____day of _____200 __at_____.

WITNESS:

(SIGNATURE)
(NAME)

(OFFICIAL ADDRESS)

(SIGNATURE)
(NAME)
Designation with Bank Stamp

Attorney as per Power of Attorney No._____
Date: _____

INSTRUCTIONS FOR FURNISHING BANK GUARANTEE FOR EMD/BID SECURITY

1. The Bank Guarantee by bidders will be given on non-judicial stamp paper as per stamp duty applicable. The non-judicial stamp paper should be in the name of the issuing bank. In case of foreign bank, the said banks guarantee to be issued by its correspondent bank in India on requisite non-judicial stamp paper.

2. The expiry date as mentioned in bid document should be arrived at by adding 2 months to the date of expiry of the bid validity unless otherwise specified in the Bidding Documents.

3. The bank guarantee by bidders will be given from bank as specified in ITB

4. A letter from the issuing bank of the requisite Bank Guarantee confirming that said bank guarantee /all future communication relating to the Bank Guarantee shall be forwarded to the Employer at its address as mentioned at ITB.

5. Bidders must indicate the full postal address of the bank along with the bank's e-mail/ Fax no. From where the earnest money bond has been issued.

6. If a bank guarantee is issued by a commercial bank, then a letter to Employer confirming its net worth is more than Rs. 1,000,000,000/- (Rupees one hundred crore) or equivalent along with documentary evidence.

Bank details for BG/LC (SFMS) receiving through SFMS:
Bank Name: ICICI Bank Limited
Bank IFSC: ICIC0000041
Bank A/c No.: 004105013583
Bank Address: ICICI BANK LTD, MALAV PARISAR,4 CHOTI KHAJRANI,
A.B. ROAD.INDORE 452008 (M.P), INDORE

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LETTER OF AUTHORITY
PROFORMA FOR LETTER OF AUTHORITY FOR ATTENDING AND SUBSEQUENT NEGOTIATIONS / CONFERENCES

No. Date:

Aavantika Gas Limited
202 – B, 2nd Floor, NRK Business Park,
Vijay Nagar Square, A.B. Road,
Indore (M.P), Pin – 452010

Dear Sir,

We _____ hereby authorize following representative(s) to attend Bid opening and for any other correspondence and communication against above Bidding Document:

Name & Designation _____ Signature _____

Name & Designation _____ Signature _____

We confirm that we shall be bound by all commitments made by aforementioned authorized representatives.

Yours faithfully,

Signature

Name & Designation

For and on behalf of

Note: This letter of authority should be on the letterhead of the bidder and should be signed by a person competent and having the power of attorney to bind the bidder.

Not more than two persons are permitted to attend techno –commercial un-priced and price bid opening.

F – 6

NO DEVIATION CONFIRMATION

Aavantika Gas Limited
202 – B, 2nd Floor, NRK Business Park,
Vijay Nagar Square, A.B. Road,
Indore (M.P), Pin – 452010

Dear Sir,

We understand that any deviation / exception in any form may result in rejection of bid. We, therefore, certify that we have not taken any exceptions/deviations anywhere in the bid and we agree that if any deviation / exception is mentioned or noticed, our bid may be rejected.

(SEAL AND SIGNATURE OF BIDDER)

Note: This No Deviation Confirmation should be on the letterhead of the bidder and should be signed by a person competent and having the power of attorney to bind the bidder

F-8

DETAILS OF SIMILAR WORK DONE DURING PAST FIVE YEARS

Sr. No.	Description of the work	Location of the work	Full Postal Address and phone nos. of Client & Name of Officer-in-Charge	Value of Contract	Date of Commencement of Work	Scheduled Completion Time (Months)	Date of Actual Completion	Reasons for delay in project completion, if any

Note: Copies of Letter of awards and completion certificate for the above works to be enclosed. The Work completed earlier than five years need not be indicated here. The list of work, not of similar nature need not be indicated here Failing to comply aforementioned instructions may lead to rejection of bid.

SEAL AND SIGNATURE OF BIDDER

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PROFORMA FOR CONTRACT PERFORMANCE BANK GUARANTEE
(ON NON-JUDICIAL PAPER OF APPROPRIATE VALUE)

Ref: Bank Guarantee No……..

Date……

To
Aavantika Gas Limited
202 – B, 2nd Floor, NRK Business Park,
Vijay Nagar Square, A.B. Road,
Indore (M.P), Pin – 452010

Dear Sirs,

M/s _____ have been awarded the work of (Specify Tender Name & No.), vide PO/WO No. _____ (Specify the PO / WO No.) _____ for AAVANTIKA GAS Ltd., 202 – B, 2nd Floor, NRK Business Park, Vijay Nagar Square, A.B. Road, Indore (M.P.) India.

The Contracts conditions provide that the CONTRACTOR shall pay a sum of _____ (as full Contract Performance Guarantee in the form therein mentioned. The form of payment of Contract Performance Guarantee includes guarantee executed by Nationalized Bank, undertaking full responsibility to indemnify AAVANTIKA GAS Ltd., in case of default.

The said_____(name of the contractor's firm) has approached us and at their request and in consideration of the premises we having our office at _____ have agreed to give such guarantee as hereinafter mentioned.

1. We (name of the Bank) _____hereby undertake and agree with you that if default shall be made by M/s _____ _____ in performing any of the terms and conditions of the tender or in payment of any money payable to AAVANTIKA GAS Ltd., we shall on demand pay without any recourse to the contractor to you in such manner as you may direct the said amount of _____ only or such portion thereof not exceeding the said sum as you may from time to time require.

2. You will have the full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contract with the said _____ _____ and to enforce or to forbear from endorsing any powers or rights or by reason of time being given to the said _____ which under law relating to the sureties would but for provision have the effect of releasing us.

3. Your right to recover the said sum of _____ (_____) from us in manner aforesaid will not be affected or suspended by reason of the fact that any dispute or disputes have been raised by the said M/s._____ and/or that any dispute or disputes are pending before any officer, tribunal or court.

4. The guarantee herein contained shall not be determined or affected by the liquidation or winding up dissolution or changes of constitution or insolvency of the said but shall in all respects and for all purposes be binding and operative until payment of all money due to you in respect of such liabilities is paid.

5. This guarantee shall be irrevocable and shall remain valid upto_____, If any further extension of this guarantee is required, the same shall be extended to such required period on receiving instruction from M/s._____ _____on whose behalf this guarantee is issued.

6. The Bank Guarantee's payment of an amount is payable on demand and in any case within 48 hours of the presentation of the letter of invocation of Bank Guarantee. Should the banker fail to release payment on demand, a penal interest of 18% per annum shall become payable immediately and any dispute arising out of or in relation to the said Bank Guarantee shall be subject to the jurisdiction of Indore Courts.

7. We have power to issue this guarantee in your favor under Memorandum and Articles of Association and the undersigned has full power to do under the Power of Attorney dated _____ granted to him by the Bank.

Yours faithfully,

_____Bank

By its Constituted Attorney

Signature of a person duly authorized to sign on behalf of the Bank.

The bidders bank has to send the below details in the BG SWIFT message to our Banker:
77C: Details of Guarantee
7035: ICIC0000041
7036: ICICI BANK LTD, INDORE AC NO 004105013583
7037: AG533170984 Unique Identifier Number (Mandatory)
7038: XXXXX
7039: XXXXXX(XX)DT XX.XX.2025

INSTRUCTIONS FOR FURNISHING CONTRACT PERFORMANCE GUARANTEE

1. The Bank Guarantee by successful bidder(s) will be given on non-judicial stamp paper as per stamp duty applicable. The non-judicial stamp paper should be in name of the issuing bank. In case of foreign bank, the said bank guarantee to be issued by its correspondent bank in India on requisite non-judicial stamp paper and place of bid to be considered as Indore.

2. The bank guarantee by bidders will be given from bank as specified in ITB.

3. A letter from the issuing bank of the requisite Bank Guarantee confirming that said bank guarantee and all future communication relating to the Bank Guarantee shall be forwarded to Employer

4. If a bank guarantee is issued by a commercial bank, then a letter to Owner confirming its net worth is more than Rs. 1,000,000,000/- (Rupees one hundred Crores) or its equivalent in foreign currency along with a documentary evidence.

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DECLARATION
(ON BIDDER'S LETTER HEAD)

We confirm that we have not been banned by any CGD Company for the tendered product/service.

SEAL AND SIGNATURE OF BIDDER

Form F-13
DECLARATION ON TENDER DOCUMENT DOWNLOADED (on Bidder's letter head)

No. Date:
Aavantika Gas Limited,
Indore (M.P.)
Sub: Bid Document no. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025.

Sir,
We hereby confirm that we have read each page of the subject Tender document along with Corrigendum & Reply to bidder's queries thoroughly and understood the complete Scope of Work and other terms & conditions. We hereby also confirm that tender terms & conditions are acceptable to us and entire scope of work shall be executed as per Project Timeline at the Quoted Rates without any deviation.

Yours faithfully,

Signature
Name & Designation
For and on behalf of
SEAL & SIGNATURE OF BIDDER

ATTACHMENT VII

SCHEDULE OF RATES (SOR)

CITY GAS DISTRIBUTION PROJECT
STATION PIPING, HOOKUP AND ASSOCIATED CONNECTIVITY WORKS
TENDER NO. AGL/0514/MANUAL TENDER/STATION PIPING/10-2025

Sr. No.	Description	UOM	QUANTITY	Unit Rates Excluding GST	Total Amount Excluding GST
	Pithampur CGS AG Piping Connectivity work				
10	**ABOVE GROUND PIPING, HOOK-UP AND ASSOCIATED CONNECTIVITY WORK** A) Receiving and taking over of all AGLs free issue materials (i.e 4" Meter,NRV) including lifting & transportation from company's designated place of issue/Store B) Complete work of Fabrication, Erection, Installation, Hook up with other System Piping at Battery Limit, Painting, Radiographic Testing & Commissioning of complete Steel Piping System, in accordance with relevant Tender Specifications, Drawings, Scope of work and as per directives of AGL representative C) Preparation of Fabrication, Isometric & As-Built drawings, Bill of Material, Pipe-Books and editable copy of all relevant documents such as 1 set of tracing on polyester film, 2 sets of as-built drawings and 1 soft copy and 1 hard copy	**M**	55		
20	Supply of all required material, Fittings for fabrication of CGS AG Piping. Material grade of required material as per below. 1) **Seamless Pipe:** ASTM A106 GR. B (CHARPY) B 36.1 SCH 80 2) **Elbow, Reducer, Tee:** ASTM A234 GR. WPB (CHARPY) B 16.9 BW SCH 80 3) **WNRF, BLRF, BLRF with NPT:** ASTM A105 (CHARPY) B 16.5 RF 300#/600# SCH 80 4) **Below 4" size valve:** ASTM A 105, TRIM SEAT RPTFE Bs-5351 5) **Sockolet:** ASTM A 105 MSS-SP97 SW, 3000 6) **Gasket:** 4.5 mm thick Spiral Wound Gasket with SS inner Rings of 300#/600# 7) **Stud Nut:** HDG 8) **TF:** 4" CS X 125 MM PE100 SDR 11 9) **PG:** 150 mm Dial, Maximum Range - 70 Kg/Cm2 10) **TG:** 150 mm Dial, Maximum Range - 80 °C Except above types of fittings if any other fittings required then it should be SCH 80 with minumum thickness is 6.4 mm. details specification will provide by AGL as per site requirement **Note: Except following free issue material all other material is in scope of Vendor: 4" IJ & 4" Meter. Installation of free issue material is in scope of vendor. Supply of 4" Valve payment will be done as per available Separate SOR.**	**M**	55		
30	**PIPE/VALVE MS SUPPORT- SUPPLY, FABRICATION & ERECTION** A) Pipe Supports, Valve Supports & other structures: Supply fabrication and erection with PCC base of all types of pipe supports, like clamps, saddle, guide, stops, cradles, turn buckles, anchors, T Posts, stockade / trestle and pipe bridge for overhead piping, frames for canopy, approach ladders and platforms, crossover, cable tray supports etc, including painting of the same as per specification or EIC.	**KG**	184.36		
40	**Supply & Installation of Type F TLP for Insulation joint with minimum 4 cables including supply of 1Cx06sqmm & 1Cx25sqmm cables, Prepacked 20KG + 20KG Zinc Grounding Cell with connecting 1Cx25sqmm cable for grounding, Surge Diverter & pin brazing connection encapsulation kit for pipe to cable connection etc.**	**Nos**	3		
50	**Supply of 4" FE BV BODY-ASTM A 216 GR. WCC/ A234 GR WPC, TRIM-SEAT AISI 4140+0.003" ENP/ AISI 410 API-6D FLGD, 300#, B 16.5, RF/ 125 AARH**	**Nos**	3		
60	**HSE Ensuring at Site - PPE's:** Ensuring Personnel Protective Equipment and other site related safety requirements	**M**	55		
70	**HSE Ensuring at Site - Hard Barricades:** Ensuring Personnel Protective Equipment and other site related safety requirements	**M**	55		
Total Amount Excluding GST					

Bidder to Quote GST (%) : _____
**** The Quoted GST % (as applicable) will derive total amount.**

Name of Bidder :
Seal and Sign of Bidder :

PREAMBLE TO SCHEDULE OF RATES

1. **The Schedule of Rates (SOR) shall be read in conjunction with all other sections of the Bid Document**
2. **The Bidder is deemed to have studied the drawings, specifications, Special Conditions of Contract (SCC), General Conditions of Contract (GCC) and details of works to be done within the Time-schedule specified in the Bid document and should have acquainted himself of the conditions prevailing at Project-site.**

3. **All duties and Taxes, GST and other levies or any other statutory payment payable by the bidder for supply of goods / material at AGL Warehouse shall be included in the SOR.**
4. **Bidders must submit firm prices for all the items of SOR. Bids of all such Bidders not complying with this requirement shall not be accepted.**
5. **Bidders shall quote as per the items of SOR only. No comment, explanation or Clarification in SOR is acceptable.**
6. **The quantities specified in SOR are tentative and shall be used to evaluate the Bidder's position. AGL does not make any commitment for quantities to be ordered on daily or monthly basis; and payments shall be released for actual quantities ordered and supplied/executed.**
7. **No claim shall be entertained during the currency of the contract towards any item due to the above including where the Bidder/ contractor has quoted low / high prices.**
8. **All items of work mentioned in the SOR shall be carried out as per the specifications, drawings and instructions of Employer and the Prices are deemed to be inclusive of costs towards material, consumables, labour, supervision, tools & tackles and detailing of construction/ fabrication drawings, isometric wherever required as called for in the detailed specifications and condition of the Contract.**
9. **Employer reserves the right to cancel / delete / curtail any item of work if necessary. Such a step shall not be considered as a reason for changing the Prices.**
10. **The prices quoted in SOR shall be deemed to include all activities of work mentioned in item-description (short description) of SOR (detailed).**

Name, Signature & Stamp of Bidder