

NAME OF TENDER:

**SUPPLY AND LAYING OF
ONSHORE PIPELINES FOR
PETROLEUM PRODUCT (MGO)
FROM JETTY TO PRODUCT
TANK AT LIOC TERMINAL
TRINCOMALEE**

Tender No :	LIOC/ENG/PT/02/2016-17
Due Date &Time :	22.02.2017 @ 10:30 Hrs

TECHNICAL/ COMMERCIAL BID





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PRODUCT (MGO) FROM JETTY TO PRODUCT TANK AT LIOC TERMINAL
TRINCOMALEE**

REF: LIOC/ ENG/ PT/ 02/ 2016-17

DATE: 02/ 02/ 2017

M/S. _____

Dear Sirs,

**SUB: SUPPLY AND LAYING OF ONSHORE PIPELINES FOR PETROLEUM PRODUCT (MGO) FROM
JETTY TO PRODUCT TANK AT LIOC TERMINAL TRINCOMALEE**

Dear Sir,

1.0 Following documents forming a part of the mentioned tender are enclosed in single set:

S/N	DESCRIPTION
PART A: TECHNICAL/ COMMERCIAL BID	
1	Notice Inviting Tender
2	Form of tender & Appendix
3	Technical bid Abstract
4	Abbreviations and notations
5	List of documents in support of qualifying norms
6	Particulars of Bid Bond and tender fee
7	Statement of credentials
8	Undertaking towards documents submission
9	Declaration for downloading documents from web site
10	Declaration to be signed and submitted with details
11	List Of Directors Of LIOC
12	Proforma of declaration for Holiday/ Black Listing
13	Special terms and conditions of contract
14	Terms and conditions - Safety
15	Specification for blast cleaning & painting for MS piping / allied structural work
16	Form of Agreement
17	Conditions of Contract Part I & Part II
18	Format for Bid Bond
19	Format for Performance Bond
PART B: PRICE BID	
1	Price bid

2.0 We request you to submit your lowest quotation for the work contained in the tender. Your offer complete in all respects must be submitted so as to reach this office of LIOC on or before **22/ 02/ 2017 at 10:30 hrs.** Offer may please be dropped in Engineering tender box kept in our office at address given below.

**SENIOR VICE PRESIDENT (ENGG),
LANKA LIOC PLC,
LEVEL 20, WEST TOWER, WORLD TRADE CENTRE,
ECHELON SQUARE, COLOMBO - 01, SRI LANKA**

SIGNATURE OF TENDERER

SEAL

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- 3.0 Bid Bond: The bid bond for **LKR 426,200.00** in the form of demand draft (drawn in favour of Lanka IOC PLC payable at Colombo) or Bank Guarantee (in the strictly as per the format enclosed) must be submitted strictly in the Technical Bid cover.
- 4.0 Tender Fee: A tender fee of **LKR 5000/-** by Demand draft (in favour of Lanka IOC PLC payable at Colombo) shall be applicable. The tenders can also be downloaded from the web site of the firm www.lankaio.com in which case the tender fee of LKR 5000/- would be not applicable.
- 5.0 Submission of Tender Documents:
- Tender Envelope must be super scribed duly indicating the tender number, due date and time of opening, name of work tendered, address of tenderer. It must be noted that the Technical bid (named as COVER A) & Price bid (named as COVER B) shall be enclosed in separate covers and sealed. The two covers (COVER A & COVER B) in sealed condition containing the above must be enclosed in an outer cover (named COVER C) and sealed and submitted. The outer cover (COVER C) must be super scribed duly indicating the tender number, due date and time of opening, name of work tendered, name and address of tenderer. Non-submission of the tender documents in the manner prescribed above will render the offer liable for rejection.
- 5.1 Tenderers to note that LIOC shall not be responsible for the postal delays in dispatch and receipt of tender documents. Tenderers must also note that all pages of tender along with drawings issued must be signed with stamp and submitted as part of submission of tender.

Thanking You,

**Yours Faithfully,
For LANKA IOC PLC.,**

FOR SR. VICE PRESIDENT (ENGG)

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NOTICE INVITING TENDER (PRESS NOTICE)



NOTICE INVITING TENDER

Tender no: LIOC/ ENG/ PT/ 02/ 2016- 17

Lanka IOC PLC invites sealed tenders in prescribed tender form under two bid system from bonafide contractors as per following details

NAME OF WORK	SALE PERIOD (BOTH DAYS INCLUSIVE)	CONTACT PERSON
SUPPLY AND LAYING OF ONSHORE PIPELINES FOR PETROLEUM PRODUCT (MGO) FROM JETTY TO PRODUCT TANK AT LIOC TERMINAL TRINCOMALEE COST OF TENDER: LKR 5,000/- (NON REFUNDABLE) [BY DEMAND DRAFT ONLY (DRAWN IN FAVOUR OF LANKA IOC PLC PAYABLE AT COLOMBO)]	02/ 02/ 2017 From 0900 Hrs To 21/ 02/ 2017 Upto 1700 Hrs	ASST MANAGER (ENGG) TEL: 011 2475720 Email: sarawanakanth@lankaio.com

Please visit our website www.lankaio.com for further details on this tender.

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PRODUCT (MGO) FROM JETTY TO PRODUCT TANK AT LIOC TERMINAL
TRINCOMALEE****NOTICE INVITING TENDER**

1	Name of work	:	SUPPLY AND LAYING OF ONSHORE PIPELINES FOR PETROLEUM PRODUCT (MGO) FROM JETTY TO PRODUCT TANK AT LIOC TERMINAL TRINCOMALEE
2	Place of Work	:	LIOC OIL TERMINAL, TRINCOMALEE, SRI LANKA
3	Tender Ref	:	LIOC/ ENG/ PT/ 02/ 16 - 17
4	Tender Fee	:	LKR 5,000/- (non refundable / non transferable) Demand draft drawn in favour of Lanka IOC PLC payable at Colombo. Tender fee not applicable if downloaded from the www.lankaioec.com
5	Bid Bond	:	LKR 426,200.00 (By way of DD or BG as per format)
5A	Mode of submission of bid bond		A. By Demand draft in favour of Lanka IOC PLC payable at Colombo B. By Bank Guarantee in favour of Lanka IOC PLC issued by any MNC/reputed Bank in Sri Lanka.
6	Sale Of Tenders (between 0900 Hrs to 1700 Hrs on working days)		
	a) Starts On	:	02/ 02/ 2017 at 0900 Hrs
	b) Closes On	:	21/ 02/ 2017 at 1700 Hrs
7	Pre Bid Meeting	:	Pre-bid meeting to be held at LANKA IOC PLC, TRINCOMALEE OIL TERMINAL, CHAINA BAY, TRINCOMALEE On 15/ 02/ 2017 @ 1000 HRS.
8	Tender Submission Address	:	SR. VICE PRESIDENT (ENGG), LANKA IOC PLC, LEVEL 20, WEST TOWER, WORLD TRADE CENTRE, ECHELON SQUARE, COLOMBO - 01, SRI LANKA
9	Due Date And Time	:	
	a) Submission Of Tenders	:	22/ 02/ 2017 @ 1030 HRS
	b) Opening Of Tenders (Technical Bid Only)	:	22/02/ 2017 @ 1030 HRS
10	Verification Of Original Documents	:	23/ 02/ 2016 & 24/ 02/ 2016
11	Work Completion Time	:	12 Weeks
12	Number of parties to be selected	:	1 NO
13	Security Deposit	:	Security Deposit of 10% to be submitted along with Purchase Agreement by way of DD or BG (as per attached format)

Sealed tenders in two bid system (a) Technical bid with commercial terms and (b) Price Bid are invited from reputed, established and financially sound parties for **NEW PIPELINES FOR BONDED PRODUCTS AT TRINCOMALEE TERMINAL**. Parties, meeting the following qualifying parameters as per details mentioned below, only need apply:

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QUALIFYING PARAMETERS:

Parties who satisfy the following qualification parameters as per the details given below only need apply.

SL	QUALIFYING PARAMETERS
1.	Similar works: Value of similar works shall be as per following. 1. 3 similar work orders each of value not less than LKR 17 Mil (including VAT) OR 2. 2 similar work orders each of value not less than LKR 22 Mil (including VAT) OR 3. Single similar work order of value not less than LKR 34 Million (including VAT) in any of the last 5 years ending 31/ 01/ 2017 .
2.	Average Annual Financial turnover during last 3 financial years ending 31 st Mar' 2016 ie. 2013-14, 2014-15 and 2015-16 shall be at least LKR 13 Million . Note: In case the turnover for any of the above years is not furnished then, the turnover shall be taken as ZERO while computing average turnover.
3	Business Registration and VAT registration certificates. Proof of only submission of application for VAT registration shall not be considered as valid document.

Definition of Similar works:

Experience in successful completion of Fabrication and laying of steel piping and associated works along with painting for petroleum/ chemical industries. Experience to include pipeline of size 150 mm diameter or more.

Note:

- Proof of works completed as per qualifying parameters mentioned above shall be supported by copies of work orders, approved drawings, final bill copies/ work completion certificates, etc indicating date of work order, date of completion of works, nature of works and value of works completed etc.
- In case of works taken up prior to the qualifying period (5 years ending 31/ 01/ 2017) are completed during the qualifying period then, the cost of works completed in the qualifying period shall be reckoned for the purpose of qualification. Proof of turn over shall be supported by copies of Profit and Loss account statements, income statements & balance sheet indicating therein Professional receipts.

CONSORTIUM PARTIES

Bidding by Consortium parties also permissible including foreign partners. Any of the consortium partners shall be able to individually meet one or more of the Pre Qualifying conditions mentioned above. However, the lead partner must necessarily meet atleast one of the Qualifying parameters.

In case of one or more of the Consortium partners being a foreign entity, the Lead Partner must be a local firm only and lead partner shall provide with Business Registration and VAT registration certificates.

However any of the other Consortium Partner/ Partners shall be able to individually meet other Pre Qualifying condition so that Consortium Partners shall be fulfill all above PQ criterion.

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Under the statement of credentials name of all partners in case of consortium and also the name of the lead partner shall be clearly indicated. All the payments shall be released to the Lead partner in local currencies.

TENDER FEE:

Tender documents (non transferable) can be obtained from Engineering department, Lanka IOC PLC, 20th floor, West Tower, Echelon Square, Colombo, Sri Lanka by way of a request letter together with tender fee for **LKR 5,000/-** by way of Demand Draft drawn in favour of LANKA IOC PLC payable at COLOMBO.

LIOC shall not be responsible for any Postal / Courier delays if document is sought by post.

The tender documents can also be downloaded from our web site **www.lankaio.com** during the sale period. In such case, the tenderers must ensure that all the documents are downloaded and the responsibility of the same shall vest with the individual tenderer. Before downloading the tender documents from the website, the tenderer should register in the website by giving the correct name of the firm, address and all details as required. It shall be the responsibility of the tenderer to ensure that they register with the web site well in advance and download the documents before due date and time of close of sale. In case, the name and address in which the tenderers have registered at the website does not match with the name and address of in which they have quoted, their tender shall be rejected outright.

The tender documents downloaded are not transferable and can be used only by the registered tenderer who has downloaded the documents. Hence any tender submitted by the tenderers who have neither bought the tender nor downloaded the same shall be rejected outright. **In case, the tenders are downloaded, the tenderers are NOT required to submit the Tender Fee for LKR 5,000/- along with the Technical Bid documents.**

Tenders marked “Technical Bid with Commercial Terms without Price” shall be opened on due date and time mentioned in presence of Bidders at the above mentioned address. Lanka IOC PLC reserves the right to accept / reject any or all tenders without assigning any reason whatsoever.

Tenders received after the due date and time shall be rejected outright.

BID BOND:

Tenderers are requested to submit bid bond of **LKR 426,200.00** in the form of Demand Draft/ BG to be issued by any scheduled bank in Sri Lanka in favour of Lanka IOC (as per format attached with this tender). The BG towards bid bond to be issued by the banks should be valid for a period of 4 months (120 days) from the date of opening of technical/ commercial bids.

Tenders received without bid bond shall be rejected outright.

The bid bond of unsuccessful tenderers shall be returned after finalization of tender and after submission of original cash receipts by the tenderers. Bid bond of successful tenderer shall be returned upon finalization of tender and on acceptance of the PO placed by LIOC.

Tenderers may note that the bid bond shall be forfeited in case of following situations:

- Canvassing of information or submission of forged/ false documents/ information by tenderers.

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- Unilateral withdrawal or revision of the offer by the tenderer during the validity period of the offer.
- Backing out after placement of work order.

Bid bond shall not carry any interest.

Tenders marked “Technical Bid with Commercial Terms without Price” shall be opened on due date and time mentioned in presence of Bidders at the above mentioned address. Lanka IOC PLC reserves the right to accept / reject any or all tenders without assigning any reason whatsoever.

Tenders received after the due date and time shall be rejected outright.

PROCEDURE FOR SELECTION OF CONTRACTOR:

- A. **Pre-bid meeting:** Pre-bid meeting minutes shall form a part of this tender document.
- B. **Submission of Documents towards qualifying parameters:-** Tenderer will be required to fill in and enclose documents in support of qualifying parameters together with relevant documents as given in the Statement of Credentials sheet attached. OFFER OF THOSE TENDERERS NOT ENCLOSING ALL RELEVANT DOCUMENTS TOWARDS QUALIFYING PARAMETERS ARE LIABLE FOR REJECTION
- C. **Verification of Original Documents:-** Tenderers are required to report on the specified dates mentioned in the tender along with all original documents, copies of which have been submitted with the Technical Bid towards qualification. No separate communication will be issued to tenderers in this regard. The Bids of the Tenderers who do not report for verification of original documents on date mentioned may be summarily rejected.
- D. **Technical Qualification:-** Tenderer will be considered as technically qualified based on meeting qualifying parameters and after verification of original documents towards the same as stipulated above. In the event, document submitted by the tenderer is found to be forged or incorrect, such tenderer shall be rejected and bid bond submitted shall be forfeited immediately. Such tenderer is also liable to be put on Holiday List by IOC. Parties who have carried out the work on sub contract basis shall not be eligible to participating in the tender.
- E. **Price Bid Opening & Finalisation of parties:** Tenderers are required to quote fixed percentage above or below the rates given in the Price Schedule. Price Bid of only technically qualified parties shall be opened, after intimation to successful tenderers. Status of tenderers shall be arrived at based on the price quoted by individual tenderers and arranged from lowest bidder to highest bidder in terms of quotation. In case of identical rates received, parties having higher annual average turnover in the last 3 financial years ie as worked out for qualifying criteria shall get precedence.

The lowest acceptable rate with or without negotiation & accepted by Lanka IOC.

ACCEPTABLE RATES & AWARD OF CONTRACT:

The parties are required to quote their lowest percentage rate (+/-) which will be uniformly applicable on all the items of the attached Schedule of Rates (SOR).

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A merit list based on the quoted percentage rate of the bidders in ascending order shall be prepared to decide enlistment.

The **lowest acceptable rate** shall be offered to the parties serially as per the above merit list. The lowest acceptable rate shall be treated as the rate acceptable to Lanka IOC PLC taking into consideration abnormal quotes. In other words, abnormally low & high quotes can be rejected.

LIOC reserves the rights to negotiate with the tenderer. The tenderer shall confirm the negotiation within the stipulated time. If the tenderer fails to comply, LIOC reserves the right to reject the tender at their discretion.

The contract shall be finalized with **maximum of ONE (01) party**.

The Tenderers are advised to submit their offer strictly adhering to the terms and conditions and specifications contained in the Tender document and not to stipulate any deviations. Failure to do so will result in rejection of the Tender outright notwithstanding their status on quoted rates.

Canvassing of information or submission of forged or false documents / information by any Tenderer shall make their offer invalid. In addition, action shall also be taken by Lanka IOC PLC for forfeiture of bid bond as well as putting the Tenderer on Holiday list.

The successful tenderer will have to execute an agreement with LIOC PLC, covering all aspects to the contract, in the form prescribed, immediately before commencement of work. Intending tenders should acquaint themselves with provision of the agreement before sending the tenders.

Tenders should reach **ENGINEERING DEPARTMENT, LANKA LIOC PLC, LEVEL 20, WEST TOWER, WORLD TRADE CENTRE, ECHELON SQUARE, COLOMBO - 01 (SRI LANKA)** before due date and time mentioned above.

SENIOR VICE PRESIDENT (ENGG)

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FORM OF TENDER

NOTE: The Appendix forms parts of Tender; Tenderers are required to fill up all the blank spaces in this Tender Form and Appendix.

To: **Lanka IOC PLC**
20, West Tower,
World Trade Centre,
Echelon Square,
Colombo 01.

1. I/We, Of
the undersigned, having examined the Form of Agreement, the Conditions of Contract, Form of Tender, Drawings, Specifications, Priced Bills of Quantities and the Schedule of Rates and Prices, do hereby offer and undertake to execute, complete and maintain the whole of the said works referred to in the schedule of the Form of Agreement in conformity with the said Drawings, Specifications and all other work in connection therewith and incidental falls pertinent thereto, to your entire satisfaction and strict accordance with the Conditions of Contract, at the rate and prices set forth in the said Priced Bill of Quantities and/or Schedule of Rate and Prices at the amount given at the end of the Priced Bills Of quantities or such other sums as may be ascertained in accordance with the Conditions of Contract.
2. And, I/We do hereby undertake to commence the works within **Seven (07) days** from the last date of acceptance of this Tender, if any, or at the instance of the Engineer's order to commence, and to complete and deliver the whole of the works as aforesaid duration calculated from the last day of the aforesaid period in which works are to be commenced.
3. And further, I/We do hereby undertake to obtain the guarantee of a Bank with your approval, to be jointly and severally bound with us in a sum not exceeding ten percent (10%) of the aforementioned sum for the due performance of the contract under the terms of a Bond to be approved by you.
4. And I/We further agree, in the event of my/our failing to execute the said agreement or the said Bond, if required within **Fourteen (14) days** of my/our being called upon to do so, at the latest then any acceptance of this tender by you, may be revoked by you on behalf of the Employer and that I/We shall be held responsible for all and any damages suffered by the Employer in consequence of such delay or failure.
5. Unless and until the formal agreement is prepared and executed, I/We do hereby agree, that this tender together with your written acceptance thereof, shall constitute a binding contract between the two parties.
6. I/We understand that you are not bound to accept the lowest or any tender you may receive.
7. I/We further undertake to abide by this tender for a period of **Hundred Twenty (120) days** from the last date fixed for "receiving of tenders" and that the same shall remain binding upon me/us and may be accepted at any time before the expiration of such period.

In witness whereof, I/We do set my hand/our respective hands hereto at
on this Day of Two Thousand and sixteen.

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Signature of Tenderer

in the capacity of and/or duly authorised to sign

this tender for and on behalf of

Signature

Seal & Address

SIGNATURE OF TENDERER

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APPENDIX TO FORM OF TENDER
Clause

Amount of Bond Guarantee	10	LKR 1,552,200.00
Period of Completion from Work order	41	As Stipulated By LIOC
Amount of Liquidated damages	47 (1)	1% per week or part thereof
Limit of Liquidated damages	47 (1)	10% of the Work Order
Amount of bonus (if any)	47 (3)	None
Period of Maintenances	49	01 year
Percentage of adjustment of		
Provisional sums	59 (4) (c)	Ten (10) percent
Mobilization Advance	60 (1)	Nil
Percentage of Retention	60 (4) (a)	Nil
Time within which payment to be made after certificate	60 (7)	21 days

In witness whereof, I/We do set my hand/our respective hands hereto at

on this Day of Two Thousand and Sixteen.

Signature of Tenderer

in the capacity of and/or duly authorized to sign

this tender for and on behalf of

Signature

Seal & Address

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TRINCOMALEE****PUBLIC TENDER (TWO BID SYSTEM)****TECHNICAL BID/ COMMERCIAL BID ABSTRACT
(MUST BE FILLED BY THE TENDERER AND SUBMITTED ALONG WITH TECHNICAL BID)**

SN	DETAILS	IOC's REQUIREMENT	DETAILS FURNISHED BY TENDERER
1	Bid Bond	LKR 426,200.00	
2	a. Mode of bid bond b. Details of bid bond(DD/ BG no; date; Banker)	DD/ BG	
3	Value of similar works as per Notice Inviting Tender (Copies of Work order, Work completion certificate, Final bills to be enclosed).	As per NIT	
4	Average Annual Financial turnover	As per NIT	
5	List of clients with WO copies	To be enclosed	
6	Credentials	To be enclosed	
7	Validity of tender	120 Days from date of opening of Technical Bid	
8	Work Completion Period	90 Days	
9	Bio data of important persons of the firm	To be enclosed	
10	Type of firm (Company registration certificate)	To be furnished	
11	VAT registration number (VAT registration certificate)	To be furnished	
12	Tender documents have been signed on all pages with seal & submitted	To be confirmed	
13	Equipment questionnaire	Enclose list of equipment proposed to be deployed to site of works	
14	Experience questionnaire	To be furnished.	
15	Confirm that there are no deviations from tender conditions	To be confirmed	
16	Confirm that bid bind instrument is enclosed in technical bid cover	To be confirmed	
17	Confirm that the Price bid does not contain any condition	To be confirmed.	
18	Confirm that the rates have been expressed in both figures and words in the price bid.	To be confirmed.	
19	Mobilization advance	NOT APPLICABLE	
20	Any other relevant information	To be furnished.	

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* Please write `Confirmed' after ensuring that all requirements as above are complied.

SIGNATURE OF TENDERER:

SEAL & DATE

ADDRESS

SIGNATURE OF TENDERER

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ABBREVIATIONS & NOTATIONS

**UNLESS OTHERWISE SPECIFIED FOLLOWING NOTATIONS/ ABBREVIATIONS SHALL BE APPLICABLE
TO DOCUMENT**

MM/mm	- MILLIMETER
SQMM/sqmm/mm ²	- SQUARE MILLIMETER
CM/cm	- CENTIMETER
SQCM/Sqcm	- SQUARE CENTIMETER
SFT/sft	- SQUARE FEET
M/m/rm/RM	- METRE / RUNNING METRE
SQM/sqm/m ²	- SQUARE METRE
CUM/cum/m ³	- CUBIC METRE
KG/kg	- KILOGRAM
MT	- METRIC TONNE
MS	- MILD STEEL
DIA/dia/Φ	- DIAMETER
NO (S) / Nos. / nos.	- NUMBER(S)
RCC	- REINFORCED CEMENT CONCRETE
E-I-C	- ENGINEER - IN - CHARGE
IS/BIS	- INDIAN STANDARD
API	- AMERICAN PETROLEUM INSTITUTE
JOB	- JOB LUMP SUM
EMD	- EARNEST MONEY DEPOSIT
ISD	- INITIAL SECURITY DEPOSIT
BG	- BANK GUARANTEE
CRVT	- CONE ROOF VERTICAL TANK
FRVT	- FLOATING ROOF VERTICAL TANK

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LIST OF DOCUMENTS REQUIRED IN SUPPORT OF QUALIFYING NORMS

ALL REQUIRED DOCUMENTS ARE TO BE SUBMITTED ONLY WITH TECHNICAL/ COMMERCIAL BID.

NO OTHER EXTRA DOCUMENTS SHOULD BE ATTACHED WITH THE TECHNICAL/ COMMERCIAL BID & NO DOCUMENTS/CONDITIONS SHOULD BE ATTACHED WITH THE PRICE BID. IOC RESERVES THE RIGHT FOR OUTRIGHT REJECTION OF CONDITIONAL BIDS.

NON-SUBMISSION OF ALL REQUIRED DOCUMENTS OR INCOMPLETE SUBMISSION OF ANY DOCUMENTS MAY RESULT IN REJECTION OF THE TENDER.

1. ESSENTIAL DOCUMENTS:

- a. BID BOND instrument in original with Technical bid.
- b. Tender fee instrument in original.

Following essential documents **MUST** be attached with the Technical/ Commercial Bid for consideration of the offer (In the absence of these documents, the tender is liable for rejection).

- a) Copy of Balance Sheets including PROFIT & LOSS statements of the previous three consecutive financial years 2013-14; 2014-15 & 2015-16. The turnover by way of contract receipts/ sales as per audited accounts, submitted by the tenderer shall be the basis for further evaluation, wherever required.
- b) Copy of Work Order(s) (indicating items of work) and Call up Orders (In case of rate contracts) in support of Qualifying Work Order(s) value as per qualifying parameters, completion certificate, copies of final bills duly signed & accepted by the client, cheques received for payment & bank statement etc to prove completion and value of works as per NIT.
- c) Copy of VAT Registration certificate.

2. OTHER DOCUMENTS/ INFORMATION: Copies of the following documents should also be attached with the Technical/ Commercial Bid.

- i. Certificate of Incorporation in case of Company
- ii. Power of Attorney in favour of the person signing the documents.
- iii. Registration Certificate in case of Public/ Private Limited Company OR Partnership Deed in case of Partnership Firms as applicable.
- iv. An affidavit that party is not black/holiday listed in enclosed Proforma.

The tender shall stand summarily rejected inter-alia on following grounds:

- i. Name and address of tenderer not matching with the name and address in which the tender documents are downloaded from LIOC web site.
- ii. Tenderer not meeting tender qualifying norms.
- iii. Non-withdrawal of any conditions imposed in tender document & conditions imposed during negotiations post Price Bid opening.
- iv. Tenderer submitting fabricated/false/ forged documents along with tender documents.

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v. Party not submitting bid bond.

The details of Tender Fee/ BID BOND payments should be filled in the format given in the tender.
The bank instruments must be enclosed in original along with this TECHNICAL BID only.

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PARTICULARS OF TENDER FEE

DEMAND DRAFT NO:

DATED.....

ON BANK.....

FOR LKR.5,000/- (BY WAY OF DEMAND DRAFT PAYABLE AT COLOMBO).

PARTICULARS OF BID BOND

DEMAND DRAFT NO:

DATED.....

ON BANK.....

FOR LKR. 426,200/- (BY WAY OF DEMAND DRAFT PAYABLE AT COLOMBO).

OR

BANK GARNATEE NO:

DATED.....

ON BANK.....

FOR LKR. 426,200/- BG (AS PER FORMAT ENCLOSED).

The bid bond shall be valid for a period of (4 months) 120 days from the date of opening of
technical/ commercial bids.

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1. Bidders are advised to submit the following data with relevant certified supporting documents (photocopies). Incomplete tenders may be rejected and Price Bid shall not be opened.

General Information

1	Name of the Company *	
2	Address	
3	Name of the Contact person	
4	Nature of Organization (i.e proprietorship/ partnership/ Pvt Ltd/ etc) *	
5	VAT Registration (i.e Copy of VAT registration issued by inland revenue) *	
6	Telephone / Fax/ Email	
7	Registration with Govt./ any organization *	
8	Any other details	

- Please attach photocopy of relevant documents(Mandatory).
2. Interested Party should have an average annual Financial Turnover as mentioned in the NIT or above in the last 3 financial years ending 31st March 2015.

Financial Year	Turn Over (LKR)	Remarks
2015 - 2016		Photocopy of audited balance sheet to be submitted. (Mandatory)
2014 - 2015		
2013 - 2014		

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Note: In case of non-submission of balance sheet for any particular FY, the same shall be considered as ZERO for computation of avg. Turn Over.

3. Interested contractors should have successfully completed similar work as mentioned in the NIT.

Name of the Client	Name of the Work	Work Order Details	Value of completed works	Date of completion	Remarks
					Photocopies of Purchase Order / Bill Copy & Payment receipt and/ or Work Completion Certificate (including value of work completed) issued by Client to be submitted. (Mandatory)

* Please attach separate sheets duly typed incorporating above information

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UNDERTAKING TOWARDS DOCUMENTS SUBMISSION

We confirm that we have quoted the rates in this tender considering Inter-alia the:

1. Notice Inviting Tender
2. Price Bid document
3. Special Terms and Conditions of Contract
4. Technical Specifications & Scope Of Services
5. Terms & Condition - Safety
6. Form Of Agreement
7. Conditions of contract (Part I & Part II)
8. Statement of Credentials
9. All other documents forming part of tender

We certify that, we have received the complete Tender Documents as mentioned and have studied the same thoroughly before submitting the Bid. We accept all the terms & conditions specified therein.

Signature of the Tenderer/ Authorized Representative

Name & Address: _____

Seal: _____

Telephone Nos.: _____

Date:

Place:

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**DECLARATION FOR DOWNLOADING DOCUMENTS FROM WEBSITE
(To be submitted by tenderers downloading documents from Website)
(To be signed by Power Of Attorney holders)**

I/We hereby declare that:

I/ We have downloaded the documents pertaining to the subject tender from www.lankaio.com containing all attachments including the drawings forming part of tender.

I/ We have submitted printout of all the above documents along with the tender and have not altered the tender documents.

I/ We understand that it is our responsibility to download all the above documents and submit printout of the same before due date & time of closing of Tender. I/ We also hereby undertake to confirm that our bid shall not be considered by the LIOC in case all the documents forming part of the tender hosted on the website are not submitted by us.

Name:

Address:

Date:

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PROFORMA OF DECLARATIONS TO BE FURNISHED BY THE TENDERERS

DECLARATION - 'A'

We declare that we have complied with the Conditions of Contract (Part I & II)

Date :

Place :

**Tenderer's signature
Seal**

DECLARATION - 'B'

We declare that we do not have any employee who is related to any officer of LIOC PLC

OR

We have the following employees working with us who are near relatives of the Officer Director of LIOC

Name of the employee of the Tenderer	Name & designation of the Officer of LIOC

Date :

Place :

**Tenderer's Signature
Seal**

DECLARATION - 'C'

The Tenderer is required to state whether he is a relative of any Director of LIOC or the Tenderer is a firm in which any Director of LIOC or his relative is a partner or any other partners of such a firm or alternately the Tenderer is a private company in which Director of LIOC is a member or Director.

S/N	PARTICULARS	DETAILS
1	Name of the Tenderer and his relations with the Director in LIOC.	
2	Name of the Director of LIOC who is related to the Tenderer.	
3	Name of the Director of LIOC who is a member or a Director of the firm.	

Date :

Place :

**Tenderer's
Signature & Seal**

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DECLARATION - 'D'

Tenderer is required to state whether they have employed any retired Director and above rank officer of LIOC in their firm. If so, details hereunder to be submitted.

S/N	PARTICULARS	DETAILS
1	Name of the person	
2	Post last held in LIOC	
3	Date of retirement	
4	Date of employment in the firm	

Date :
Place :

**Tenderer's
Signature & Seal**

N.B.

- A separate sheet may be attached, if the above is not sufficient.
- Strike out whichever is not applicable. If the tenderer employs any person subsequent to signing the above declaration and the employee/s so appointed happens to be the near relatives of the Officer/Director of LIOC, the tenderer should submit another declaration furnishing the name/s of such employee/s who is/are related to the officer/s of LIOC
- List of Directors of LIOC board is attached.

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LIST OF DIRECTORS OF LANKA IOC PLC

SN	NAME OF THE DIRECTORS & ADDRESS
01	Mr. B S Cant , Chairman LIOC, Director (Marketing) Indian Oil Corporation Limited, Indian Oil Bhavan, G-9, Ali Yavar Jung Marg, Bandra (East), <u>Mumbai (India) - 400 051.</u>
02	Mr. P M Mohan , Director LIOC, ED (Pricing), Indian Oil Corporation Limited, (Marketing Division), Indian Oil Bhavan, G-9, Ali Yavar Jung Marg, Bandra (East), <u>Mumbai (India) - 400 051.</u>
03	Mr. D K Sharma , Director/ LIOC, ED (Retail Sales) Indian Oil Corporation Limited, (Marketing Division), Indian Oil Bhavan, G-9, Ali Yavar Jung Marg, Bandra (East), <u>Mumbai (India) - 400 051.</u>
04	Mr. Shyam Bohra , Managing Director, LIOC, 20 th Floor, West Tower, World Trade centre, Colombo - 01
05	Prof. Lakshman R. Watawala , Director, Lanka IOC PLC, No: 102/ 5, Barnes Place, Colombo - 07
06	Mr. Amitha Goonaratne , Director, Lanka IOC PLC, No 110, Noris Canal Road, Colombo -0 10, Sri Lanka.

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PROFORMA OF DECLARATION OF BLACK LISTING/ HOLIDAY LISTING

**(FORMAT TO BE TYPED ON TENDERERS' LETTERHEAD AND SUBMITTED ALONG WITH
TECHNICAL BID DOCUMENTS WITH SIGNATURE AND STAMP)**

In the case of a Proprietary Concern:

I hereby declare that neither I in my personal name or in the name of my Proprietary concern M/s. _____ which is submitting the accompanying Bid/Tender nor any other concern in which I am proprietor nor any partnership firm in which I am involved as a Managing Partner have been placed on black list or holiday list declared by except as indicated below :

(Here give particulars of blacklisting or holiday listing, and in absence thereof state "NIL")

In the case of a Partnership Firm :

We hereby declare that neither we, M/s. _____, submitting the accompanying Bid/Tender nor any partner involved in the management of the said firm either in his individual capacity or as proprietor or managing partner of any firm or concern have or has been placed on blacklist or holiday list declared by LIOC except as indicated below :

(Here give particulars of blacklisting or holiday listing and in the absence thereof state "NIL")

In the case of Company:

We hereby declare that we have not been placed on any holiday list or black list declared by LIOC except as indicated below :

(Here give particulars of black listing or holiday listing and in the absence thereof state "NIL")

It is understood that if this declaration is found to be false in any particular, LIOC shall have the right to reject my/our bid, and if the bid has resulted in a contract, the contract is liable to be terminated.

Place :

Signature of Bidder:

Date :

Name of Signatory:

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SPECIAL TERMS & CONDITIONS OF CONTRACT

1.0 SECURITY DEPOSIT/ PERFORMANCE BOND:

- 1.1 As per relevant clauses of Conditions of Contract, the successful tenderer shall pay security deposit up on placement of work order in any of the following modes.

A. INITIAL SECURITY DEPOSIT:

The successful tenderer within 14 days of receipt of acceptance of tender issued by owner shall deposit initial security deposit for an amount of 10% of the contract value in any of the following modes.

- a. Demand draft drawn in favour of LANK IOC PLC payable at Colombo.

OR

- b. Bank Guarantee (as per the format enclosed) valid for a period of 16 months to be submitted prior to commencement of works. The BG shall be subsequently extended for a period to cover 12 months from the date of completion of the work. This BG shall be submitted directly by the bankers under their covering letter to the office of LIOC in a sealed cover.

- 1.2 Forfeiture of Security Deposit: All sums of compensation or other sums of money payable by the Contractor may be deducted from SD. In the event of SD being reduced from the original quantum due to recoveries as aforesaid the contractor shall within 15 days of such recoveries, make good deficiency in SD either by cash or by way of Demand Draft.

- 2.0 The contractor shall arrange all necessary power and water for the whole of the works mentioned in the Schedule of works. The Contractor shall have to make his own arrangement for laying cable/pipeline from the existing sources in the Terminal. Only flameproof cable and fittings of LIOC approved makes shall be allowed for tapping the power. Contractor should install approved metering device at their cost and prevailing rates shall apply for the quantity of power & water consumed.

- 3.0 Entire works should be carried out as per LIOC specifications, drawings and instructions at site. Any omissions / Deviations without LIOC approval in writing will result in rejection of contractor's claim payment.

- 4.0 All materials supplied by the contractor shall be of best quality and shall be approved by LIOC Engineer before use. All necessary test certificates shall be provided by the contractor.

- 5.0 Wherever supplies of materials are in the scope of Contractor, the same could be supplied only after obtaining written permission from LIOC Engineer.

- 6.0 The rates quoted shall be inclusive of all taxes and duties as applicable and no separate payment shall be made in this regard.

- 7.0 LIOC reserves the right to accept or reject in part or whole, any or all tenders without assigning any of the reason to it. Also LIOC reserves the right not to accept the lowest quotation and no query from the contractor will be entertained in these regards.

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LIOC shall provide water required for pressure testing of the existing pipelines. It shall be the responsibility of the contractor to provide necessary arrangements for drawing water.

9.0 POWER SUPPLY:

LIOC shall provide power required for welding/ grinding of the existing pipelines. It shall be the responsibility of the contractor to provide necessary arrangements for drawing power.

The electrical works shall be carried out through Licensed Electrical personnel only.

10.0 CONTRACTOR'S SCOPE OF SUPPLY:

10.1 All materials including cement, sand, bricks, reinforcement, structural steel, consumables, testing appliances, tools and tackles necessary for completing the work shall be procured & supplied by the Contractor at his own cost unless otherwise specified in the schedule. No claim/ delay on this account will be entertained by the LIOC.

10.2 LIOC reserves the right in selection of best make of materials to be procured by the contractors & contractor shall procure the same only up on the approval by site in charge.

11.0 FIRM PRICE:

Once the offer is accepted and agreement executed, the rates shall be valid till the completion of works in all respects and no escalation whatsoever will be entertained on any grounds. The rate quoted to include all taxes and duties including NBT as applicable & no variation or reimbursement shall be entertained due to revisions in statutory tax or levies imposed by the Government of Sri Lanka. **VAT alone if payable shall be to LIOC account.**

12.0 MEASUREMENTS FOR WORKS/RECORD MEASUREMENTS/ BILLS:

12.1 All the payment for quantities certified in the running account/ final bill shall be as per the details recorded in the standard measurement book of the LIOC and jointly signed by the Contractor/ site engineer of IOC.

12.2 Method of measurement shall be strictly in accordance with the technical specification for this work.

12.3 The payment shall be as per the details entered in the standard Measurement Certificate bills of the LIOC.

13.0 ON ACCOUNT PAYMENTS:

On Account Bills shall be paid for the work done, measured and certified.

14.0 PAYMENT TERMS:

Measure and pay as per works completed. Upto 95% in running bills.

No advance payment shall be made to any contractor.

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15.0 The rates include all leads & lift unless and otherwise specified & cost of all material labour, taxes, transport charges on materials at all levels, and overhead expenditure.

16.0 In case of any variation between the clauses stipulated in the special terms and those stipulated in general terms, works contract etc., the stipulations in the special terms and conditions shall take precedence.

17.0 LIQUIDATED DAMAGES FOR DELAY IN COMPLETION OF WORKS:

The contractual price payable shall be subject to adjustment by way of liquidated damages at the rate of 1% of order value per week subject to a total of 10% of the order value.

18.0 SPECIAL CLAUSE:

The contractor is required to take necessary care to protect to the existing nearby structure while carrying out his scope of work. Any damage caused to other property shall be rectified at his own cost.

19.0 GUARANTEE:

All equipment including components and sub-contracted items should be guaranteed by the Vendor within the defect liability period mentioned in the tender. In the event of any defect in the equipment or workmanship manifesting themselves, the tenderer will replace/ repair the equipment at Vendor's cost and risk on due notice, failing which the rejected equipment will be sent to the Vendor on Freight To Pay basis for free replacement.

The equipment after rectification of defects will be dispatched by the Vendor on 'Freight Paid' basis. Alternatively, IOC reserves the right to have the equipment repaired/ replaced at the locations concerned at the Vendor's risk, cost and responsibility.

20.0 TESTING OF MATERIALS/ WORKS:

20.1 The Contractor shall carry out the various tests as enumerated in the technical specifications of this tender document and the technical documents that will be furnished to him during the performance of the work and no separate payment shall be made unless otherwise specified in schedule of rates.

20.2 All the tests either on the field or at outside laboratories concerning the execution of the work and supply of materials by the Contractor shall be carried out by Contractor at his own cost.

20.3 The work is subject to inspection at all times by the Site Engineer/ Engineer-in-Charge/ representatives nominated by LIOC. The Contractor shall carry out all instructions given during inspection and shall ensure that the work is being carried out according to the technical documents and the relevant codes of practice furnished to him during the performance of the work.

20.4 Any work not conforming to the execution drawings, specifications or codes shall be rejected forthwith and the contractor shall carry out the rectifications at his own cost.

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- 20.5 All results of inspection & tests will be recorded in the inspection reports, proforma, which will be approved by the Site Engineer/ Engineer-in-Charge. These reports shall form part of the completion documents.
- 20.6 Inspection & acceptance of works shall not absolve the Contractor from any of his responsibilities under this Contract.
- 21.0 **BILL OF QUANTITIES:**
- 21.1 Bill of quantities are approximate and payment shall be made as per actual certified measurements. The contractor is not entitled for any sort of compensation towards excess materials procured / stored.
- 21.2 After the placement of the order the successful tenderer shall not be allowed to sublet or assign any part of the work order without LIOC's prior written consent.
- 21.3 The tender will be considered as a whole for both all items put together as per the price schedule enclosed.
- 22.0 **AUTHORISED REPRESENTATIVE:**
- 22.1 The successful tenderer within 10 days of receipt of acceptance of tender, name an engineer responsible for the job at site on behalf of the contractor. Bidder should give in writing to the LIOC, the name of his authorised and qualified engineer who will supervise the work and shall remain at the site during execution of the job.
- 23.0 **SITE CLEANING:**
- 23.1 The Contractor shall take care for cleaning the working site from time to time for easy access to work site and also from safety point of view.
- 23.2 Working site should be always kept cleared upto the entire satisfaction of the Engineer-in-Charge. Before handing over any work to owner the contractor in addition to other formalities to be observed as detailed in the document,- shall clear the site to the entire satisfaction of Engineer-in-Charge.
- 24.0 **MISCELLANEOUS REQUIREMENTS:**
- 24.1 It shall be contractor's responsibility to obtain approval for any revision and/or modifications decided by the contractor from the Owner/Engineer-in-Charge before implementation. Also such revisions and/or modification if accepted / approved by the Owner/Engineer-in-Charge shall be carried out at no extra cost to the owner.
- 24.2 Any changes required during and/or after approval for detailed construction drawings due to functional requirements or for efficient running of system keeping the basic parameters unchanged and which has not been indicated by the Contractor in the data / drawings furnished along with the offer, will be carried out by the contractor at no extra cost to the owner.
- 24.3 All expenses towards mobilization & demobilization including bringing in equipment, clearing the site etc. shall be deemed to be included in the prices quoted and no separate payments on account of such expenses shall be entertained.

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- 24.4 It shall be entirely Contractor's responsibility to provide, operate & maintain necessary construction equipments, scaffoldings and safety gadgets, cranes and other lifting tackles, tools and appliances to perform the work in a workman like and efficient manner & complete all jobs as per time schedules.
- 24.5 Preparing approaches and working area for movement and operation of the cranes, levelling the areas for assembly and erection shall also be the responsibility of the Contractor. The Contractor shall acquaint himself with access availability, facilities such as railway siding, local labour etc. to provide suitable allowances in his quotation. The Contractor, at his own cost, may have to build temporary access roads to aid his own work which shall also be taken care while quoting for the work
- 24.6 The procurement and supply in sequence and at the appropriate time of all materials & consumables shall be entirely the Contractor's responsibility. Rates for execution of work will be inclusive of supply of all these items.

25.0 SAFETY:

Since works have to be carried out in petroleum storage and distribution establishment, the contractor should ensure that day to day operations, safety and security of the location are not affected in any way on account of the works being carried out. In case of any damage to our properties due to the negligence on the part of the contractor or their workmen, the contractor will be held responsible and liquidated damages as assessed by the LIOC would be recover from them.

When hot works are involved, the following safety precautions have to be strictly observed before commencement of works.

- All hot works operations should be carried out under the supervision of our representative and also under the supervision of responsible representative of the contractor.
- All hot work operations should be undertaken only after issue of hot work permits by the location in charge on day to day basis.
- It should be ensured that the tanks, pipes, containers where the hot work is required are gas freed and properly checked to this effect with explosive meters.
- It should be ensured that the surrounding area is free from oil, rags, oil spillage and other sources of ignition and the area is cleaned/ sprinkled with sand or dry earth. It should also be ensured that metallic trays filled with DCP powder are kept for collecting the welding arc/ hot metal cutting.
- Hot work should commence only after positioning the portable fire extinguishers and sand/ dry powder in readiness at site and hydrant system made available at the nearest point.
- Match boxes, lighters etc used for hot work should be kept in the custody of the supervisor only.

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- If hot work has to be carried out in a place close to storage tanks or any other facility under operation, it is necessary to provide screen wall made of AC sheets to segregate the area to prevent sparks traveling to the hazardous area.
- It should be ensured that no workmen carries match boxes or any other source of ignition with them while entering the premises or inside the premises. After the hot work operation of the day, the following precaution should be taken.
 - Welding sets should be switched off and power mains disconnected. If the connection is taken from a temporary switch board the fuse carriers should be removed and handed over to the supervisor.
 - Gas cylinder and the cutting sets should be properly closed and the equipment removed to a safe place.
 - The site of work should be examined to ensure that it is free from hot splatters and any other source of ignition.
 - All the work men of the contractors should be moved out of the premises.

26.0 SAFETY PRECAUTIONS & HOT WORK:

- 26.1 Contractor shall have to take all safety precaution for carrying out hot work in the premises after obtaining hot work permit from location in charge at his own cost as directed by the Engineer-In-Charge. Necessary safety equipment such as safety belts, helmets and other equipments are to be positioned by the contractor and use as per requirement.
- 26.2 Any casualty or damage caused to property or person by any untoward incidents while executing this contract will be at the contractor's risk and cost.
- 26.4 The contractor shall also abide by hot work permits to be taken on day to day basis from the location as per policy of the LIOC.
- 26.5 The successful tenderer shall be responsible for observance of all conditions as per Appendix III furnished along with GCC with regard to safety.
- 27.0 The tenderers are advised to submit their offer strictly as per the terms and conditions and specifications contained in the tender document and not put forth conditions/ counter conditions. Conditional tenders received subsequent to the pre bid meeting tenders shall render the offer liable for rejection.
- 28.0 Tenderers to note that the rates quoted for items contained in the price schedule shall be inclusive of all the works involved for according all assistance to the LIOC for commissioning the system. It may be noted that commissioning assistance shall be limited to supply of all labour, stud bolts, nuts, washers, gaskets which give way during commissioning.

29.0 MATERIAL WITHOUT APPROVAL

- 29.1 Any material brought without prior written approval, shall be entirely at the risk and cost of the Contractors.
- 29.2 If contractor brings defective/substandard materials at site it shall be the responsibility of the contractor for the removal and disposal of the same at his cost. LIOC shall not

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entertain any claim for the contractor in this account in case the contractor fails to remove such materials within 15 days after notice in writing to the contractor LIOC reserves the right to dispose such materials at the entire risk and the cost of the contractor.

- 29.3 Work order quantities are approx. and payment shall be made only as per actual measurements. The contractor is not entitled for any sort of compensation towards materials procured /stored in excess of the measured quantity, if any.
- 29.4 Excess quantities over that mentioned in work order or extra item or deviation in work order should not be carried out by the contractor unless he has been asked to do so in writing and if carried out without such written approval the same will be at risk and cost of the contractor.
- 29.5 Detailed measurements of works carried out shall be taken jointly by the contractor and LIOC representative at every stage of work before proceeding to next stage
- 29.6 The entire works shall be carried out under the supervision of the authorized representative of LIOC.
- 30.0 While carrying out the work, extreme care should be taken to ensure the safety of the personnel engaged by the contractor for the work and the men working with other contractor and LIOC personnel. Contractor shall obtain required License from the Labor officer if required as per law before starting the work.
- 31.0 LIOC reserves the right to operate or not to operate any items mentioned in the schedule.
- 32.0 Any additional items of work that become necessary during the course of execution shall be authorized and approved for full details of the work by LIOC representative before execution of the same.
- 33.0 LIOC reserves right to have the choice of the best material which are in the contractor's scope of supply.

**SR. VICE PRESIDENT (ENGG.)
LANKA IOC PLC,**

I / We confirm that I / We have gone through the above conditions carefully and agree to abide by the same

Signature of Tenderer:

Name:

Title:

Address:

Date & Seal:

SIGNATURE OF TENDERER

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TERMS & CONDITIONS - SAFETY

Since the works have to be carried out in Petroleum storage and distribution establishment, the contractors should ensure that day to day operations, safety & security of the location are not affected in any way on the account of the work being carried out. In case of any damage to LIOC properties due to negligence on the part of the contractor or their workmen, the contractor will be held responsible and liquidated damages as asserted by the corporation would be recovered from them.

For all cold works and hot works involved at site, following safety precautions have to be strictly observed before commencement of hot works.

- a. All hot works should be carried out under the supervision of LIOC representative and also under the supervision of a responsible representative of the contractor.
- b. All hot work operations should be undertaken only after issue of hot work permit by Site Engineer on a day to day basis.
- c. It should be ensured that the tanks, containers, pipelines etc. where hot work is required are gas free and properly checked to this effect with explosive meters.
- d. It should be ensured that surrounding area is free of oil rags, spillages and other sources of ignition and the area cleaned and sprinkled with dry sand / earth. It should also be ensured that metallic trays filled with DCP are kept for collecting the welding arc / hot metal cutting.
- e. Hot work should commence only after positioning the portable fire extinguishers and sand / dry powder in readiness at site and hydrant system made available at the nearest point.
- f. Match boxes, lighters etc. used for hot work should be kept in the custody of supervisor.
- g. If hot work has to be carried out in a place close to storage tanks or any other facility under operation, it is necessary to provide a screen wall made of AC sheets to segregate the area to prevent the sparks traveling to the hazardous area.
- h. It should be ensured that no workmen carry matchboxes or any other source of ignition with them while entering the premises or inside the premises. After the hot work operation of the day, the following precautions should be taken.
 - Welding sets should be switched off and the power mains disconnected. If the connection is taken from temporary switchboard, the fuse carriers should be removed and handed over to the supervisor.
 - Gas cylinders and cutting sets should be properly closed and the equipment removed to a safe place.
 - The site of work should be examined to ensure that it is free from hot splatters and any other source of ignition.
 - All the workmen of the contractor should be moved out of the premises.

Note: Successful tenderer to strictly follow the instruction of Fire department of the terminal including instructions being given from time to time by the terminal personnel in order to ensure safety at all points of time throughout the execution of works.

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TECHNICAL SPECIFICATIONS

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SPECIFICATIONS FOR CIVIL WORKS

SPECIFICATION FOR EARTHWORK

SCOPE

This specification covers the general requirements of earth work in excavation in different materials, backfilling, filling, site grading and disposal of material for Petroleum Terminal Projects of Indian Oil LIOC Limited.

GENERAL

This specification shall be read in conjunction with relevant drawings, schedule of works. Work Specifications, Material specifications, Drawings and specifications given in BOQ are complimentary to each other, and in case of ambiguity between them, the most stringent of them shall be adopted.

DEFINITION OF THE TERMS

Fill : shall mean earth, sand, stabilized aggregate, murram or other material specified to bring the existing or excavated grade to proposed grade.

Backfill : shall mean earth, sand, stabilized aggregate, murram or other material specified to replace earth or rock removed during construction.

It is understood that the Contractor has full knowledge of actual site conditions and that they will deploy such methods of excavation as may be found suitable for actual site conditions from time to time. Further, the resources deployed shall be sufficient for completing the job in time and as directed by the Engineer.

Roads whether of temporary or other nature, required to be constructed for access and for movement of men, equipment, transport vehicles, vehicles carrying fill material, etc. to or over borrow areas &/or over areas on which fill has to be deposited shall be constructed by Contractor at his cost. Such access roads shall be maintained in good condition during all seasons to ensure completion of work according to time schedule.

All good, silver, oil, minerals, a archeological and other findings of importance, trees cut or other materials of any description & all precious stones, coins, treasures, relics antiquities and other similar things which may be found in or upon the site shall be the property of Owner and Contractor shall duly preserve the same to the satisfaction of Owner and from time to time delivery the same to such person or persons as Owner may from time to time authorise or appoint to receive the same.

EXCAVATION

All excavation work shall be carried out by mechanical equipment unless, in the opinion of Engineer, the work involved and time schedule permit manual work.

Excavation for permanent work shall be taken out to such widths, lengths, depths and profiles as are shown on the drawings or such other lines and grades as may be specified by Engineer.

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The excavation shall be done to correct lines and levels. This shall also include, where required, proper shoring to maintain excavations and also the furnishings, erecting and maintaining of substantial barricades around excavated areas & warning lamps at night for ensuring safety. Proper temporary drainage shall be provided by Contractor at his cost before starting any earthwork.

All excavations shall be neatly cut to lines, curves, slopes and grades shown in the drawings to be provided to the contractor or as directed by the Engineer. Where excavations are made in excess of the limits delineated on the drawings either by error or by accident, the extra excavation shall be made good at contractor's cost by refilling to the proper grade by thoroughly compacted suitable fill or by PCC 1:4:8 where it is meant for foundations.

If there is any stone in the excavated materials, suitable for rubble packing, road metal or for masonry, it shall be separated and stacked as directed by Engineer.

The contractor shall provide, maintain and operate pumping equipment of required capacity and keep the area of construction free of water, particularly during concreting.

General excavation will include excavation in ordinary soil, road metal, made-up ground, clays, soft murram, small boulders, sandy soil and other materials not requiring the use of explosive or iron wedges or chisels.

All water from any source whatsoever getting accumulated in excavated area, trenches etc. shall be properly diverted in an approved manner or pumped so that areas are kept free of water.

The material obtained from excavation, which is not considered suitable for filling operations shall be disposed-off by the contractor outside the boundary limits of boundary of the Owners plot to a non-objectionable place. If such disposal involves payment of any royalty to the Municipal LIOC or any other authority or any private party, the same shall be to the contractor's account.

All excavation shall be kept free of water and slush. Grading in the vicinity of excavations shall be controlled to prevent surface water running into excavated areas. The contractor shall remove by pumping or other means approved by Engineer, any waste inclusive of rainwater and sub-soil water accumulated in excavation and keep the trench dewatered until the construction of foundation structure and backfilling are complete in all respects. Sumps made for dewatering must be kept clear of foundations. Methods of pumping should be approved by the Engineer.

It shall be contractor's responsibility to take all necessary steps to prevent the sides of trenches and pits from collapsing. Type of timber shoring done for this purpose and the wood used will be as per Engineer's approval. In case where the soil is soft and loose, the boards shall be placed horizontally against the sides of the excavation and supported by vertical, which shall be strutted to similar timber pieces on the opposite face of the trench or pit. The lowest board supporting the sides shall be taken into the ground. No portion of the vertical side of the trench or pit shall remain exposed so that earth is not able to slip out. Withdrawal of the timber shall be done very carefully to prevent the collapse of the pit or trench. It shall be started at one end and proceeded systematically to the other end. Concrete or masonry shall not be damaged during the removal of the timber. No claim shall be entertained if the timber cannot be removed and is lost or buried.

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FILLING: Filling shall be permitted after removing vegetation, trees, roots etc. and after excavating up to specified level. Approved soil fill consisting of ordinary soil, murrum, etc. shall be deposited in layers not exceeding 250mm and unless otherwise stated, every layer shall be power rolled with 8-10 tone vibro roller or manually where roller is not accessible due to undulations or obstructions as directed by Engineer to achieve 95% of the maximum dry density (Proctor Density).

Contractor should ensure that all clods of earth are broken down to a size not larger than 100mm.

To ensure that the fill has been compacted as specified, field & laboratory tests shall be carried out by Contractor at his cost. Field compaction test shall be carried out at different stages of filling and also after the fill to the entire height has been completed.

Contractor shall protect the earth fill from being washed away by rain or damaged in any other way. Should any slip occur, Contractor shall remove the affected material and make good the slip at his cost.

The fill shall be carried out to such dimensions and levels as indicated on the drawings after the stipulated compaction. The fill will be considered as incomplete if the desired compaction has not been obtained.

BACK FILLING: The material used for back filling shall be free from lumps and clods, roots and vegetation, organic material etc. Backfill material will be obtained from nearby area where excavation has been done or from approved borrow.

FILLING IN DISPOSAL AREA

Surplus material from excavation, which is not required for back filling, shall be disposed off in designated disposal areas. The spoils shall not be dumped haphazardly but should be spread in layers approx. 250mm thickness in loose, and compacted as directed.

In certain cases, the Engineer may direct disposal without compaction which can be done by tipping the spoils from a high bench neatly maintaining always a proper level and grade of the bench.

LEAD: Lead for deposition/disposal of excavated material and for bringing in the murrum for filling shall be determined by the contractor before submitting bid for the job by actually visiting site and ascertaining facts.

No extra compensation will be admissible on the grounds if the actual lead happens to be more than what the contractor had anticipated or assumed.

Owner shall in no way be responsible for making any payment to the Contractor or to the agencies/authorities connected with disposal of excavated material or with borrows for bringing the filling material.

MODE OF MEASUREMENT & PAYMENT: Earthwork in excavation for all works shall be measured and paid for as per plan area (PCC Line) marked in approved drawing and the actual approved depth of excavation done and the rate shall be inclusive of back filling, disposal of surplus excavated material, dewatering, shoring, backfilling additional excavated area if required, with approved fill material.

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SPECIFICATION FOR CONCRETE WORK

SCOPE: This specification covers the requirements for general use of Plain Cement Concrete work and shall include incidental items of work not shown or specified but reasonably implied or necessary for completion of the work.

GENERAL: All embedded items, buried and cables should be inspected and approved before concrete is placed in position. It shall be the responsibility of the contractor to see that all embedded and buried item remain in proper position while concreting is being done.

MATERIALS : Specifications for materials used in PCC work shall be as per ‘Specification for Civil Work Material’ enclosed with this tender. In particular, the following :

- Coarse aggregate shall of size not more than 40 mm or as specified.
- Sand (fine aggregate) shall pass through IS Sieve No. 480 test sieve leaving a residue not more than 5%.

SHUTTERING : The contractor shall be entirely responsible for the sufficiency and efficiency of the shuttering and for the safe removal of the same. The shuttering shall be designed and arranged so that it will not settle or deflect under the load of concrete placed and workmen and can be removed without causing any damage to the concrete.

Joints shall be tight enough to prevent leakage of liquid and fines from the concrete and shutter shall be lined as may be necessary to provide the desired concrete surface.

Before any concrete is placed all shavings and other harmful matter shall be removed from inside the shuttering. No concrete shall be deposited until the shuttering is inspected and approved.

The formwork shall be so designed and erected that the forms for slabs and sides of the beam, columns and wall are independent of the soffits of beams and can be removed without any strain to the concrete already placed or affecting the remaining, formwork. No prop shall be removed without the approval of the Engineer. If formwork is erected with full height of the column, one side shall be left open and built-up in sections as placing of concrete progresses.

In general, all shuttering and form work to be used shall be unwrought, unless otherwise stipulated.

Unwrought Form work: Wooden plank used for this type of Form work shall be available from the saw mill. When this type of form work is used, the concrete surfaces after the removal of form work shall be plastered only where necessary, as required by Engineer.

The form work shall be so constructed that it is rigid enough to remain free from any bulging, sagging or any movement during the placing of the concrete, and can be subsequently removed without damaging concrete. The form work shall be sufficiently watertight to prevent loss of liquid from the concrete. All form work shall be fixed to proper elevation. No concreting shall be undertaken by the contractor until the level, size, suitability etc. is approved by Engineer.

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Before reuse, all forms shall be thoroughly scrapped, cleaned, examined and when necessary repaired and retreated before resetting. Form work shall not be reused, if declared unfit or un-serviceable by the Engineer.

All rubbish shall be removed from the interior of the forms and the surface of formwork to come in contact with concrete shall be cleaned and thoroughly treated with approved oil, soft soap, or emulsion. The oil shall be applied before the reinforcement is placed, and care shall be taken that no oil comes in contact with steel while it is being placed in position. The joints of forms shall be made watertight by plugging them with good clay and jute, or by other approved means before applying oil. The form shall be so fixed that only slight marks are visible on the surface of the concrete after stripping the forms.

All form work shall be removed without shock or vibration and without damaging the new concrete. The side forms shall be so fixed that while removing them the supporting forms and posts are not disturbed to any extent. In no circumstances, should the supporting forms be struck until the concrete reaches an strength of atleast twice the stress to which the concrete may be subjected at the time of striking.

CONCRETE MIX PREPARATION

GENERAL: No concrete shall be deposited until all shuttering has been inspected and approved by the Engineer. The materials shall be accurately measured out in box made for the purpose of required size of shape and mixed in proper order in machine as directed.

PROPORTIONING: The concrete shall be proportioned and mixed as laid down in IS 456. In proportioning concrete, the quantity of cement shall be determined by weight. For coarse / fine aggregates the proportioning can also be done by volume based on the mix design done for controlled concrete. Boxes of suitable size shall be used for measuring coarse & fine aggregates. The sizes of boxes shall be such as to suit a batch of one bag of cement weighing 50 Kg. and shall be taken as 0.35 cu.m. While measuring the aggregates shaking & ramming shall be done. The determination of the proportion of cement, aggregates and water for controlled concrete shall be made with preliminary tests by designing the concrete mix before the start of actual concreting operation. The proportions of sand and aggregates arrived at for getting the particular strength are based on dry aggregates and due allowance shall be made for bulking of fine aggregates. The rate for concrete shall include all expenses incurred for design mix, test specimens, laboratory testing etc. and shall be borne by the contractor. No substitutions shall be made in the materials used in the work without the approval of the Engineer.

MIXING : All concrete shall be mixed in mechanical mixed until there is a uniform distribution of materials and the mass is uniform in colour.

Hand Mixing: Normally, hand mixing of concrete will not be allowed, but where the total quantity of concrete is small, the mixing by hand may be approved by Engineer. However, this can be carried out by adding additional quantity of cement as per IS - 456 at contractors own cost. Hand mixing shall be done on a hard, even and impervious surface of adequate size. The material shall be turned over not less than three times dry, a measured quantity of water shall then, be added and turned until a mixture of uniform consistency is obtained.

Concrete Mix Design : The design of concrete mix shall be as per IS:456 with the minimum cement content as per the relevant schedule of items. The preliminary test for

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approval of design mix shall consist of three sets of separate tests and each set of test shall be conducted on six specimens. Not more than one set of six specimens shall be made any particular day. The six specimens of each set, three shall be tested at 7 days and remaining three at 28 days. The preliminary test at 7 days is intended to only to indicate the strength to be attained at 28 days.

Consistency: The degree of consistency shall be decided by the nature of work. The following slumps in the standard slump test shall be adopted for different type of work.

	WORK	Slump in mm	
		Vibrator used	Vibrator Not used
A	PLAIN CEMENT CONCRETE		
1.	Mass concrete in foundation, footings, retaining walls and pavement.	25 - 40	50 - 75
2.	Thin sections of floorings less than 75mm	25 - 40	75 - 100
B	REINFORCED CEMENT CONCRETE		
1	Mass concrete in R.C.C foundation footings and retaining walls.	10 - 25	85
2	Beams, slabs and columns simply reinforced.	25 - 40	100- 125
3	Thin R.C.C section or section with congested steel.	40 - 50	125- 150

WATER CEMENT RATIO: Once a mix, including its water cement ratio has been determined and specified for use by the Engineer, that water cement ratio shall be maintained. The Contractor shall determine the water cement of the aggregates frequently as the work progress and the amount of mixing water shall be adjusted so as to maintain the specified water cement ratio.

WORKABILITY: The concrete mix proportion chosen should be such that the concrete is of adequate workability for the placing condition and can be properly compacted with the means available.

CONCRETE HANDLING AND DEPOSITING

CONVEYANCE OF CONCRETE : All concrete shall be conveyed from the mixer to the place of final deposit as rapidly as possible in suitable buckets, containers which shall be mortar leak tight. Care shall be taken to prevent the segregation or loss of the ingredients and maintaining the required workability.

In no circumstances shall more than half an hour elapse between the time when water is added and concrete is placed in position. In no case concrete be dropped from borrows, skips or otherwise from a height of more than 1.5 meters. In the event of rain storm or other severe weather conditions arising concreting shall be stopped and appropriate temporary stop ends, vee groove etc. placed as may be necessary the contractor shall always have in readiness approved framed sheeting tarpaulins etc. for the protection of newly placed concrete.

DEPOSITING CONCRETE :

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GENERAL: Before placing concrete all soil surfaces upon which or against which concrete is to be placed shall be well compacted and free from standing water, mud or debris. Soft or yielding soil shall be removed and replaced with lean concrete or with selected soils and compacted to the density as directed by Engineer. The surface of absorptive soil (against which concrete is to be placed) shall be moistured thoroughly so that moisture is not drawn from the freshly placed concrete.

Concrete shall not be placed until the formwork have been inspected and approved by the Engineer. Any accumulated water on the surface of the bedding layer shall be removed by suitable means before start of placement. No concrete shall be placed on a water covered surface.

Concrete shall be placed in its final position before the cement reaches its initial set and concrete shall normally be compacted in its final position within 30 minutes of leaving the mixer and once compacted it shall not be disturbed. No concrete that has been partially hardened or has been contaminated by foreign materials shall be deposited. On no account, water shall be added after the initial mixing.

Concrete once started shall be carried out as a continuous operation until the placing of the section is completed. Before fresh concrete is deposited upon or against any set concrete the surface of these concrete shall be properly roughened, swept clean by wire brushes, thoroughly wetted and covered with a thin layer of mortar composed of equal volumes of cement and sand.

Concrete shall be discharged by vertical drop only and the drop height shall not exceed 1.5 M throughout all stages of delivery until the concrete comes to rest in forms.

Concrete shall be deposited as near as practicable in its final position to avoid rehandling. Concrete shall be placed in successive horizontal layers. The bucket loads or other units of deposit, shall be spotted progressively along the face of the layer with such overlap as will facilitate spreading the layer of uniform depth and texture with a minimum of hand shoveling.

Vibrators : Connecting shall not be started unless adequate number of vibrators including reserve vibrators are on hand. Concrete shall be placed in layers not more than 200 mm. thick.

Concrete shall be compacted with mechanical vibrating equipment supplemented, if necessary to obtain consolidation by hand spading rodding and tamping. Mechanical vibrators shall be used for compaction with necessary reduction in water content of the mix.

Immersion type vibrators shall be inserted in a vertical position at intervals of about 600 mm, depending upon the mix, the equipment used, and continued experience on work. The vibrators shall be withdrawn slowly. The spacing shall provide some overlapping of the area vibrated at each insertion. In no case shall vibrators be used to transport concrete inside the forms. Over vibration shall not be permitted. Hand tamping in some cases may be allowed subject to the approval of the Engineer.

Vibrators shall not be allowed to come in contact with forms.

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The use of formwork vibrators shall not be permitted for compaction of in-situ concrete without specific authorization of the Engineer.

The use of surface vibrators of screed board type shall not be permitted for consolidation of concrete under ordinary conditions. However, for this slabs (of thickness less than 200 mm.) surface vibration by such vibrators may be permitted, upon approval of the Engineer.

Dewatering : All water from any source whatsoever, getting accumulated in the area where concrete is to be laid/deposited should be diverted in an approval manner or bailed out or pumped out so that the areas are kept dry and free from water, during concreting and for a specific period after laying concrete to allow the concrete to set. The period shall be as directed by the Engineer.

Further, any water collected in the area where concrete is to be deposited, should also be removed in an approved manner and the area cleaned of all rubbish, slush etc. before concrete is deposited.

Arrangements are made for placing concrete under water, the areas on which concrete to be deposited shall be kept free from water for 12 hours after concrete is completed.

CURING: The top and side surfaces of concrete shall be kept moist for a period of ten days after the concrete is placed and shall be protected from the direct rays of the sun by using wet gunny bags / jute bags.

Care shall be taken so that no shock or vibration shall reach the concrete during the process of setting and preliminary hardening.

The fresh concrete shall be kept moist from its exposed sides continuously for 10 days.

TESTS : All sampling and testing aggregate for concrete shall be carried out specifically provided in attached specifications. The cost of all sampling materials and testing shall be deemed to be included in the rates.

Samples shall be taken from concrete made during the progress of the work as per "Frequency of Testing". Six cubes as approved by Engineer shall be made for every sample, and three of them shall be tested after 7 days, and the remaining three after 28 days.

Moulds shall be furnished by the Contractor and he shall arrange for testing of cubes at laboratory specified by Engineer at no extra cost to Employer. The Contractor shall furnish the labour and facilities required for taking samples and handling and storing of concrete test cube / cylinders at the site of the work at his own cost.

FREQUENCY OF TESTING: The minimum frequency of sampling of concrete for each grade shall be in accordance with the following :

Quantity of concrete in the work m ³	Number of samples
1-5	1
6-15	2
16-30	3
31-50	4
51 and above	4 Plus one additional sample for each additional 50

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M³ or part thereof.

MEASUREMENT & PAYMENT: Measurement shall be made for various grade of concrete in cubic meter for work done at all levels, depths & floors inclusive of form work.

SPECIFICATION FOR PLUM CONCRETE IN FOUNDATION

The concrete shall in general conform to IS: 456 with the following additional requirements:

Plums : This shall be hand broken hard stones, angular in shapes, clean, size 100 to 150 mm

Plums shall be used for plain cement concrete up to a maximum limit of 20% of the total volume of concrete.

Measurements : The length, breadth and depth shall be measured correct to a centimeter and volume shall be calculated in cubic meters correct to two decimals.

Rate : The rate shall include the cost of all materials and labour involved in the operation including the cost of form work, removal of form work, pumping and bailing out water.

SPECIFICATION FOR PLASTERING WORK

CEMENT PLASTER- 16 mm The cement plaster shall be of thickness specified.

Preparation of Surface: The joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scraping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced.

Mortar: The mix and type of fine aggregate specified in the description of item shall be used for the respective coats. Generally coarse sand shall be used for undercoat and fine sand for the finishing coat unless otherwise specified. For sand faced plaster and undercoat work of smooth plaster the fine aggregate shall conform to grading zone IV.

Application: The plaster shall be applied in two coats i.e. undercoat of specified thickness and finishing coat of specified thickness.

a)**Undercoat:** The undercoat shall be as specified. Ceiling plaster shall be completed before commencement of wall plaster. Plastering shall be started from the top and worked down towards the floor. To ensure even thickness and a true surface, plaster about 150 x 150 mm shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauges. The surface of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar shall then be laid on the wall between the gauges with trowel. The mortar shall be applied in a uniform surface slightly more than the specified thickness and then brought to a true surface by working a wooden straight edge reaching across the gauges.

All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, raisers, junctions etc. where required shall be done without any extra payment.

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In suspending work at the end of the day the plaster shall be left, cut clean to line both horizontally and vertically. When recommencing the plastering, the edge of old work shall be scraped, cleaned and wetted before plaster is applied to the adjacent areas to enable the two to properly joint together. Plastering work shall be closed at the end of the day on the body of wall and not nearer than 150 mm to any corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings, as these invariably lead to leakage's. No portion of the surface shall be left out initially to be patched up later on except that when plaster is brought to a true surface with a wooden straight edge, the surface shall be left rough and furrowed 2 mm deep with a scratching tool diagonally both ways, to form key for the finishing coat. The surface shall be kept wet till the finishing coat is applied.

b) **Finishing Coat:** The finishing coat shall be applied after the under coat is sufficiently set but not dried and in any case within 48 hours and finished in the manner as specified above. For sand faced plaster the top coat shall be firmly trowelled and sponge floated to remove excess moisture and to bring the sand grains to the surface. The surface shall have uniformly granular.

While the plaster is still fresh, it shall be floated with 3 mm thick cement float of pure cement and heavily trowelled with a trowel. Cement shall be uniformly dry sprinkled over the entire area to the extent, when rubbed smooth, the whole area is coated with neat cement coating.

SPECIFICATION FOR FORM WORK FOR CONCRETING WORKS:**MATERIAL FOR FORM WORK :**

Materials used for formwork in contact with concrete surface in various parts of the structure may be timber, plywood or metal depending upon the type of finish required. The plywood for concrete shuttering shall conform to IS: 4990.

WROUGHT FORM WORK: This form work shall be lined with plywood of approved quality/thickness or metal plates without indentation. The contractor shall be permitted reuse of shuttering brought new on the work as per the following table. Such reuses shall be permitted only if the forms are properly cared for, stored and repaired after each use.

The contractor shall not be permitted to reuse any old shuttering already used, in work other than those covered under this contract.

Engineer-in-Charge may in his absolute discretion order removal of any forms he considers and fit for use in the work and order rejection of any form stored or erected, he considers unfit for use, irrespective of the number of uses specified above.

UNWROUGHT FORM WORK: Wooden plank used for this type of formwork shall be of good quality timber. The surfaces of these planks need not be planed. Faces in contact with concrete shall be free from cement grout, projecting nails, splits or other defects that may mar the concrete surface.

SHUTTERING: Shuttering shall be fixed in perfect alignment securely braced so as to withstand without deflection or displacement of any kind, the weight of concrete and the weight and movement of men, material and plant. Bamboos shall not be used as props or

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cross bearers. The shuttering for beams and slabs shall be so erected that the shuttering on the sides of the beams and under the soffit of slabs can be removed without disturbing the beam bottoms. Vertical props shall be taken whereby the props can be gently lowered vertically, while striking the shuttering. Shuttering shall be made so that they can be removed without shock or vibration to the concrete. Shuttering joints shall be close enough to prevent leakage of any mortar from the concrete. Beam soffits shall be given suitable camber if required.

Before concreting, all shuttering shall be carefully examined and any rubbish waste, sawdust, nails etc., inside will be cleaned out. Temporary openings shall be provided or holes drilled, especially at bottom of columns and wall forms, to enable sawdust, shavings etc. to be washed or blown out from the interior of the forms before the concrete is placed. Such openings/holes shall be later suitably plugged. Shuttering surfaces shall be treated with a coat of non-staining suitable mould oil which acts both as a parting agent and also gives surface protection.

The Contractor shall be entirely responsible for the sufficiency and efficiency of the formwork, which term includes moulds, and also for the safe removal of the same.

Suitable provision shall be made in the form work for providing cutouts, openings, fixing of nozzles, cleats and any projections during the concreting.

STRIPPING TIME: Forms shall not be struck until the concrete has reached a strength at least twice the stress to which the concrete may be subjected at the time of removal of formwork. The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions and cured under conditions of temperature and moisture similar to those existing on the work. Where possible, the formwork shall be left longer as it would assist the curing. In normal circumstances and where Portland cement is used, forms may generally be removed after the expiry of the following periods:

(a)	Walls, columns and vertical faces of all structural members	24 to 48 hours as may be decided by the Engineer
(b)	Slabs (props left under)	3 days
(c)	Beam soffits (props left under)	7 days
(d)	Removal of props under slabs:	
1)	Spanning up to 4.5m	7 days
2)	Spanning over 4.5m	14 days
(e)	Removal of props under beams and arches:	
1)	Spanning up to 6 m	14 days
2)	Spanning over 6 m	21 days

For other cements, the stripping time recommended for ordinary Portland cement may be suitably modified.

The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab, beam or arch as the case may be together with any live load likely to occur during curing or further construction.

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PROPPING AND CENTERING: Props used for centering shall be of steel, timber posts, ballies or any other material approved by the Engineer-in-Charge. Ballies shall rest securely on wooden sole plates of 40mm thickness and minimum bearing area of 0.1 square metre laid either on ground or on brick masonry pillars. Double wedges shall be provided between the sole plates and the wooden props.

In case of structures with two or more floors, the weight of concrete, centering and shuttering of any upper floor being cast shall be suitably supported on one floor below the topmost floor already cast. In such cases normal props shall be provided for supporting the floor to be cast on the top most floor already cast. Suitable supports below this floor shall be provided preferably to come below the props of the upper floor planks at top ends of these props shall be provided so as to give even distribution of load. Form work and concreting of upper floors shall not be done until concrete of lower floor has set for at least 14 days, unless the formwork of the lower floor is retained & approved by the Engineer-in-Charge. Scaffolding/propping shall be done in one or more stages wherever required as approved by the Engineer-in-charge.

SPECIFICATIONS FOR MASONRY:

A. BRICK MASONRY

Scope: This specification recommends requirements regarding materials, workmanship, construction and mode of measurement of Brick Work and Stone Masonry Work.

Classification: The brick work shall be classified according to the class designation of bricks used.

Mortar: The mortar for the brick work shall be as specified.

Soaking of bricks: Bricks required for brick work in cement mortar, composite lime mortar or lime mortar either than fat lime mortar shall be adequately soaked in stacks before use, by profusely spraying with clean water at regular intervals for a period of not less than six hours so as to keep them wet to the satisfaction of Engineer-in-Charge.

Laying: Brick work shall be laid in English Bond unless otherwise specified. Half or cut bricks shall not be used except where necessary to complete bond. Closers in such case, shall, be cut to the required size and used near the ends of walls. A layer of mortar shall be spread for full width over a suitable length of the lower course. Each brick shall be properly bedded and set home (position) by gently tapping with handle of trowel or wooden mallet. Its inside faces shall be battered with mortar before the next brick is laid and pressed against it. On completion of a course, all vertical joints shall be fully filled from the top with mortar. The walls shall be taken up truly plumb. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in alternate course shall come directly one over the other. Both the faces of the walls of thickness more than one brick length shall be kept in proper plane. All connected brick work shall be carried up simultaneously and no portion of work shall be left more than one metre below the rest of work. All non-fixtures, pipes, outlets of water, hold-fasts which are required to be built into shall be embedded in mortar or concrete in their correct position.

Joints: Brick shall be so laid that all joints are full of mortar. The thickness of joints shall not exceed 10 mm. for brick work with bricks of any class designation. All face joints shall

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be raked as required by taking tool during the progress of work. When mortar is still green so as to provide proper key for the plaster or pointing to be done. Where plastering or pointing is not required to be done, the joints shall be struck flush and finished at the time of laying.

Brick Coping and Cut Corners: Top courses of all plinth, parapet, steps and lop wall below R.C.C. shall be laid with brick on edge unless specified otherwise. The bricks forming the top courses and ends of walls shall be properly radiated and keyed into position.

Curing : Masonry work in cement mortar, composite lime mortar, lime mortar except fat lime mortar shall be kept moist on all faces for a minimum period of seven days

Measurement : Measurement of brick masonry shall be based on cubic metre of actual work done for brick work of one or more brick thickness. Deductions for openings etc. in brick wall shall be as per IS: 1200.

RANDOM RUBBLE MASONRY IN CM1:5

Providing Random Rubble Masonry in CM 1:5 with hard stone below and above plinth at all levels including scaffolding, dressing of stones, packing interstices, leveling, curing etc. complete

- i) Random Rubble Masonry in CM 1:5
- ii) Providing Random Rubble masonry (maximum size of the stone to be 250 x 250 x 250 except for bond stone) in Cement Mortar 1:5 (1Cement: 5 coarse sand) in foundation, plinth, superstructure etc. including all leads and lifts. Bond stones shall be given at every 1.5 M spacing in every course. Key stones in between the courses shall be provided at spacing not more than 2.0 M.

SPECIFICATIONS FOR STRUCTURAL STEEL WORK

SCOPE: This specification covers the general requirements for supply, fabrication, painting, transport and erection of structural steel and steel tubes for General Building Construction, Plant Structures, Pipe Racks, Equipment Supports, Cable Trays and other Miscellaneous work consisting of elements such as; but not limited to:

- a) Columns, beams, plate girders, trusses, bracings, purlins, sag rods, staircases, ladders, monorails, portal frames, cross overs, trusses, tie runner etc.
- b) Hand railing, motor pit railing.
- c) Stair treads and flooring of chequered plate and gratings.
- d) Anchorages such as inserts and holding down bolts.

The supply shall also include fastenings like nuts, bolts and washers, welding rods, oxyacetylene gas and primer/finish paint. The work shall be carried out as per drawings, standards and instructions furnished by the Engineer. Plate work such as tanks, chimney, vessels, bunkers are excluded from the contractors scope.

FABRICATION:

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Fabrication shall be generally carried out as per IS- 800 for Structural Steel and IS-806 & IS-6227 for Tubular structure. Fabrication shall include preparation of shop drawings, erection drawings and material lists based on design drawings furnished by the Engineer. The fabricator shall submit all relevant shop and erection drawings to Engineer's approval before fabrication. The drawings shall clearly distinguish between shop and field welds and bolts. It is to be understood that the approval shall be for compliance with design only and shall not relieve the fabricator of the responsibility of accuracy of detailed dimensions and omissions. Erection drawings shall consist of line diagrams showing every member in position with erection marks. Erection mark shall appear on the LEFT end of members as DETAILED. It is to be understood that due to the non availability, certain section might have to be substituted subject to Engineer's approval. The drawings shall also be modified by the fabricator at no extra cost.

Generally shop connections shall be welded and field connections bolted. Welding shall include not only design requirements but also functional requirements such as, but not limited to continuous welds, seal welds, grinding the welded parts flush etc. as specified by the Engineer. However, if any site welding is involved, it shall be done so at no extra cost. Welding shall be done only by qualified and tested welder. High tensile bolts shall be used only when specified in the drawings. Field welding shall not be permitted for joints subject to impact. All double angle or double channel members shall be connected to each other by stitch plates at spacing of not more than 750mm. No field connections shall be with less than 2 numbers 20 bolts at each end except for purlins, side runners, ladders, sag rods etc. Washers shall be used under all heads and nuts of bolts. Tapered washers shall be provided against bevelled surfaces. Tolerances for fabrication shall be as per IS-7215.

PAINTING: After fabrication, steel works shall be given two coats of primer (one coat to be given immediately after fabrication and one coat to be given immediately after erection) as specified. All surfaces shall be given surface treatment as specified. For description of surface treatment refer separate specification for painting. The part of any member to be embedded or any surface in common contact with concrete or masonry portion close to field weld and galvanised sections shall not be painted unless specifically instructed by the Engineer.

The final painting of two coats of synthetic enamel paint shall be as specified in the Schedule of Quantities and the requirements are covered in separate painting specification. Surfaces not in contact, but inaccessible after shop assembly, shall receive the paint before assembly. However, this does not apply to the interior of sealed and hollow sections. Where the number of coats specified in the drawing is more than one, each coat shall vary in shade from preceding coat.

MEASUREMENT:

General Structural Work: The mode of measurement shall be based on the weight of the structure assessed from the approved shop drawings and respective material lists. The weight of the structural material shall be calculated on the basis of IS Hand book. No allowance in weights shall be made for rolling tolerance. Welds, bolts, nuts, washers etc. shall not be measured. Structural works in single or built up sections with or without connecting plate shall be measured together.

Handrail : The measurement of handrailing shall be based on metre run of handrailing consisting of top run and middle run together measured as a single run. The bends in the

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handrailing near obstructions such as columns, walls etc. or at the terminations points shall not be measured. Welds, bolts, nuts, washers etc. shall not be measured.

M.S. Chequered Plate and Grating: The measurement of chequered plate and grating shall be on the basis of weight. Welds, bolts, nuts, washers etc. shall not be measured.

RATE :

General Structural Work : The rate shall include the cost of structural steel , handling, transportation, fabrication and the erection of steel in position at site including scaffolding, temporary supports, necessary tools and tackles and it includes the cost of providing and applying two coats of synthetic enamel paint and two coats of red oxide zinc chromate primer. The above rate includes the cost of preparation of fabrication drawings. Welds, bolts, nuts, washers etc. shall not be paid separately. Necessary touch up of primer/final paint is also included in the above rate.

Handrail : The rate shall include cost of procuring, transporting, handling, fabrication and erection of handrail including the cost of toe plates. It also includes the cost of providing and applying two coats of synthetic enamel paint and two coats of red oxide zinc chromate primer. Welds, bolts, nuts, washers etc. shall not be paid separately.

M.S. Chequered Plate and Gratings : The rate shall include all cost of procuring, transporting, handling, fabricating and erecting in position at site including fixing. The rate shall be deemed to include preparing notches, holes, bandings etc. The rate also includes the cost of providing and applying two coats of finish paint as specified and two coats of red oxide zinc chromate primer. Welds, bolts, nuts, washers etc. shall not be paid separately.

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SPECIFICATIONS FOR PIPELINE / STRUCTURALS STEEL WORKS

A. PIPELINE WORKS

1.0 GENERAL

- 1.1 The contractor is expected to visit site to get himself acquainted with prevailing site conditions i.e. availability of water, power, approach road etc before quoting for this tender. The contractor shall be entirely responsible for provision of all such utilities. No delay shall be entertained on this account.
- 1.2 The contractor may have to arrange temporary power connection from the local Electric Supply Authority by his own effort and cost. Alternatively contractor shall have to carry out the work with his own DG sets at no extra cost.
- 1.3 For payment purpose against items, of supply fabrication and erection of steel of all types, the weight shall be calculated based on section given in the standard steel tables and physical verification whichever is less. The net fabricated dimensions edge to edge shall be taken into account. The measurement shall exclude any allowance for wastage and weld metal etc.
- 1.4 Measurement of pipeline shall be taken for actual pipeline laid at site. Gate valves, flanges, strainers, filters etc. would not be included for measurement in pipeline.
- 1.5 Maximum wastage of 1.5% shall be allowed in pipeline fabrication for all diameters of pipes.
- 1.6 Contractor will take sufficient care during welding of old pipelines which may contain traces of petroleum products and shall follow the prescribed safety precautions.
- 1.7 The contractor will have to segregate the good pieces of pipeline from the lot as per directions.
- 1.8 The contractor will be given old and new MS pipelines. The contractor will have to cut all the Tee's, bends etc. welded on the pipeline before use.
- 1.9 The above ground pipeline will pass through brick wall etc. at places. The contractor will dismantle the required portion of the structure for passing the line and also make good the damaged surface of the structure to its original conditions. Necessary pipe sleeve shall also be provided by the party without extra cost.

2.0 INSPECTION

- 2.1 Engineer-in-Charge or his authorized representative or third party appointed by IOC shall have free access at all reasonable time to inspect those parts at the manufacturer's works which are connected with the fabrication of the steel work and shall be provided with all reasonable facilities for satisfying himself that the fabrication is being undertaken in accordance with the provision of this contract.
- 2.2 Inspection shall be made at site/ at the place of manufacture prior to dispatch of the fittings. The inspection shall be conducted so as not to interfere unnecessarily with the operation of work.

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2.3 Should any structure or part of a structure be found not to comply with any of the drawings and specifications, it shall be rejected. No structure or part of the structure once rejected shall be re-submitted for test except in case where the LIOC considers the defects as rectifiable.

2.4 Defects which may appear during fabrication shall be made good by the contractor .

2.5 The suitability and capacity of all plants & equipments used for erection shall be to the satisfaction of the engineer.

3.0 Erection of equipments (Pumps and motors) :

3.1 Drawings : The following drawings will be provided by the LIOC, which are to be followed for erection of each equipment :

- * General arrangement drawing with outline dimensions.
- * Foundation detail drawings.

3.2 Erection of the equipments :

* All equipment erection shall be done by experienced fitters. For this purpose, the contractor shall employ an able erection supervisor and crew who have done similar jobs.

* Erection shall be carried out as per instructions of the equipment manufacturers and direction of site engineer.

* All the instruments of hydrant engine such as pressure gauges, Composite gauges etc., including instrument panels, shall be installed by the contractor as part of equipment erection and no separate payment will be made.

3.3 After piping has been connected, the alignment shall be checked by the contractor again, to ensure the piping connections do not induce any undue stresses on the equipment.

3.4 Pumps will be supplied for erection either completely assembled, couple to the drive and both mounted on a common base plate or in 3 individual parts as pump assembly, motor and base plate or as pump assembly and motor mounted on separate base plate. The pumps shall be erected on foundations and leveled with shims and wedges with help of precision levels and other instruments. The pump and the driver shall then be coupled and aligned. Final alignment shall be done after all piping connections are made. Shims and wedges where required will be arranged by the contractor.

3.5 Trial runs of equipments - unless indicated otherwise, all equipments shall be subjected to trial runs up to the satisfaction of the site engineer on load and without load condition. This also includes coordination with the supplier of equipment to commission the same.

4.0 Piping Works :

4.1 Working Drawings :

- Drawings accompanying the tender document are indicative of scope of work and issued for tendering purpose only .

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The contractor is required to prepare the drawings for the complete piping work with its isometric view etc. to calculate the actual requirement of various items /fittings like bends ,flanges etc . The piping layout must show the expansion loops as per the requirement. The complete set of drawings shall be submitted for approval ,before commencement of the work . No fabrication will start without the approval of IOC.The construction drawings shall include

- a) General arrangement drawings.
- b) Location of all weld seams, weld sizes and details of weld etc
- c) Material to be used.
- d) Welding procedures and radiographic inspection.
- e) Edge preparation and method employed.
- f) Tolerances
- g) Quality, brand and gauge of electrodes to be used.
- h) Details of welding reinforcement
- i) Details of brackets for supporting pipes, platforms, etc.
- j) Complete bill of materials with item wise quantities for materials to be supplied by IOC and the contractor.
- k) Any correction or modifications suggested by IOC while approving the drawings.

The drawings shall be prepared on computer and one floppy of as built drawings shall be submitted after completion of work. All drawings are to be prepared on Auto-CAD (on PC).

4.2 Codes/Standards to be followed :

- * API - 1104 :
ANSI B 31.3 : Code for petroleum Refinery Piping
- * IS 823 : Code of procedure of manual Arc welding of mild steel.
- * IS 814 : Metal arc welding for mild steel.
- * IS 817 : Welder qualification tests.

4.3 Fabrications :

Bends , reducers, expanders ,tees and end blinds provided shall be factory made forged irrespective of diameter of pipeline .Such fittings shall have approximately the similar material composition as that of pipeline under fabrication.

4.4 Erection :

- a. Cleaning - Before erection all pre-fabricated spool pieces, pipe fittings etc. shall be cleaned inside and out side by suitable means. The cleaning process shall include removal of foreign matter such as scale, sand, weld spatter, cutting chips etc. by wire

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brushes cleaning tools etc., and blowing out with compressed air and/or flushing out with water.

- b. Flange Connections - While fitting up matching flanges, care shall be exercised to properly align the pipes and to check the flanges for trueness so that faces of the flanges can be pulled together without inducing any stresses in the pipes and equipments nozzles.
 - c. Valves - Valves shall be installed with spindle/ actuators orientation / position as shown in the layout drawings.
 - d. Line mounted equipments / items - installation for line mounted items like filters, strainers, sight glasses etc., including their supporting arrangements shall form part of piping erection work and no separate payment shall be made for this work.
- 4.5 Pipe supports - Pipe supports are designed to effectively sustain the weight and thermal effects of the piping system and to prevent its vibrations. Location and design of pipe supports will be as per the following table or as given by site engineer:

Nominal pipe size in MM.	Maximum span in M.
20/25 mm	2.10 m
050 mm	3.05 m
080 mm	3.60 m
100 mm	4.25 m
150 mm	5.15 m
200 mm	5.75 m
250 mm	6.70 m
300 mm	7.00 m
350 mm & above	7.60 m

The above spacings are indicative and will be kept as per site requirements (min. above)
The minimum clearance of 300 mm has to be maintained between the ground and the bottom surface of pipeline. All pipeline supports will be numbered serially for identification.

5.0 Testing of piping system :

- 5.1 Testing of piping after erection shall be done as per API-1104 and as specified in price bid.
- 5.2 With the exclusion of instrumentation, piping systems fabricated or assembled in the shop/factories shall be tested at the site, irrespective of whether or not they have been pressure tested prior to site welding or fabrication.
- 5.3 A test pressure of 10.5 kg/sq.cm shall be maintained for minimum 4 hours.
- 5.3 All tests shall be completed to the satisfaction of site engineer including retesting if any leakage is noticed during testing.
- 5.5 The site engineer shall be notified in advance by the contractor of testing sequence/ program, to enable him to be present for witnessing the test.

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5.6 All equipments, materials, consumables and services required for carrying out the pressure testing of piping system shall be provided by the contractor at his own cost.

5.7 Water for testing shall be arranged by contractor at his own cost.

5.8 Test records in triplicate shall be prepared and submitted by the contractor for each piping system line wise for the pressure test done in the proforma as approved by site engineer.

6.0 Documents to be submitted by contractor : (four copies each)

- Welders qualification test report as per IS-817.
- Electrode and material test certificates from the manufacturer.
- Complete record of the Hydrostatic testing carried out on each section of the pipeline including test certificates for the same for submission to CCOE authorities.
- Flushing reports.
- Pipeline quantity certificates for product piping system as per the pipelines laid.
- On completion of work, as built drawings of complete piping system are to be prepared and furnished by the contractor as required by IOC. All drawings are to be prepared on Auto-Cad (on PC). The contractor shall submit two CDs containing all drawings, one set of tracing and 3 sets of drawings/ printouts.
- Pipeline elevation profile for the entire route of pipeline. Any other records as required by the site engineer.

7.0 HOT WORK PERMIT

7.1 No hot work is permitted without issuance of hot work permit by location in-charge. at existing locations.

7.2 After completion of work the site should be cleared of all scrap ,contractor's equipment and machinery used in fabrication.

B. SPECIFICATIONS FOR STRUCTURAL STEEL WORK

SCOPE: This specification covers the general requirements for supply, fabrication, painting, transport and erection of structural steel and steel tubes for General Building Construction, Plant Structures, Pipe Racks, Equipment Supports, Cable Trays and other Miscellaneous work consisting of elements such as; but not limited to:

- a) Columns, beams, plate girders, trusses, bracings, purlins, sag rods, staircases, ladders, monorails, portal frames, cross overs, trusses, tie runner etc.
- b) Hand railing, motor pit railing.
- c) Stair treads and flooring of chequered plate and gratings.
- d) Anchorages such as inserts and holding down bolts.

The supply shall also include fastenings like nuts, bolts and washers, welding rods, oxyacetylene gas and primer/finish paint. The work shall be carried out as per drawings, standards and instructions furnished by the Engineer. Plate work such as tanks, chimney, vessels, bunkers are excluded from the contractors scope.

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STRUCTURAL STEEL WORKS

GENERAL

The structural works described hereunder is the Scope of Works for the project.

DESIGN

DESIGN: The structural steelwork shown on the drawings and described in this specification has been designed to BS 449.

SLIP FACTOR: A slip factor of 0.45 has been used in the design of friction grip joints.

DEFINITIONS

SHOP DRAWING: Drawings showing all necessary information to fabricate the structural steelwork.

CONTRACTORS' DRAWINGS

Approval by the Consultant of drawings prepared by the Contractor does not relieve the contractor of the responsibility for accuracy of detail dimensions on drawings, nor for the general fit up of parts to be assembled on site.

GENERAL REQUIREMENTS

CODE OF PRACTICE: Comply with BS 449 and this specification. In case of conflict, the requirements of this specification take precedence.

CONSTRUCTION INFORMATION

FABRICATION: Provide the following information at least 2 weeks before commencing fabrication.

Complete and Co-coordinated shop drawings.

Details of welding procedures in accordance with BS 5135 for all welds.

QUALITY CONTROL

WELDERS: All welders employed for the project should possess valid certificate issued by an appropriate authority.

All welds are to be tested by the Inspecting Authority in accordance with the following schedule.

Butt welds: All butt welds are required to be tested.

Fillet weld: 20% of the total lengths of all fillet welds to be selected by the Consultant are required to be tested.

MATERIALS - SECTIONS PLATES BARS

HOT ROLLED SECTIONS, PLATES AND BARS: Steel to BS 4360. Quality grades as noted on the drawings.

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DIMENSIONS AND TOLERANCES

PLATES AND BARS	: to BS 4360
HOT ROLLED SECTIONS	: to BS 4 Part 1
ANGLES	: to BS 4848 : Part 4
HOLLOW SECTIONS	: to BS 4848 : Part 2

CONDITION OF STEEL: Steel for fabrication is not to be more heavily pitted or rusted than grade C of Swedish Standard 05 59 00.

MATERIALS - STRUCTURAL FASTNERS

ORDINARY BOLTS AND NUTS: to BS 3692 Grade 8.8. Dimensions may be in accordance with BS 4190.
HIGH STRENGTH FRICTION GRIP BOLT: BS 4395:Part 2

WASHERS: BS 4320.

SPRING WASHERS: BS 4464

SURFACE FINISH

GALVANIZED: bolt assemblies are to be galvanized in accordance with BS 729.

MATERIALS

WELDING CONSUMABLES: All welding consumables used for the arc welding of carbon manganese steels are to comply with BS 5135.

MECHANICAL PROPERTIES: Welding consumables and procedures are to give mechanical properties for the deposited weld metal not less than minimal specified for the parent metal.

GROUT

Grout is have a minimum compressive strength at 28 days of 60 N/mm² and is to be of the following form. The grout is to be pressure grouted Conbextra GP manufactured by FOSROC Construction Chemicals or equivalent approved by the Consultant.

WORKMANSHIP

IDENTIFICATION

MARKING: Mark all materials to ensure that they are used as specified.

DOCUMENT: provide all mill certificates and manufacturer's certificates to show evidence of materials are provided as specified. Mill certificates and manufacture certificates shall be provided by the Contractor for each batch of steel materials delivered to the site. Steel materials delivered to the site, if not accompanied by any certificates shall be rejected.

STORAGE

Steelwork shall be kept in a clean place and in manner to prevent damage to the steelwork.

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WORKMANSHIP - GENERAL

CUTTING

PROCESS: Cut steel by an automatic or semi-automatic process.

HAND FLAME CUTTING: Use only when approved by the Consultant.

GRINDING: remove burrs, sharp arises and ragged edged by grinding.

ACCURACY OF FABRICATION

ACCURACY: fabricate steelwork to an accuracy that will enable erection within the specified limits to take place without inducing excessive stresses, deflection or distortion into the structure.

LENGTH: members with both ends to be supported by existing structure or other proposed steelwork are not to deviate from the detailed length by more than 3mm for members 10m or less, 4mm for members greater than 10m in length.

STRAIGHTNESS: the deviation of a member from a straight line drawn between both ends of the member is not to exceed the greater of 3mm or 0.1% of the distance between both ends of the member.

WORKMANSHIP - WELDING

GENERAL

ARC WELDING: arc welding of carbon and carbon manganese steels is to comply with BS 5135.

WELDING PROCEDURES

WELDING PROCEDURES: approved to BS 4870: part 1 by the Contractor.

DISTORTION: Welding procedures and sequence of fabrication are to be such that distortion is reduced to a minimum.

WELDERS: approval tested to BS 4871: part 1

WELDING CONSUMABLES: store, handle and use in accordance with the manufacture's recommendations.

TACK WELDING: to comply with BS 5135

TEMPORARY ATTACHMENTS: welding of temporary attachments required for fabrication or erection is to comply with BS 5135.

BUTT WELDS: use run-on and run-off plates in making butt welds to ensure full throat thickness at the ends. They are to comply with the following requirements.

The specification for the plates is to be identical to that for the material being welded.

The plates are to be prepared in the same manner as the parts being joined.

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After completion of welding the plate are to be removed by cutting. The surfaces where they were attached are to be ground smooth and inspected for cracks.

REMOVAL OF SLAG: remove slag by light hammering, wire brushing or other methods that do not deform the surface of the weld.

WORKMANSHIP - BOLTING

HOLES

FORMING: drill or punch and ream all holes unless agreed otherwise.

SIZE: holes for ordinary bolts are to be of diameter not more than 2mm greater than the diameter of the bolt for bolts up to 24mm diameter, and not more than 3mm greater than the diameter of the bolt for bolts over 24mm diameter, except in steel base plates and where noted on the drawings.

HSFG FASTENERS: holes to comply with BS 4604.

MAKE UP OF BOLT ASSEMBLIES: for all bolt assemblies the strength grade combination of bolt/nuts/washers is to be as prescribed or recommended in the relevant British Standard.

CONDITION OF BOLTS: bolt assemblies are to be in such condition immediately before installation that the nut turns freely on the bolt.

GALVANISED NUTS: re-tap nuts in galvanised bolt assemblies after galvanising.

WASHERS

WASHERS: each bolt assembly is to contain at least one washer placed under the part being rotated.

TAPER WASHERS: place under bolt heads and nuts bearing on surfaces sloping 3 degrees or more from a plane at right angles to the bolt axis.

INSTALLATION OF SPRING WASHERS: tighten bolt assemblies containing spring washers until the spring washer is completely flattened.

LOCKING OF NUTS: secure nuts used in connections subject to vibration or reversal of stresses to prevent loosening. If not specified on the drawings include the proposed method in the erection details.

LIMITS TO LENGTH: the length of bolt is to be such that at least one clear thread shows above the nut after tightening, and at least one thread plus the thread run out is clear between the nut and the unthreaded shank of the bolt.

HIGH STRENGTH FRICTION GRIP FASTENERS

USE: the use of high strength friction grip bolts is to comply with BS 4704

TIGHTENING METHOD: tighten high strength friction grip bolts using the 'torque-control' method.

LOAD INDICATING WASHERS: use in accordance with the manufacturer's recommendations.

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DISCARDED BOLT ASSEMBLIES: if after tightening a bolt or nut is slackened off for any reason the complete bolt assembly is to be discarded and not re-used in the works.

WORKMANSHIP-ERECTION

GENERAL: check before erection of any steelwork that work abutting the steelwork to be erected has been correctly placed in position and level.

ERECTION STRESSES: not exceed the stress limit given in BS 449 during handling and erection.

ALIGNMENT: align each part of the structure as soon as practicable after it has been erected. Do not make permanent connections between members until sufficient of the structure has been aligned, leveled, plumbed and temporarily connected to ensure that members will not be displaced during the subsequent erection or alignment of the remainder of the structure.

THERMAL CUTTING: do not use thermal cutting equipment on site unless agreed otherwise for specific applications.

SITE WELDING: where site welding is required, provide suitable staging, platforms and weather protection for welding operations with all safety precautions.

GROUTING

GROUTING. Do not carry grouting until the steel beam has been aligned and properly connected at its ends.

SPACE: immediately before grouting, the space is to be clean and free of all extraneous matter.

PROPRIETARY GROUT: prepare, mix and place in accordance with the manufacturer's recommendations.

QUALITY CONTROL & TEST CERTIFICATES

STEELS: provide mill or test certificates to demonstrate that steels used in the work conform with this specification. Mill certificates shall be provided for each batch of steel materials delivered to the site.

BOLTS: provide test certificates to demonstrate that bolts used in the Work conform with this specification. Test certificates shall be provided for each batch of bolts and nuts materials delivered to site.

SCOPE OF WELD EXAMINATION

BUTT WELDS: subject to the following non-destructive examinations.

Visual inspection to BS 5289

Penetrant test BS 6443 or magnetic particle test to BS 6072.

Ultrasonic examination to BS 3923: part 1 or to an equivalent standard.

FILLET WELDS: subject to the following non-destructive examinations:

Visual inspection to BS 5289

Penetrant test BS 6443 or magnetic particle test to BS 6072

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Ultrasonic examination to BS 3923: Part 1 or to an equivalent standard for welds with a leg length greater than 12mm.

INSPECTING AUTHORITY: examination of welds is to be carried out by the Inspecting Authority.

RECORDS: keep records of all weld examinations.

BOLTED CONNECTIONS: following complete assembly of all bolted connections, check the fit and tightness at least 5% of the bolts at locations to be agreed with the Consultant.

FREQUENCY OF TESTING STEEL MATERIALS

The Contractor shall allow for testing steel materials BS 4360 by an accredited laboratory. Tests shall be carried out prior to commencement of work and prior to change of source of steel plate materials.

59 00 Pictorial surface preparation standards for painting steel surfaces STEEL WORK CORROSION PROTECTION SPECIFICATION

GENERAL

Do not treat surfaces to be encased in concrete unless specified. See structural drawings for protective treatments and notes.

DEFINITIONS

DFT: minimum dry film thickness of a paint coating. Minimum local thickness of a sprayed metal or galvanized coating.

HDG GALVANIZING: galvanizing in accordance with BS 729.

MATERIALS

PROPRIETARY MATERIALS

EVIDENCE OF COMPLIANCE: Before commencement of the work, provide evidence to demonstrate that the proposed materials comply with the specification.

MANUFACTURE'S INSTRUCTIONS

MANUFACTURE'S INSTRUCTIONS: obtain from the manufacturer of any proprietary product detailed instructions on the use of the product, specific to the situation found on the Contract.

USE OF PRODUCT: comply with the manufacturer's instructions for the use of any product. If these are in conflict with the requirements.

LIST OF CODES AND STANDARDS

BRITISH STANDARDS

BS 4	Structural steel section Part 1: specification for hot rolled sections
BS 427	Method for Vickers hardness test Part 1: testing of metals
BS 729	Hot dip galvanised coating on iron and steel articles.
BS 1449	Steel plate, sheet and strip Part 1: specification for carbon and carbon manganese plate, sheet and strip
BS 1706	Electroplated coating of cadmium and zinc on iron and Steel

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BS 2853	The design and testing of steel overhead runway beams
BS 2989	Specification for continuously hot-dip zinc coated steel : Wide strip, sheet/plate and slit wide strip.
BS 2994	Specification for cold rolled steel sections.
BS 3382	Electroplated coatings on threaded components Part 1: Cadmium on steel components Part 2: Zinc on steel components
BS 3692	ISO metric precision hexagon bolts, screws and nuts.
BS 3923	Methods for ultrasonic examination of welds. Part 1: Manual examination of fusion welds in ferritic steels
BS 4190	ISO metric black hexagon bolts, screws and nuts
BS 4320	Metal washers for general engineering purposes
BS 4360	Specification for weldable structural steels
BS 4395	High strength friction grip bolts and associated nuts and washers for structural engineering. Part 1: General grade. Part 2: Higher grade bolts and nut and general grade washers. Part 3: Higher grade bolts (wasted shank), nuts and general grade washers.
BS 4464	Spring washers for general engineering and automobile purpose(metric series)
BS 4604	The use of high strength friction grip bolts in structural steel work. Metric series. Part 1: General Grade Part 2: Higher Grade (Parallel shank) Part 3: Higher Grade (Wasted shank)
BS 4848	Hot rolled structural steel sections Part 2: Hollow sections Part 4: Equal and Unequal angles
BS 4870	Specification for approval testing of welding procedures. Part 1: Fusion welding of steel
BS 4871	Specification for approval testing of welder working to approved welding procedures. Part 1: Fusion welding of steel.
BS 4921	Standardized coatings on iron and steel articles
BS 4933	ISO metric block cup and countersunk head bolts and screw with hexagon nuts.
BS 5135	Specification for the process arc welding of carbon and manganese steels.
BS 5289	Code of practice for visual inspection of fusion welded joints. BS 5950 Structural use of steel work in building Part 1: Code of practice for design in simple and continuous construction hot rolled sections. Part 2: Specification for materials, fabrication and erection hot rolled sections
BS 5996	Method of ultra sonic testing and specifying quality grades of ferritic steel plate.
BS 6072	Method of magnetic practice flaw detection
BS 6363	Specification for welded cold formed steel structural hollow sections
BS 6443	Method of penetrant flaw detection
BS 6780	Specification for through thickness reduction of area of steel plates and wide flats.

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MATERIAL SPECIFICATIONS FOR PIPING/ STRUCTURAL WORKS

1.0 STRUCTURAL SECTIONS

1.1 Structural steel work shall conform to IS:808 - latest Edition.

1.2 Structural steel materials shall be of SAIL, ISSCO, Vizag Steel or TISCO make and shall be conforming to **IS-2062 Gr A**

Angles upto ISA 50, flats and square bars shall be of any BIS approved manufacturer duly approved by Engineer-in-Charge.

1.3 Sectional weight as per IS standard will be considered for payment purposes.

2.0 PIPES

2.1 A. Pipes for Product Services

<u>Services</u>	<u>Material</u>
Product Pipe Lines	API 5L Gr. B ERW (PSL-1)
	Pipe size: 250mm, Wall thickness:7.8mm Pipe size: 300mm to 350mm, Wall thickness:7.9mm Pipe size: 400mm to 600mm, Wall thickness: 9.5mm
Product Pipe Lines	BS 1387 (HEVAY DUTY)
	Pipe size: 80mm, Pipe size: 100mm, Pipe size: 150mm, Pipe Size: 200 mm,

2.2 Pipe dimension shall be accordance with ASME B36.10 and to B36.19 for stainless steel pipe and respective ASTM STD. for non-ferrous pipes.

3.0 WELDING ELECTRODES

3.1 Welding electrodes shall conform to Covered electrodes for manual metal arc welding of carbon and carbon maganese steel/American Welding Society, AWS - A5.1 - "Carbon Steel covered Arc Welding Electrodes" - AWS classification Nos. E6010 / E6011 / E6013 / E7015 / E7016 / E7018.

Product piping : Root run: E 6010; Fill Up: E 6018
Water piping : Root/ Fill up: E 6013

3.2 Welding electrodes of any of the following makes can be used :

ESAB India Ltd.

GEE Limited

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Advani Orlekon	D & H Welding
D & H Sechron Electrodes Ltd	Kobe Steels
Honavar Electronics Ltd.	Modi Arc Electrodes Co
Mailam Metallogen (P) Ltd.	Anand Arc Electrodes Pvt. Ltd.

4.0 FLANGES

Scope

- 4.1.1 Design, manufacture, testing, inspection and supply of raised face carbon steel forged Weld Neck Raised Face (WNRF)/ Blind Raised Face (BLRF) flanges.
- 4.1.2 The sizes, ANSI pressure rating of the flanges and distribution shall be as per Schedule of Rates of Tender Document.
- 4.1.3 The flanges shall be suitable for use in Crude Oil/ Petroleum Product service.

4.2 Specified Requirement:

- 4.2.1 Maximum operating temperature :
- 4.2.2 Minimum operating temperature :

4.3 Code & Standards :

Detail 24" & Below (Except 22")

- a) Manufacturing : ANSI B 16.5 latest edition
 - b) Dimensions : ANSI B 16.5 latest edition
 - c) End Preparation : ANSI B 16.5 / ANSI B 16.25
 - 4.4 Material : BS 4360
 - 4.5 Drilling : ANSI B 16.5
 - 4.4 Material for SORF/ BLRF flanges to conform to ASTM A-105 class 150 upto NB 400 mm dia for product lines.
 - 4.5 Material for SORF/ BLRF flanges to conform to BS 4360 Gr. A, Class 150 for NB 500mm and above.
 - 4.6 Flanges shall conform to ASME B16.5 for product lines and water services.
 - 4.7 All flanges shall have raised serrated faces finished to 125 AARH.
 - 4.8 All flanges shall be of slip on type up to and including 400 mm dia.
- #### **5.0 BUTT WELDED PIPE FITTINGS**

5.1 General :

- 5.1.1 This specification covers design, manufacture, testing and supply of forged carbon steel seamless/butt welded pipe fittings like LR bends, concentric/ electric reducers,

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equal,/unequal tees and cross bar tee suitable for use in Crude Oil/ Petroleum Product service.

5.1.2 The type, size, working pressure and quantity of fittings required as per Schedule of Rates of Tender Document.

5.1.3 The following temperatures shall form the basis of design of these fittings.

Maximum temperature : +55°C

Minimum temperature : + 5°C

5.1.4 Fittings shall be designed and manufacturing tolerances shall be as ANSI 31.4.

5.2 Specific Requirement for Pipe Fittings :

5.2.1 Low Pressure Fittings (ANSI Cl.150)

a. All fittings shall be out of ASTM A234 WPB material.

b. Fittings of below 18" NB size of 150 class pressure rating shall be of SEAMLESS type and fittings of sizes 18" and above of 150 class pressure rating may be of two cup, butt-welded type out of suitable carbon steel plate material. After forming, the heat treatment process to be followed shall be furnished.

c. Pipe to be used for manufacturing of fitting shall be tested quality. The supplier shall furnish all documentary proof, related to the same to the Owner's inspector for final acceptance.

d. Welded pipe employed for manufacturing shall be coupon tested for parent metal as well as the weld metal to establish the UTS and to notch toughness.

e. Welded Tee shall, not be of fabricated (Stub in) type.

f. All weld joints shall be 100% radiographed and shall be stress relieved.

5.1 Materials for fittings shall be SW type and conform to ASTM A 105 and ANSI B 16.11 & class 3000 up to 40 mm pipe size.

5.2 Materials for fittings shall be BW conform to ASTM A 234 Gr. WPB, Sch 40 for 50 mm and above pipe sizes.

5.3 Forged steel SW and threaded fittings shall be in accordance with ASME B16.11, unless and otherwise noted.

5.4 BW fittings shall be in accordance with ASME B16.9, unless otherwise noted.

5.5 For 500 mm dia, the fittings shall be made out of pipe sections.

6.0 GASKETS

6.1 Gaskets materials shall be of 3 mm thk Compressed Asbestos Fibre (CAF) conforming to IS : 2712 Gr. O/1 for product lines as well as Water service lines.

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7.0 STUDS & NUTS

7.1 Scope :

7.1.1 Manufacture, testing and supply of alloy steel bolting materials, nuts and washers for flanges, valves etc. for Crude Oil/ Petroleum Product Service.

7.1.2 Each bolt shall be supplied with matching two nuts and two washers.

7.2 Specified Requirements :

7.2.1 Bolting material covers studs, stud bolts and washers.

7.2.2 Stud Bolts extend completely through the nuts with minimum D/3 Projects.

7.2.3 Nuts shall be of hexagonal shape.

7.2.4 For 1 inch and smaller in diameter, all stud bolts and nuts threaded in accordance with coarse series (UNC) and for 1 1/8 inch and larger in diameter with 8 pitch thread series (8 UN) of the Code ANSI B 1.1 Class 2 A fit.

7.2.5 Site Conditions:

Temperature Range	-	+5°C to + 50°
Rainfall	-	Heavy
Rel. Humidity	-	98%

7.3 Codes & Standards :

4.1	Stud Bolts	:	ASTM A 193 (Gr.B 7)
4.2	Nuts	:	ASTM A 194 (Gr. 2H)
4.3	Washers	:	Toughened mild steel IS-2016-1967 (Punched washers 'A' with 2mm minimum thickness)
4.4	Tolerances for material	:	ASTM A 29 and ANSI B 1.1
4.5	Bolting details	:	ANSI B 16.5
4.6	Dimensions of stud bolts and nuts	:	ANSI B 18.2.1/ ANSI B 18.2.2
4.7	Threading for stud bolts and nuts and tolerances of threads	:	ANSI B 1.1
4.8	Testing of steel fasteners (All supplements included)	:	ASTM A 370, A 193, A 194.
4.9	Proof load test on nuts	:	ASTM A 194.

8.0 RCC HUME PIPE

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RCC Hume Pipe shall be as per relevant BS specifications & match with the requirements of NP2 Class

9.0 NIPPLE AND HALF COUPLING :**9.1 General :**

9.1.1 Butt-welded steel nipples and half couplings suitable for Crude Oil/ Petroleum Product service.

9.1.2 The size, pressure rating, quantity shall be as per Schedule of Rates of Tender Document.

9.1.3 Site Conditions :

Temperature Range : +50° C to +50° C
Rainfall : Heavy
Rel. Humidity : 98%

9.2 Specific Requirements for Nipples :

Code of Conformity : ANSI B 16.9
Ends : Butt welded and plain bevel
Material : ASTM A 105
Pressure rating : 3000 lbs
Normalised or quenched and tempered. Tempering temperature shall not be less than 1100° F.

9.3 Specific Requirements for Half couplings :

Code of Conformity : ANSI B 16.11
Ends : Socket Weld ends
Material : ASTM A 105
Pressure Rating : 3000 lbs.
Normalized or quenched and tempered. Tempering temperature shall not be less than 1100° F.

10.0 VALVES**10.1 GENERAL**

10.1.1 All SW valves upto 40mm size shall be of class 800

10.1.2 All flanged valves (except forged) shall have flanges integral with the valve body.

10.1.3 Valve Castings / Forgings shall be from approved foundries.

10.1.4 Yoke materials shall be at least equal to body material.

10.1.5 Forgings are acceptable in place of Castings but not vice-versa.

10.1.6 All stainless steel valves shall be of non-magnetic construction and asbestos free.

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TRINCOMALEE****Codes and Standards :**

Code of Conformity - BS 5351
End to End Dimensions - ANSI B 16.10

Material of Conformity :

All material conform to - BS 5351

a. Body	:	Forged / CS Construction
b. Ball	:	SS316 solid ball with mirror finished surface duly tested by the surface finish tester preferably "telesurf". The profile shall be tested by profile tester. The ball of Ball valves shall not protrude outside the flange ends.
c. Stem Material	:	SS 316
d. Body Seat Ring	:	PTFE
e. Valve Body Connector	:	Compatible for flanged connection.

C. CAST STEEL GATE VALVES (CSGV - CLASS 150) :

Gate Valves shall be conforming to API 600 / 6D for material, construction and dimensions.

-	Body	Cast Carbon Steel Conforming to ASTM-A 216 GR WCB.
-	Stem	Rising AISI - 410
-	Wedge	Solid or flexible, Carbon Steel conforming to ASTM-A 216 GR WCB. Trim of 13% Chromium stainless steel.
-	Yoke	Cast Carbon Steel conforming to ASTM-A 216 GR WCB.
-	Bonnet	Cast Carbon Steel conforming to ASTM-A 216 GR WCB - Outside screws.
-	End	Flanged with 1.5 mm. raised serrated finish and drilled as per ASME B-16.5 Table 1 A Class 150.
-	Bonnet Gasket	Made of corrugated or flat SS-304/soft iron with compressed asbestos filling as per table 1A of API 600.
-	Hand Wheel	Malleable iron or steel rounded solid construction.
-	Bonnet Bolts	ASTM-A 193 Gr. B7
-	Bonnet Nuts	ASTM-A 194 Gr. 2H

All dimensions of gate valve shall be as per Table 4 of API 6D. The valve shall be tested as per API-598.

D. CAST STEEL GEAR OPERATED GATE VALVES (CLASS 150) : FOR 350 MM DIA & ABOVE

Gear Operated Gate Valves shall be conforming to API 600 / 6D for material, construction and dimensions.

-	Body	Cast Carbon Steel Conforming to ASTM-A 216 GR WCB.
-	Stem	Rising AISI - 410 with facing 13% chromium steel.
-	Disc	Solid or flexible, Carbon Steel conforming to ASTM-A 216 GR WCB.

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		Trim of 13% Chromium stainless steel.
-	Back Seat	Renewable with provision to repack gland packing when line is under pressure.
-	Yoke	Cast Carbon Steel conforming to ASTM-A 216 GR WCB.
-	Bonnet	Cast Carbon Steel conforming to ASTM-A 216 GR WCB - Outside screws.
-	End	Flanged with 1.5 mm. raised serrated finish and drilled as per ASME B-16.5 Table 1 A Class 150.
-	Body Seat Ring	Seal welded, made out of carbon steel conforming to ASTM-A 216 GR WCB faced with stellite.
-	Bonnet Gasket	Made of corrugated or flat SS-304/soft iron with compressed asbestos filling as per table 1A of API 600.
-	Hand Wheel	Malleable iron or steel rounded solid construction. It shall have spokes to enable operation by chain.
-	Bonnet Bolts	ASTM-A 193 Gr. B7
-	Bonnet Nuts	ASTM-A 194 Gr. 2H

All dimensions of gate valve shall be as per Table 4 of API 6D. The valve shall be tested as per API-598.

Gear Arrangement :

A reduction gear unit comprising of bevel gears shall be provided of fully enclosed type construction with provision for lubrication and suitable gear ratio arrangement. Thrust bearing may be provided in the gear arrangement as needed. The grease cup shall be of carbon steel.

**E. CAST STEEL GATE VALVES WITH MOTORISED ACTUATORS (FLAME PROOF TYPE)
(CLASS 150):**

Gate Valves with motorised actuators for operation shall be conforming to API 600 / 6D for material, construction and dimensions.

-	Body	Cast Carbon Steel Conforming to ASTM-A 216 GR WCB.
-	Stem	Rising AISI - 410.
-	Wedge	Solid Carbon Steel conforming to ASTM-A 216 GR WCB. Trim of 13% Chromium stainless steel.
-	Back Seat	Renewable with provision to repack gland packing when line is under pressure. Seat ring shall be seal welded.
-	Yoke	Cast Carbon Steel conforming to ASTM-A 216 GR WCB.
-	Bonnet	Cast Carbon Steel conforming to ASTM-A 216 GR WCB - Outside screws.
-	End	Flanged with 1.5 mm. raised serrated finish and drilled as per ASME B-16.5 Table 1 A Class 150.
-	Body Seat Ring	Seal welded, made out of carbon steel conforming to ASTM-A 216 GR WCB faced with stellite.
-	Bonnet Gasket	Made of corrugated or flat SS-304/soft iron with compressed asbestos filling as per table 1A of API 600.
-	Hand Wheel	Malleable iron or steel rounded solid construction. It shall have spokes to enable operation by chain.
-	Bonnet Bolts	ASTM-A 193 Gr. B7
-	Bonnet Nuts	ASTM-A 194 Gr. 2H

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All dimensions of gate valve shall be as per Table 4 of API 6D. The valve shall be tested as per API-598.

F. CAST STEEL BALL VALVES (CSBV - CLASS 150)

Cast Steel Ball Valves shall be conforming to BS-5351 for material, construction and dimensions :

-	Body	Cast Carbon Steel. Conforming to ASTM-A 216 GR WCB - Single piece construction.
-	Stem	Anti Blow out SS-316.
-	Body Insert	Carbon Steel conforming to ASTM-A 216 GR WCB.
-	Ball	SS-316
-	Seat	PTFE
-	End	Flanged as per ASME B-16.5 Table 1 A , Class 150.

The valve shall be lever operated single port with anti static device and shall be fire safe to API-607/ BS 6755 Part - II

Certificate conforming to Valves being fire safe as per API-607/ BS 6755-Part -II shall be furnished.

Number of openings and closing cycles that the valve can withstand for satisfactory operation shall be clearly mentioned. At least it shall be with minimum One Lac Cycles is preferred.

10.2 Inspection and Testing of Valves

A. All testing as per API 598

- The manufacturing process for valves shall be inspected specially with regard to body seat ring welding. The welders qualification and the electrode used shall also be verified.
- The internal quality control procedures being followed shall be witnessed and checked for adequacy.
- Checking the serial number of the valves for further reference / identification.
- Verifying the foundry marking and recording the initials of foundry, size, type, heat no. etc. to ensure that the castings are from one of the approved foundries only.
- Co-relate the marked heat number with the material test certificate provided by the foundry regarding physical characteristics and metallurgical composition of the material and ensuring that the same is in conformity with standard values as per ASTM-A-216 Gr. WCB.
- Random visual and dimensional check of the machined body, bonnet, stem, seat rings and other components to ensure proper machining and conformity to dimensions as per API 600/6D.
- Inspect all assembled valves for any surface defects.
- Verify conformity of dimensions of the valve as per API 600/6D.
- Operation of all valves for easy opening and closing.
- Hydrostatic shell test and seat test for all valves.
- 10% low pressure (80%) air seat test.

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Inspection of valves shall be carried out before painting.

The inspecting agency shall put identification mark on all cleared valves. The certificate issued for cleared valves shall specifically mention their conformity to API-600 standards.

B. Gate Valves with Motorized Actuators

Inspection and testing of Gate Valves with motorised actuators shall be carried out with all above points (i.e. 9.9 A) in addition with following points :

- All testing as per API 598.
- Verification of CMRS and CCE approval certificates for Flameproof actuators.
- Valve operation of the motorised unit shall be verified.
- Speed of valve operation and tripping of torque switch at maximum valve torque at 90% of nominal voltage shall be verified.

C. CAST STEEL BALL VALVES :

Inspection and testing of Ball Valves shall be carried out with all above points (i.e. 9.9 A) in addition with following points :

- All testing as per API 607/ BS 6755-Part -II
- Verification of third party certificate issued in respect of :
 - a. Fire safe test as per API 607/ BS 6755-Part -II
 - b. Cyclic test for 1 lac cycles of operation for satisfactory performance and deformation in seat if any after the above.
 - c. Inspection of valves shall be carried out before painting.
 - d. The certificate issued for cleared valves shall specifically mention their conformity to BS 530f strainers can be accepted with due approval of LIOC.

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**WELDING REQUIREMENTS IN PIPELINE FABRICATION****1.0 WELDING RESPONSIBILITY**

- 1.1 The contractor is responsible for the welding done by welders employed by him. Engineer-In-Charge shall conduct the tests required to qualify welding procedures, and to qualify the welders and if, necessary re-qualify welders and welding operators.

2.0 WELDING OF PIPELINES

- 2.1 The welding of pipe lines shall be as per API -1104.

3.0 WELDING QUALIFICATIONS**3.1 QUALIFICATION REQUIREMENTS**

- 3.1.1 Qualification of the welding procedures to be used and of the performance of welders and welding operators shall conform to the requirements of the ASME Section IX.

4.0 PROCEDURE QUALIFICATION BY OTHERS

- 4.1 Engineer-In-Charge is responsible for qualifying any welding procedure that will be used. Welding procedures qualified by others may be used, subject to the specific approval of the Engineer-in-Charge / Inspector provided that the following conditions are met.

- a) The proposed Welding Procedure Specification (WPS) has been prepared, qualified and executed by responsible, recognized organization with expertise in the field of welding and
- b) The Contractor has not made any change in the welding procedure.

- 4.2 The contractor should accept written responsibility for both i.e. the Welding Procedure Specifications (WPS) and the Procedure Qualification Record (PQR).

- 4.3 The contractor has at least currently employed welder or welding operator, who have met with the following requirements

- a) While in employment, the welder has satisfactorily passed a performance qualification test using the procedure and the P-Number material specified in the WPS.
- b) The performance bend test required by ASME Section IX QW-30 shall be used for this purpose

5.0 PERFORMANCE QUALIFICATION BY OTHERS

- 5.1 Site Engineer may accept a performance qualification made by certified agencies with the specific approval of the Engineer-In-Charge.

- 5.2 The Contractor shall obtain a copy from the certified agencies of the performance qualification test record & submit the same to Engineer-In-Charge with specific recommendation & approval of Inspector with the following details.

- a) The name of the agency.
- b) The name of the welder or welding operator.

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- c) The procedure identification.
- d) The date of successful qualification.
- e) The data that Individual last used, the procedure on Pipeline fabrication.

6.0 QUALIFICATION RECORD

6.1 The Contractor shall maintain a self-certified record, available to the Engineer-In-Charge and the Inspector. The records will have the following details:

- a) The procedure used.
- b) The welders and welding operators employed showing the date and results of procedure and performance qualifications
- c) The identification symbol assigned to each welder and welding operator.

7.0 WELDING MATERIALS**FILLER METAL**

Filler metal shall conform to the requirements of ASME Section IX. filler metal, not yet incorporated in ASME Section IX may be used with IOC approval, if a procedure qualification test is first successfully made.

8.0 CLEANING

8.1 Internal and external surfaces to be thermally cut or welded shall be clean. They will be free from paint oil rust scale and other material that would be detrimental to either the weld or the base metal when heat is applied.

9.0 END PREPARATION

- 9.1 End preparation is acceptable only if the surface is reasonably smooth and true, and slag from oxygen or arc cutting is cleaned from thermally cut surfaces.
- 9.2 Discolouration remaining on a thermally cut surface is not considered detrimental oxidation.
- 9.3 End preparation, for groove welds specified in ASME or as specified, which meets the WPS is acceptable.
- 9.4 Edge preparation - The pipes supplied are generally with bevelled ends. However, in case any ends are damaged the cutting/ beveling shall be carried out.

10.0 WELDER'S IDENTIFICATION SYMBOL

10.1 Each qualified welder and welding operator shall be assigned an identification symbol. Unless otherwise specified in the engineering design, each weld or adjacent area shall be marked with the identification symbol of the welder or welding operator .In addition of marking the weld, appropriate records shall be maintained.

TACK WELDS

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Tack welds at the root of the joint shall be made with filler equivalent to that to be used in the root pass.

Tack welds shall be made by a qualified welder or welding operator.

Tack welds shall be fused with the root pass weld, except that those which have cracked shall be removed. Bridge tacks (above the weld) shall be removed.

Tack welds used in assembling shall be removed and surface grinded properly and gaps filled with weld metal.

PEENING

Peening is prohibited on the root pass and final pass of a weld.

11.0 CLIMATIC CONDITIONS

No welding shall be done if there is impingement on the weld area, of rain, snow, sleet or excessive wind or if the weld area is frosted or wet.

Electrodes for welding shall be stored in a dry place (HOT CASE) in their original packets or cartons.

12.0 FILLET AND SOCKET WELDS

Fillet welds, including socket welds, may vary from convex to concave. The size fillet weld shall be as per engineering design.

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FORMAT FOR WELDING PROCEDURE SPECIFICATIONS (WPS)

1. Contractor's Name _____
2. By _____
3. WPS No.(s) _____ Date _____
4. Supporting PQR No. (s) _____
5. Revision No. _____ Date _____
5. Types of Welding _____
Process (es) (Automatic, Manual, Machine or Semi Automatic)

Notes :

- 1) Tenderers to sign Pg. Nos. ____ to ____ in token of acceptance of formats.
- 2) Details have to be filled in by the successful tenderer at the time of acceptance of W.O.

WA. JOINT

1. Joint Design _____
2. Backing (Yes) _____ (No) _____
3. Type of Backing Material _____

Notes:

- a) The general arrangement of the parts to be welded should be shown by sketches, drawings, weld symbols or written detailed description. The root spacing and the details of weld groove should be specified.\
- b) The contractor should attach the sketches to illustrate joint design, weld layers and bead sequence e.g. for notch toughness procedures, for multiple process procedures etc.

WC1. POSITIONS

1. Position(s) of Groove _____
2. Welding Progression : Up _____
Down _____

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3.Position(s) of Fillet _____

WC2. PREHEAT

1. Preheat Temp. Minimum _____
- 2 Interpass Temp. Max _____
- 3 Preheat Maintenance _____

Note: Continuous or special heating where applicable should be recorded

WC3. GAS

- 1 Shielding Gas(es) _____
- 2 Percent Composition _____
(mixtures)
- 3 Flow Rate _____
- 4 Gas Backing _____
- 5 Trailing Shielding Gas _____

WC4. ELECTRICAL CHARACTERISTICS

- 1 Current AC or DC _____ Polarity _____
2. Amps.(Range) _____ Volt- (Range) _____
- 3 Tungsten Electrode _____
Size & Type (Pure Tungsten-2% Thoriated etc.)
- 4 Mode of Metal Transfer _____
For GNAW (Spray arc, short circuiting arc etc.)
5. Electrode Wire feed _____
speed range

Notes:

- a. Amps. and volts range should be recorded for each electrode size, position and thickness etc.
- b This information may be listed in a tabular form similar to that shown above

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WC5. TECHNIQUE

1. String or Weave Bead _____
2. Orifice or Gas Cup Size _____
3. Initial and Interpass Cleaning _____
(Brushing, Grinding etc.)
4. Method of Back Gouging _____
5. Oscillation _____
6. Contact Tube to Work Distance _____
7. Multiple or Single Pass (per side) _____
8. Multiple or Single Electrodes _____
9. Travel Speed (Range) _____
10. Peening _____
11. Other _____

WB. STEEL PLATES MATERIAL (BASE METAL)

1. P.No. _____ Group No. _____ To P. No. _____ Group No. _____

OR

2. Specification _____ Specification _____

to

type and grade _____ type and grade _____

OR

- 3 Chem. Analysis _____ Chem Anlysis _____
and Mech. Prop. _____ and Mech. Prop. _____

4. Thickness Range :

- 5- Base Metal : _____ Groove _____ Fillet _____

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6. Deposited : Groove _____ Fillet _____
Weld Metal
7. Plate thickness Groove _____ Fillet _____
range
8. Other _____

WC. ELECTRODES

1. F.No. _____ Other _____
2. A.No. _____ Other _____
3. Spec. No. (SFA) _____
4. AWS No. (Class) _____
5. Size of filler metals _____
(Electrode, Cold Wire, Hot Wire etc.)
6. Electrode Flux (Class) _____
7. Flux Trade Name _____

Notes: Each base metal filler metal combination should be recorded individually.

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WELD LAYERS	PROCESS	FILLER METAL		CURRENT		VOLT RANGE	TRAVEL SPEED RANGE	OTHER
		CLASS	DIA	TYPE POLAR	AMP. RANGE			
								eg. Remarks, Coment Hotwire, Addition Technique, Torch Angle, Etc.

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FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)

1. Contractor's Name _____
2. PQR No. _____
3. Date _____
4. WPS No. _____
5. Welding Process(es) _____
(Type - Manual, Automatic, Semi-Auto)

**PA. JOINTS
GROOVE DESIGN OF TEST COUPON**

Note :

For combination qualifications the deposited weld metal thickness shall be recorded for each filler metal or process weld.

PB. STEEL PLATES MATERIAL (BASE METAL)

1. Material Spec. _____
2. Type of Grade _____
3. P.No. _____ To P.No. _____
4. Thickness of Test Coupon _____
5. Size Test Coupon _____
6. Other _____

PC. WELDING ELECTRODES (FILLER METALS)

1. Weld Metal Analysis A-No. _____
2. Size of Filler Metal _____
3. Filler Metal E-No. _____
4. SPA Specification _____

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5. AWS Classification _____

6. Other _____

PC1. POSITION

1. Position of Groove _____

2. Weld Progression (Up, down) _____

3. Other _____

PC2. PREHEAT

1. Preheat Temp. _____

2. Interpass Temp. _____

3. Other _____

PC3. GAS

1. Types of Gas of Gases _____

2. Composition of Gas Mixture _____

3. Other _____

PC4. ELECTRICAL CHARACTERISTICS

1. Current _____

2. Polarity _____

3. Amps. _____

4. Volts _____

5. Tungsten Electrode Size _____

6. Other _____

PC5. TECHNIQUE

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1. Travel Speed _____
 2. String or Weave Bead _____
 3. Oscillation _____
 4. Multipass or Single
Pass (per side) _____
 5. Single or Multiple
Electrodes _____
 6. Other _____
-

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TENSILE TEST

SPECIMEN NO.	WIDTH	THICKNESS	AREA	ULTIMATE TOTAL LOAD Kgs.	ULTIMATE UNIT STRESS Mpa	TYPE OF FAILURE AND LOCATION

GUIDED BEND TEST

TYPE AND FIGURE NO.	RESULT

TOUGHNESS TEST

SPECIMEN NO.	NOTCH LOCATION	NOTCH TYPE	TEST TEMP.	IMPACT VALUES	LATERAL EXP.	MILES	DROP WEIGHT	
					% SHEAR		BREAK	NO BREAK

FILLET WELD TEST
2. RESULT

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Satisfactory :

Yes _____

No _____

3. PENETRATION INTO PARENT METAL :

Yes _____

No _____

3. MACRO -RESULTS _____

OTHER TESTS

1. TYPE OF TEST _____

2. DEPOSIT ANALYSIS _____

3. OTHERS _____

1. WELDER's NAME _____

2. CLOCK NO. _____ STAMP NO. _____

3. TEST CONDUCTED BY _____

4. LABORATORY TEST NO. _____

This is to certify that the statements in this record are correct. We also certify that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer _____

Date _____ By _____

Detail of record of tests are illustrative only and may be moulded to conform to the type and number of tests required by the Code.

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CONTRACTORS RECORD OF WELDER QUALIFICATION TESTS

Welder Name _____

Check No _____ Stamp No _____

Using WPS No _____ Revision _____

The above welder is qualified for the following ranges

SN.	DESCRIPTION	RECORD ACTUAL VALUES USED IN QUALIFICATION	QUALIFICATION
1	Process		
2	Process Type		
3	Backing (Metal, weld, flux etc)		
4	Material Specs		
	a. Plate thickness		
	b. Groove		
	c. Fillet		
5	Filler Metal		
	Spec No		
	Class		
	F. No		
6	Position		
7	Weld Progression		
8	Gas Type		
9	Elec. Charac		
	a Current		
	b Polarity		

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GUIDED BEND TEST RESULTS

TYPE & FIGURE NO.

RESULT

RADIOGRAPHIC TEST RESULTS

For alternative qualification of groove welds by radiography Radiographic
Results_____

FILLET WELD TEST RESULTS

Fracture Test_____

(Describe the location, nature & size of any crack or tearing of the specimen)

Length and Percent of Defects_____ INCHES_____%

Macro Test - Fusion _____

Appearance - Fillet Size(ing) _____ in. X _____ in.

Convexity _____ in. or Concavity _____

Test Conducted by _____

Laboratory - Test No. _____

This is to certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Organisation _____

Date _____

By _____

Details of record tests are illustrative only and may be modified to conform to the type & number of tests required by the Code.

Note : Any essential variables in addition to those above shall be recorded.

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ELECTRODE QUALIFICATION TEST RECORD

Date _____

Test started On _____

Test completed on _____

A. DETAILS _____

1. Tested at _____

2. Work order no. _____

3. Sponsoring Agency _____

4. Manufacturer's Name _____

5. BrandName _____

6. Welding positions _____

7. In combination with (if any) _____

8. Reference Code & Classification _____

9. Special requirements (if any) _____

10. Batch No. with date & size _____

SN.	ELECTRODE SIZE	BATCH NO.	DATE OF MANUFACTURE	REMARKS

B. TESTS

All weld tests _____

Base material used _____

Buttering used _____ Yes/No.

Preheat Temperature _____ Deg.C

Interpass Temperature _____ Deg.C

PWHT details soaking Tem./Time _____

Visual Examination _____

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RADIOGRAPHIC PROCEDURE FOR PIPELINE FABRICATION

- | | | |
|-------|---------------------------------------|---|
| 1. | Location | - |
| 2. | Date of Testing | - |
| 3. | Name of the Contractor | - |
| 4. | Material | - |
| | Carbon steel/Alloy Steel | - |
| | /Stainless Steel | - |
| 5. | Pipe size | - |
| 6. | Type of Weld Joint | - |
| 7. | Radiation Source | - |
| 8. | Intensifying Screens/
Lead Screens | - |
| 9. | Geometric Relationship | - |
| 10. | Limit of Film Coverage | - |
| 11. | Film Type and Make | - |
| 12. | Exposure Time | - |
| 13. | Processing | - |
| 14. | Density | - |
| 15. | Sensitivity | - |
| 16. * | Type of Penetrameter
(Source side) | - |
| 17. * | Type of Penetrameter
(Film slide) | - |

Signature of Contractor
with Seal

Approval of Owner's Inspector

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WELDER'S IDENTIFICATION CARD

PHOTOGRAPH

- | | | |
|----|---------------------|---|
| 1. | Name | - |
| 2. | Identification | - |
| 3. | Date of Testing | - |
| 4. | Valid until | - |
| 5. | Process | - |
| 6. | Thickness | - |
| 7. | F. No. | - |
| 8. | Approval of welding | - |
| 9. | Position | - |

Approved by

Employee's Signature
with Seal

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PRESSURE TESTING OF PIPELINES

1.0 GENERAL :

- Soundness of the welds shall be tested by means of hydrostatic tests. The test shall be conducted only after fulfilling the requirements of visual inspection, radiography etc. and when the entire work is certified by the site engineer for the performance of such tests.
- This recommended practice covers the hydrostatic testing of new and existing petroleum pipelines and the dynamic testing of existing pipelines. It recommends minimum procedures to be followed, equipment to be used and conditions to be considered during the hydrostatic and dynamic testing of pipelines.
- Nothing in this recommended practice should be considered as a fixed rule for application without regard to sound engineering judgment. Certain Governmental requirements may differ from the criteria set forth in this recommended practice, and its issuance is not intended to supersede or override such requirements.

2.0 TEST MEDIUM

The hydrostatic test should be conducted with potable water. However for ATF & A.V. Gas pipeline the product may be used as testing medium.

3.0 EQUIPMENT FOR A HYDROSTATIC TEST :

3.1 Equipment for the hydrostatic test should be properly selected and in good working order. Equipment affecting the accuracy of the measurements used to validate the specified test pressure should be designed to measure the pressures to be encountered during the hydrostatic test.

3.2 Equipment for conducting the hydrostatic test may include the following :

- a) a high volume pump capable of filling the line at minimum velocity of 2 km/h (approximately 1 mph)
- b) a test medium supply line filler capable of ensuring a clean test medium.
- c) An injection pump to introduce corrosion inhibitors or other chemicals into the test segment, if their use is required.
- d) A meter or other comparable means of measuring line fill.
- e) A variable speed positive displacement pump capable of pressurizing the line at least 7 kg/Sqcm. (approximately 100 psi) in excess of the specified test pressure. The pump should have a known volume per stroke and should be equipped with a stroke counter (a constant speed pump having a variable flow rate control may be used in lieu of the above if the liquid test medium injected into the pipeline is measured during pressurization.
- f) Portable tank, if required, capable of providing a source of liquid test medium.
- g) A large diameter bourdon tube type pressure gauge with a pressure range and increment divisions necessary to indicate anticipated test pressures.
- h) A deadweight tester certified for accuracy and capable of measuring increments of 0.1 Kg/Sqcm (1.5 psi).
- i) A 24 hour recording pressure gauge with charts and ink. This gauge should be deadweight tested immediately prior to and after use.

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- j) Two glass laboratory thermometers, with a 75 mm. (approximately 3 in) immersion capability, capable of measuring temperatures from 0 deg. C (32 Deg.F) to 50 Deg.C (122 Deg.F).
- k) A 24 hour recording thermometer capable of recording temperatures from 0 Deg. C (32 Deg.F) to 50 Deg.C (122 Deg.F).
- l) Pigs, scrappers, spheres and similar devices to be used to clean the test segment and to facilitate the removal of air from the line.
- m) Temporary manifolds and connections as necessary.
- n) Equipment, materials and fluids needed to displace the test medium from the test segment.

4.0 TEST PLAN :

The following factors should be considered in planning a hydrostatic test :

- a) Maximum operating pressure anticipated through the life of the facility.
- b) Location of pipe and other piping components in the test segment by size, wall thickness, grade type and internal design pressure(s).
- c) Shell pressure rating and locating of all pipeline valves, air vents and connections to the segment.
- d) Anticipated temperature of test medium, atmosphere and ground.
- e) Source (s) of test medium and any inhibiting or other treating requirements.
- f) Locations and requirements for test medium disposal.
- g) Profile and alignment drawing maps.
- h) Safety precautions and procedures.

5.0 TEST PROCEDURES :

A hydrostatic test procedure diagram with explanatory notes and data should be prepared prior to testing and should indicate in a detailed fashion the following :

- a. The length and location of the test segment (s).
- b. Test medium to be used.
- c. Procedures for cleaning and filling the line.
- d. Procedures for the pressurization of test segment (s) including the locations of the injection points and the specified minimum and maximum test pressures.
- e. Minimum test duration for test segment (s).
- f. Procedures for removal and disposal of test medium.
- g. Safety precautions and procedures.

A specified test pressure is defined as the minimum test pressure which should be applied to the most elevated point in the test segment. As detailed analysis of the profile to determine static and dynamic pressures while the pipeline is being tested should be performed so that the pipeline will not be over pressured at points which are at low elevations.

6.0 LINE FILL AND CLEANING :

- 6.1 The line fill operation should serve the dual function of cleaning the line and introducing the necessary test medium into the test segment.. screens or filters should be installed in the test medium supply line to control the contamination of the test medium by debris or sediment. The quality and source of water should be determined. Water which is not free of sediments and may be injurious to the pipe, valves, equipments etc. should not be used unless it is filtered. The filling operation should be planned and executed in a manner

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which prevent the infusion of air into the test segment. Vents, if necessary should be provided on the test segment to permit the purging of trapped air. Pumping of the test medium should continue until the pigging devices have been received at the receiving scraper trap, or until they have passed the block valve terminating the test segment.

7.0 PRESSURIZATION :

- 7.1 Personnel conducting the test should maintain continuous surveillance over the operation and ensure that it is carefully controlled.
- 7.2 The test segment should be pressurized at a moderate and constant rate. When approximately 70% of the specified test pressure is reached, the pumping rate should be regulated to minimize pressure variations and to ensure that increments of no greater than 1 kg/ sqcm may be accurately read and recorded. Pipe connections should be periodically checked for leaks during pressurization.

8.0 THE TEST HOLD :

- 8.1 When the test pressure is reached, pumping should be stopped and all valves and connections to the line should be inspected for leakage, a period of conservation should follow during which test personnel verify that specified test pressure is being maintained at the line pressure and temperature have stabilized. Upon the completion , the injection pump should be disconnected of its connection to the pipeline and checked for leakage. Pressure should be monitored and recorded continuously during the duration of the test.

9.0 DISPLACEMENT OF TEST MEDIUM :

- 9.1 Water should be completely drained off. This can be accomplished with spheres, squeegees and / or other pigging devices wherever practical. Water should be disposed off at approved locations in a manner that will cause minimal environmental effects.

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SPECIFICATION FOR BLAST CLEANING & PAINTING OF MILD STEEL PIPELINES/ ALLIED STRUCTURAL WORK/ DOPING FOR UNDERGROUND PIPELINES

1.0 GENERAL

- 1.1 These specifications define basic requirements for painting of mild steel pipelines and allied structural work.
- 1.2 It is deemed that the work shall be carried out by the contractor with the best quality of specified material and workmanship at his own cost.
- 1.3 Adequate numbers of required tools, brushes, blast material, scaffolding, shot/sand blasting equipment, air compressors etc. shall be arranged by the contractor at site.
- 1.4 During storage and application of paints, the paint manufacturer's instructions shall be strictly followed. Particular attention shall be paid to the following:
 - Proper storage avoiding exposure and extreme temperature.
 - Specified surface preparation.
 - Mixing and thinning.
 - Application of paints and the recommended time intervals between consecutive paint coats.
- 1.5 Two pack paint system will be mixed by mechanical means. The Engineer-In-Charge may allow hand mixing of small quantities at his discretion.
- 1.6 Painting shall be done only after the mechanical completion and testing on systems are completed.
- 1.7 The 'Fire Red' colour paint shall be used for painting fire water net work, hydrants monitors, hose boxes etc.

2.0 SCOPE OF PAINTING

- 2.1 Scope of pipeline painting work covered in the specification shall include:
 - Structural steel work, walk ways, pipes supports, ladders etc.
 - All above ground piping and fittings including identification marks).
 - Painting of valves/ strainers/ check valves and fitting of pipeline
 - identification colour bands and directions on all piping as required.
 - Supply of all primers, paints and all other material required for painting.
 - Coating and wrapping of underground pipelines .

3.0 SURFACE PREPARATION

- 3.1 In order to achieve the maximum durability, one or more of following methods of surface preparation shall be followed before blast cleaning.

MANUAL OR HAND TOOL CLEANING

This normally consists of hand descaling and/or hammering, hand scrapping and hand wire brushing. Rust, mill scales, weld spatters, old coatings and other foreign matter shall be

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removed by hammering, scrapping tools, emery paper cleaning, wire brushing or combination of the above methods. On completion of cleaning, loose material shall be removed from the surface by clean rags and the surface shall be brushed swept, re-dusted and blown off with compressed air to remove all loose matter. For repainting of existing tanks, Non ferrous tools should be used for cleaning.

MECHANICAL OR POWER TOOL CLEANING

Power tool cleaning shall be done by mechanical striking tools, chipping hammers, grinding wheels or rotating steel wire brushes. Excessive brushing of surface shall be avoided as it can reduce paint adhesion. On completion of cleaning, the detached rust, mill scale etc. shall be removed by clean rags and / or washed by water or steam and thoroughly dried with compressed air jet before application of paint.

BLAST CLEANING

- The sand / shots used for blasting shall be free from moisture, salt. Sand size should be 16 mesh to 30 mesh in order to have surface profile range 55-65 microns.
- Size of abrasive : 16 - 30 mesh. The particle should pass through 100 % when sieved with 16 mesh and nothing to pass through when sieved with 30 mesh i.e. size below 16 & above 30 mesh are not recommended.
- Shape of abrasive : Sharp, semi-sharp, spherical or near spherical. Semi-sharp means, some sharp as well as round edge in one particle grit.
- The total surface shall then be blast cleaned to Swedish Standard SA 1/2.
- The blasting has to be carried out at a pressure of 7 kg / sq. cm. at the nozzle tip. Compressed air is to be free from moisture and oil.
- On completion of blasting operation, the blasted surface shall be made clean and free from any dust and scale or rust and must show a grey white metallic lustre as demonstrated in SA2 1/2.
- Blast cleaning shall not be done in bad weather without adequate protection or when there is dew on the metal which is to be cleaned or humidity exceeding 85% . Surface profile shall be uniform to provide good key to the paint.
- Primer or first coat of paint shall be applied within 4 hours of sand blasting or as directed by Engineer-In-Charge depending on weather conditions.

4.0 APPLICATION OF PRIMER AND PAINT

- Before application of primer, the surface shall be cleaned of dust etc. All paints shall be thoroughly stirred up prior to and during their application.
- Application of coats shall not be carried out if the atmospheric temperature is less than 5°C or if the temperature exceeds 40°C in the shadow, 50°C due to the influence of sun or if relative humidity exceeds 85% or in case of adverse weather conditions like rain, fog, dust storm etc.
- Coating media shall be applied in uniform thickness. All slots, recesses, grooves, corners, angles and interstices shall be covered by paint. Sag and runs shall be distributed or removed and new paint shall be applied uniformly.
- Paint containers shall be opened only prior to utilisation and shall be carefully closed immediately after withdrawal of paint. Expiry date of the paint should be checked before opening the container. Paint, which have become unserviceable during storage, shall not be applied. All painting material shall be kept in weather proof barracks and shall be kept cool and dry.

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- Irrespective of the method of surface preparation, the first coat of primer must be applied on dry surface. This should be done immediately and in any case within 4 hours of cleaning of surface. Sweet blasting of the blasted surface should be carried out in case of more than 4 hours delay in painting.
- The brushes will conform to IS:384. The width of the brushes shall not be more than 15 cms.
- Paint shall be applied by brush/conventional spray/ airless spray. During spraying the paint shall be maintained thoroughly mixed in the spray gun.
- Contractor shall obtain approval for specification for spraying installation concerned, the type of equipment, nozzle diameter, pressure setting etc. The paint shall be sprayed uniformly. Surfaces impossible to be coated by spraying must be painted by brush.
- Painting work shall be done in day time only preferably between 9AM to 5PM..
- Successive coats in paint system shall be slightly different in shade for easy identification. Shade of each coat shall be decided by Engineer-In-Charge.

5.0 Lettering ,painting directional signs and relevant data shall be painted in suitable size as directed by Engineer in Charge.

6.0 INSPECTION AND TESTING

- Required painting materials for application shall be procured directly from manufacturers as per specification. Manufacturer's test certificates for every batch should be submitted to Engineer-in-Charge without which paints will not be accepted.
- Engineer-in-Charge at his discretion may call for tests for paint formulations. Contractor shall arrange to have tests performed including batch wise test of wet paints for physical and chemical analysis at no extra costs to the LIOC.
- The painting work shall be subject to inspection by Engineer-in-Charge at all times. Following aspects will be considered during inspection and contractor shall offer the work for inspection and approval of Site Engineer before proceeding with the next stage. The record of inspection shall be maintained in the registers. Stages of inspection are as follows
 - Surface preparation
 - Primer Application
 - Each coat of paint
- Any defect noticed during the inspection is to be rectified by the contractor to the satisfaction of Engineer-in-Charge proceeding further.
- Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during the final inspection/guarantee period/defect liability period as defined in general condition of contract.
- Dry film thickness (DFT) shall be checked and recorded after application of each coat and extra coat of paint should be applied to make up the DFT specified without any extra cost to the LIOC.
- The contractor has to position an ELCOMETER at site for checking the paint thickness by the site engineer.
- The contractor shall arrange and keep Holiday Detector at site.

7.0 PAINTING FOR CIVIL DEFENCE REQUIREMENTS

7.1 Two coats of selected finishing paint as per defence requirements shall be applied wherever specified in a camouflaging pattern and as per instructions of Engineer-in-Charge.

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- Disruptive painting for camouflaging shall be done in three colours in the ratio of 5:3:2 (all Matt finish).
- The patches should be asymmetrical and irregular.
- The patches should be inclined at specified angle to horizontal.
- The patches should be continuous where two surfaces meet at an angle.
- The patches should not coincide with corners.
- Slits and holes are to be painted in dark shades.
- Width of the patches should be 1 to 2 metres.

8.0 PAINTING SPECIFICATIONS

In the case of surface preparation, wherever blasting to SA 2 ½ is recommended, maximum peak of surface profile should be less by 5-10 micron from the primer DFT. Repainting of existing pipelines shall be by mechanical cleaning by wire brushing followed by application of paint.

Material Specification

A) SAND/GRIT

The sand/grit used for Blasting shall be free from moisture, impurities salt and shall have a maximum particle size of not more than passing through a 500 micron mesh (IS.)

B) BRUSHES

The brushes used in painting shall conform to IS : 384

C) PRIMER COAT

The primer used must provide good protection against corrosion and shall leave a tough adherent film which will form a suitable base for the following coats. It shall conform to given specifications.

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D) FINISH COAT

The finish coats shall conform to given specifications.

E) FIRE RED PAINT

The fire red paint shall be used for painting over surface of fire water pipelines

F) Only superior grade paints of approved make and quality and conforming to given specification shall be used. Contractor shall obtain approval from site engineer in writing before procurement of primer/paint etc. and shall obtain approval from site in sealed and unopened condition for inspection and approval of engineer-in-charge.

SPECIFICATION OF PAINTS FOR EXTERIOR SURFACES OF PIPELINE & STRUCTURAL PAINTING:

SN	DESCRIPTION	NO OF COATS	DFT (microns)
1	Surface Preparation	Sand blasting to SA 2.5	
2	PRIMER : Interzinc 670 HS (Zinc Silicate) of M/s. Akzo Nobel or equivalent	ONE COAT	75
3	INTERMEDIATE: Intergard 400 (MIO) of M/s. Akzo Nobel or equivalent	ONE COAT	125
4	FINISH : Interthane 990 (Polyurethane) of M/s. Akzo Nobel or equivalent	TWO COAT	40 x 2 = 80
	TOTAL THICKNESS OF THE PAINTING SYSTEM (MICRONS)		280
	Note: Required thinner as per manufacturer's recommendations to be used.		

SPECIFICATION FOR PAINTING OF GRATINGS:

SN	DESCRIPTION	NO OF COATS	DFT (microns)
1	Surface Preparation	Sand blasting to SA 2.5	
2	PRIMER : Zinc Phosphate	TWO COAT	35 x 2
3	FINISH : Synthetic enamel paint	TWO COAT	30 x 2
	TOTAL THICKNESS OF THE PAINTING SYSTEM (MICRONS)		130
	Note: Required thinner as per manufacturer's recommendations to be used.		

9.0 PAINT MANUFACTURERS

9.1 An indicative list given below of paint manufactures whose product conforming to the respective qualities specified herein may be considered for use. However, site engineer reserves the right to reject any material of these manufacturers which do not confirm to the specifications

- M/s Asian Paints India Ltd.
- M/s Bombay Paints Ltd
- M/s Berger Paints India Ltd
- M/s Kansai Nerolac Paints Ltd
- M/s PPP Sigma Kalon Paints
- M/s Jenson & Nicholson India Ltd
- M/s Akzo Nobel Paints

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f. M/s Shalimar Paints Ltd.

**TECHNICAL SPECIFICATION FOR DOPING FOR UNDERGROUND PRODUCT AND FIRE
HYDRANT PIPELINES.**

1.1 SCOPE :

This specification lays down the requirements for selection, application and protective coatings on exposed metal surface of underground piping.

Vendor to supply all the material required for pipe coating and wrapping, including supply of primer, coating and wrapping material and other accessories required for the purpose. The scope should also include application of primer and providing pipe coating/wrapping as per the specifications given below or as per the instructions of Engineer-in-charge.

1.2 MATERIAL SPECIFICATIONS :

1.2.1 Material to be used shall be Pypkote AW 4mm, complying with the requirements of AWWA C203, Section 8.

1.2.2 The product comprises of a central core of 50 micron HMHDPE film and a second center core of fiber glass tissue which lends mechanical strength and dimensional stability to the product. Interleaved between the center cores are 3 layers of coal tar mix. The membrane is terminated on both exterior by thermofusible HM HDPE film. All the seven layers are calendared together to create a 4 mm thick tape.

1.2.3 CHARACTERISTIC AND TESTING PROCEDURES:

1.	Characteristics of modified mix	Testing Procedure
a)	Softening point : In excess of 115°C	LTM01 (ASTMD-36)
B)	Penetration (25 °C, 100g, 5 sec.) : 0.3 to 2mm.	LTM02 (ASTMD-5)
c)	Filler content : 20 to 30%	---
2.	Characteristics of Tape	
a)	Nominal thickness : 4 mm + 0.2mm	---
b)	Pliability : Does not break at 17 °C	LTM03 (ASTMD228)
c)	Tensile Strength : Lengthwise : Min. 350N/5cm Crosswise : Min. 100N/5cm	LTM07 (DIN 52123)
d)	Elongation : Lengthwise : Min. 20% Crosswise : Min. 30%	LTM07 (DIN 52123)
e)	Heat Resistance : Does not drip at 100 °C	LTM 05 (ASTMD 146)

1.3 APPLICATION PROCESS:

A. APPLICATION OF PRIMER :

i) Sand blast to SA 2.5

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- ii) Apply a coat of primer (Coal Tar and solvent based primer) of density 0.90 to 0.95 gms/cm³ and viscosity of 1000-2000 centipoise (Pypkote primer manufacture by IWL or its equivalent) at the rate of 100 gms/sq.m. The primer shall be allowed to dry until the solvent evaporates and the surface becomes tacky.

B. APPLICATION OF COATING/WRAPPING TAPE :

Pypkote AW 4mm tape is wound around the pipe in spiral fashion and bonded completely to the primer coated surface of the pipe by thermo fusion process and with recommended overlaps as per manufacturers specifications. The overlaps are sealed by the same thermo fusion process. 250mm is left uncoated on either end of the pipe to permit installation and welding. This area is coated in-situ after the pipeline is installed. Additional reinforcements may be provided at the ends of pipe to prevent damage during lifting the pipe by crane.

In case of damage, rectification can be easily accomplished by patching up the damaged area by thermo fusion. Holiday test may be conducted over the coated surface.

1.4 TESTING OF WRAPPING

Holiday testing : The coating of pipes shall be checked for any voids/ holidays in coating according to AWWA C-203-86 . Holiday detection should be done at 14 to 15 KV at the brush

Thickness of coating : coating thickness should be measured using a pit gauge or cutting sample at selected spots.

After testing, the damaged coating places should be repaired and holiday tested again.

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PAYMENT SCHEDULE

SN.	DESCRIPTION	% PAYMENT
1.	CIVIL WORKS.	
a.	Up to 95% of item rate on completion of each item in RA bills.	
b.	Balance 5% on completion of all works and in final bill	
2.	PIPELINE WORK	
a.	After fabrication ,laying ,welding of pipes.	70%
c.	After hydrostatic testing	10%
c.	Sand Blasting / Painting	10%
d.	On mechanical completion of works	05%
e.	Balance in final bill	05%
3.	STEEL STRUCTURAL WORK INCLUDING GRATINGS	
a.	After supply of materials at site as per requirement	65%
b.	After fabrication, welding	20%
c.	After painting	10%
d.	Balance in final bill	05%
4.	SUPPLY OF ITEMS AS PER PART II & OTHER SUPPLY ITEMS SUPPLY ITEMS CONTAINED IN PART I	
a.	On supply of equipment / items to site including test certificates	80%
b.	After installation and grouting of installation	15%
c.	Balance in final bill	5%

SR. VICE PRESIDENT (ENGG)

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LIST OF APPROVED MAKES FOR MATERIALS

NOTE: Tenderers to note that the materials to be procured and supplied as part of the tender invited shall be strictly in accordance furnished in the specifications. The successful tenderer to obtain prior permission of LIOC and get the approvals before positioning the materials.

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FORM OF AGREEMENT

THIS AGREEMENT is made and entered into on this day ofTwo Thousand Sixteen between Lanka IOC PLC, herein after called and referred to as the Employer of the ONE PART and a Company duly incorporated under the Companies Ordinance and having it's registered office at , (hereinafter called and referred to as the Contractor which term or expression as herein used shall as and when the context so requires or admits of construction mean, and include the said Lanka IOC PLC , their heirs, successors and administrators) of the OTHER PART.

WHEREAS the Employer is desirous that the works more fully described in the documents attached hereto be executed, completed maintained and has accepted the tender dated by the Contractor for the execution, completion and maintenance of the said works.

NOW THIS AGREEMENT WITNESSED as follows: -

- (1) The words and expressions in the agreement shall have the meaning assigned to them in the conditions of contract, which is part and parcel of this agreement and hereinafter referred to.
- (2) The following documents shall be deemed to form, be read with and construed as part and parcel of this agreement
 - (a) The Tender aforesaid
 - (b) Special terms & conditions
 - (c) Conditions of Contract - Parts I & II
 - (d) Tender schedule (Bills of Quantities)
 - (e) Specifications
 - (f) Memorandum of understanding if any
- (3) The Contractor shall execute, complete, commission, test, hand-over and maintain the works and remedy defects, in conformity in all respects with the provisions of the contract, more fully described in the Drawings, Tender schedule (Bills of Quantities), Specifications and Conditions of Contract aforesaid, in consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned.
- (4) The Employer shall pay the Contractor the Contract price at the times and in the manner described by the aforesaid Schedule of payments. In consideration of the execution, completion and maintenance of the works aforesaid.

In witness whereof the party of the first part has set his hand hereunto and the party of the second part has caused its common seal be hereunto affixed and signed on the day and year aforementioned.

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ON BEHALF OF EMPLOYER

.....

.....

ON BEHALF OF CONTRACTOR

.....

.....

Signed, sealed and delivered
by the said parties in the presence of :

Witnesses

(1)

(2)

SIGNATURE OF TENDERER

SEAL



Lanka IOC

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CONDITIONS OF CONTRACT PART I

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CONDITIONS OF CONTRACT PART I

L IOC PLC

CONDITIONS OF CONTRACT PART I

General Conditions of Contract shall be in accordance with the following publication by the Institute for Construction Training and Development (ICTAD)- Sri Lanka of the Ministry of Housing, Construction and Public Utilities. (Formerly of the Ministry of Local Government, Housing and Construction)

Conditions of Contract for works of Building & Civil Engineering in Sri Lanka (with Forms of Tender & Agreement) revised edition / January 1989 ICTAD Publication No. SCA/1.

Conditions of particular application are as per Conditions of Contract Part II.

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CONDITIONS OF CONTRACT PART II

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CONDITIONS OF CONTRACT PART II

CLAUSE 1 : Definitions and interpretations

1.1.1 : The Employer is

Lanka IOC PLC
 20, West Tower,
 World Trade Centre,
 Echelon Square,
 Colombo 01.

1.1.2 : Sub-clause 1.1.2 is deleted and the following is substituted therefore

The Contractor means the person who has contracted for the works herein specified and its successors and not any assignee of such person.

1.1.3 : Sub-clause 1.1.3 is deleted and the following is substituted therefore
 Engineer or Architect or Consultant referred in this tender document is the person appointed by the Employer to act as Engineer for the purpose of this contract.

1.1.14 : Sub-clause 1.1.14 is deleted and the following is substituted therefore

“Approved” and “Approval” means approved in writing including subsequent written confirmation of previous oral approval.

1.1.17 : The following new Sub-clause 1.1.17 is added

“Day” means calendar day.

1.2 : Sub-clause 1.2 is deleted and the following is substituted therefore

Words importing the singular only also include the plural and vice Versa and words importing the masculine gender shall include the feminine and neuter genders.

CLAUSE2 : Duties and Power of Engineer’s Representative

2(1) : The approval of the “Employer” is required before the “Engineer” can execute his duties in accordance with or as defined by the limits of the following clauses:

(a) Clause 4 Sub-letting

Consenting to the sub-letting of a part of the works if the value of such part exceeds one percent (1%) of the sum indicated in the letter of Acceptance

(b) Clause 51 Variations

Ordering a variation if the value of such variation is likely to exceed one percent (1%) of the sum indicated in the letter of Acceptance or Rupees One Million, whichever is less.

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(c) Clause 27 Fossils etc.

(d) Clause 40 Suspension of work

CLAUSE 5 : Language/s and Law

5.1 : The Language is English

5.2 : First sentence "Except..... of the Contract". In the clause 5.2 is deleted and the following is substituted therefore:-

"The provisions of each of the following documents shall always prevail over those of the documents listed below it [Eg: The document listed in (c) will prevail over the document listed in (f)]:-

- (a) The Contract Agreement (when completed)
- (b) Special terms & conditions
- (c) Part I of these Conditions
- (d) Part II of these Conditions
- (e) Tender schedule (Bills of Quantities)
- (f) Specifications
- (g) Any other document forming part of the contract.

CLAUSE 9 : Contract Agreement

The following sentence is added to Clause 9 as the last sentence:-

"The stamp duty on the contract agreement is payable by the Contractor".

CLAUSE 10 : Performance Bond

10(1) Delete Clause 10 and substitute as follows:

"The Contractor shall obtain security for the proper performance of the contract to a value of ten percent (10%) of the contract price and provide the Employer such security within fourteen (14) days after the receipt of the letter of acceptance. Such security or bond will be from a Licensed Commercial Bank in Sri Lanka in the form as annexed or any other form acceptable to the Employer. The costs of compliance with the requirements of this clause shall be borne by the Contractor".

10(2) The performance Security or Bond referred to in the Clause 10.2 shall remain valid until the issue of maintenance certificate in accordance with Clause 62(1).

CLAUSE 12 The following proviso is added:-

"PROVIDED however the Employer shall not be liable to pay any such additional costs if such conditions or obstructions are proved to be for reasons beyond its control.

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CLAUSE 14 Programme to be furnished

The programme shall be submitted within fourteen (14) calendar days after receipt of the Letter of Acceptance.

CLAUSE 15 Construction Management Services

15(1) The portion of this clause starting from “The cost of in line 12 until the end of the clause is deleted and the following is substituted thereof:-

“The cost of this service is deemed to be included in the rates and prices quoted by the contractor and shall not be claimed separately by the Contractor”.

CLAUSE 19 Watching and Lighting

Add the following paragraph to this clause at the end thereof: -

“The Contractor shall indemnify the Employer in the event of any claim arising from any person as a result of the contractor not strictly adhering to the provisions of this clause.

“In the event of any claim or loss arising against or payable by the Employer as a result of the Contractor’s failure or negligence to strictly adhere to the provision of this clause, the Contractor shall be liable to indemnify and keep the Employer indemnified by reimbursement of such claim or loss in a sum certified by the Engineer which sum shall be deductible from the monies due to the Contractor from the Employer on any bill”.

CLAUSE 20 Care of works

Clause 20(1)

The word “accepted” occurring in line 30 of Sub-clause 20(1) be corrected to read “excepted”.

Clause 20(2) shall be deleted and the following new clause 20(2) be substituted therefore:

“20(2) The ‘excepted risks’ are (in the opinion of the Engineer) the risks for which the Contractor will not be able to obtain an insurance policy from an Insurance Company in Sri Lanka”.

CLAUSE 21 Insurance of works etc.,

The additional sum referred to in Clause 21(a) shall be ten percent (10%) of the amount stated in the letter of acceptance.

CLAUSE 22 Damage to persons and property

22(1) Item (c) be amended to read as follows:-

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“Damage to property which is the unavoidable result of the execution or maintenance by the Contractor without negligence in accordance with the Contract.

22(2) The following proviso is added to the clause 22(2) at the end therefore: -

“PROVIDED such claims proceedings damages coats charges and expenses arise solely due to the negligence of the Employer”.

CLAUSE 24

24.1.1.1 Accidents and injury to workmen

Add the words “arising in respect thereof or in relation thereto. The amount certified by the Engineer as due and payable to the Employer by way of such indemnification shall be paid by the Contractor or deducted from the monies due from the Employer to the Contractor” at the end of this clause.

CLAUSE 36

36(2) Clause 36(2) is amended to read as follows: -

“(2) All samples shall be supplied by the Contractor at its own costs.

CLAUSE 45 The following sentence be added at the end of this clause: -

“For the purpose of this clause statutory days of rest means all the Mercantile Holidays as declared by the Government of Sri Lanka”.

CLAUSE 47

47(3) - Deleted-

CLAUSE 52 A new Sub Clause 52(6) is added as follows:

52(6) “Notwithstanding any other provision of the contract, if the Contractor intends to claim any additional payments, not mentioned in the Bills of Quantities, pursuant to any clause of these conditions or otherwise, the Contractor shall give notice of intent in writing to the Engineer within Twenty Eight (28) days after the event giving rise to the claim has first arisen”.

52(7) A new Sub Clause 52(7) is added as follows: -

Upon happening of the event referred to in Clause 52(6), the Contractor shall keep records as may be necessary to support any claim it may make. The Engineer upon receipt of notice of a claim may instruct the Contractor to provide any records, as may be material to the claim. The Contractor shall permit the Engineer to inspect all records the Engineer considers relevant and supply copies of same when called for.

52(8) A Sub-Clause 52(8) is added as follows: -

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“Within Twenty Eight (28) days giving notice under clause 52(6), the Contractor shall send to the Engineer an account giving detailed particulars of the amount claimed and the grounds upon which it is based (together with the available documentary proof).

CLAUSE 53 Sub Clauses 53(5), 53(6), 53(6(a)) & 53(7) are deleted.

CLAUSE 60 Sub Clause 60(1) is deleted and mobilization advance shall not be paid: -

60(1) - Deleted-

60(2)(c) The materials referred to in this Clause (for payment of materials at site) shall be limited to: -

- i. Steel
- ii. Aluminium components

Monthly statements required in this Clause shall be submitted on or before the 10th day of the succeeding month.

60(7) Sub Clause 60(7) is amended as follows: -

In each of lines 5 and 14 the words and figures “ten (10)” be deleted and the following be substituted therefore: -

“Fourteen (14)”

CLAUSE 65

65(1) Last paragraph of this Clause “The Employee shall indemnify.connection therewith” is deleted.

65(5) This sub-clause be deleted and the following new sub-clause 65(5) be substituted therefore: -

65(5) The special risks are “ the excepted risks” within the meaning of the amended clause 20(2)”.

65(8) Items (d), (e) and (f) are deleted.

CLAUSE 66

66(1) The words “ The same as that.....hereof” in lines 8 to 11 be deleted and the word “payable” shall be substituted therefore.

CLAUSE 67 Clause 67 be deleted and the following new clause 67 be substituted therefore: -

67. - Deleted-

CLAUSE 68 The words “registered express” be inserted between the words “by” and “post” in the third line.

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CLAUSE 70 Original Clause 70 is deleted and the following is substituted therefore: -

“The accepted tender will be treated as firm and inclusive of all expenses and taxes payable by contractor and applicable during the entire period of construction”.

70(2) Notwithstanding any other provisions of this Contract, no variation howsoever in prices will be paid to or deducted from the contractor for fluctuation in prices of materials, components, skilled and unskilled labour and the Contractor will not be entitled to any variation in prices on account of changes in taxes, etc., for imported items/components.

The Employer will deduct from the monies due to the Contractor all statutory deductions if any deductible on account of the Contractor and remit to the relevant authorities. A certificate will be issued by the Employer stating the amount deducted and to whom such amounts have been paid. The Contractor shall furnish relevant Tax file numbers to the Employer.

CLAUSE 71 Clause 71 is deleted.

CLAUSE 72 Clause 72 is deleted.

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FORMAT FOR BID BOND BY BANK GUARANTEE

KNOW ALL MEN BY THESE PRESENTS THAT I / WE OF
..... (hereinafter called the "BIDDER") and
..... of
..... (hereinafter called
the SURETY) are jointly and severally held firmly bound upto
.....(hereinafter referred to as the OWNER) in the sum of(Rs.) of
lawful money of Sri Lanka to be paid on demand to the OWNER for which payment duly to be made
we bind ourselves and respective successors jointly, and severally firmly by these presents.

WE THE SURETY hereby renouncing the Beneficium Odinis Devisionis Et Excussions and the other
benefits and privileges sureties are entitled to the meaning, force and effect or renouncing which
have been explained to us by our attorney at law Esquire and that which we
hereby declare that we are now fully acquainted and all other the benefits, privileges and
advantages to which Sureties as such are by law entitled.

Sealed with our respective seals atand dated thisday of20...

WHEREAS the OWNER has invited bids for the construction of the for the OWNER at
.....(hereinafter called the WORKS).

AND WHEREAS it is necessary that the bid should (hereinafter called the Bid) in accordance with
the Instruction to Bidders and other Conditions of Bid (hereinafter called the Condition of
Bid).

AND WHEREAS it is necessary that the BID should be accompanied by a Bid Bond in favour of the
OWNER in a sum of Rs. (Rs.) of lawful money of Sri Lanka as security for the due,
faithful and satisfactory fulfillment by the BIDDER of the CONDITIONS OF BID.

NOW THE CONDITION of the above written Bond is such that:

(a) If before the expiration of Hundred Twenty (120) days are such extended period
hereinafter provided, after the date for the submission of bids, the BIDDER shall have received
notice from the OWNER of the acceptance of the Bid and if within fourteen (14) days of having
received such notice the BIDDER shall furnish to the OWNER in accordance with the CONDITIONS OF
BID a Performance Bond for the due and proper performance of the WORKS.

(OR)

(b) If before the expiration of Hundred Twenty (120) days or such extended period hereinafter
provided, after the date for the submission of bids, the BIDDER shall not have received notice from
the OWNER of the acceptance of the Bid.

(OR)

(c) If on default by the BIDDER to furnish the OWNER with a Performance Bond as aforesaid,
the SURETY shall pay to the OWNER the said amount of the above written Bond as liquidated
damages for such default.

Then and in any such case this obligation shall be null and void but otherwise, shall be and remain
in full force and effect.

IT IS HEREBY expressly agreed that any intimation to the surety of the extension of the period of
validity of the bond shall be deemed to have been received by him if communicated to him by

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registered post or delivered personally at the office of the said surety on or before the date of expiry of the validity of the bond for the time being in force.

IT IS FURTHER expressly agreed that no alternation in the Bid made by agreement between the OWNER and the BIDDER nor any forbearance or forgiveness in or in respect of any matter or thing concerning the Bid or CONDITIONS OF BID on the part of the OWNER shall in anyway release the SURETY from the liability under the above mentioned Bond.

* The common seal of the saidis affixed hereto at on this day of20..

+ In witness whereof the saidhas set his/their hand /hands to these presents aton thisday of20..

.....
Bidder

The common seal of the

Is affixed hereto aton this

Day of20..

WITNESSES :

1. Signature :

Name :

Address :

2. Signature :

Name :

Address :

* Delete in case of BIDDER not being a Limited Liability Co.

+ Delete in case of BIDDER not being a Limited Liability Co.

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FORMAT OF BG FOR SECURITY DEPOSIT/ PERFORMANCE BOND

WHEREAS.....OF.....(hereinafter referred to as the Contractor has agreed to enter into a contract for the consideration of Rupees.....(Rs.....) with the (hereafter referred to as the OWNER) for the construction of Proposed.....

AND WHEREAS it is one of the conditions of the said Contract that the Contractor should furnish a Bank Guarantee in the sum of Rupees.....(Rs.) being percent (%) of the value of the Contract for the due and punctual performance and fulfillment of the Contract above referred to.

AND WHEREAS the Contractor has requested the.....to furnish the requisite Bank Guarantee and whereas the.....has agreed to do so.

KNOW THAT..... a Bank incorporated under(Cap) and having its registered office in in consideration of such agreement as aforesaid hereby guarantee undertake bind and oblige ourselves to the OWNER that if the CONTRACTOR shall fail in the and punctual performance and fulfillment of the Contract above referred to, then and in that case to make payment to the OWNER in a sum not exceeding Rupees (Rs.....) provided that the rights and remedies of the OWNER hereunder are to be cumulative and in addition to and not in substitution for its rights and remedies under the said contract and this Guarantee shall not be prejudiced avoided or affected by any indulgence or forbearance of the OWNER towards the Contractor in connection with the said Contract.

AND IT IS also hereby agreed that notwithstanding anything to the contrary herein contained this Guarantee shall be valid only up to and including the thirty first day of and shall not thereafter be of any force of avail in law except in respect of claims lodged by the OWNER with under these present on or before the thirty first day of on account of monies that may be and/or become due to the OWNER by the Contractor by reason of his failure to duly and punctually perform and fulfill the Contract above referred to : provided however, that in case shall have before the said thirty first day of, extended the period for validity of this Guarantee upto any date subsequent to the said thirty first day of then the preceding provisions of this Clause shall stand amended and read as if the date to which the Guarantee is so extended had been inserted at the time wherever in the proceeding provisions of the Clause the said date, thirty first day of, occurs and this Guarantee shall have force accordingly. Such period of validity may similarly be extended from time to time so as to keep the Guarantee in full force upto such extended date or dates.

Date at this day of
FOR

Sgd.....

Sgd
(Accountant)

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(Manager)

WITNESS

1.....

2.....

DATE:.

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MEMORANDUM OF UNDERSTANDING
(FORMAT FOR CONSORTIUM)

Name of work:
(Tender No. _____)

This Memorandum of Understanding is made and entered into, on this day of _____, by and among:

_____ having its office at _____ and
registered office at _____ and _____ (hereinafter referred to as _____).

AND

_____ having its registered office at _____ and _____
(hereinafter referred to as _____)

AND

_____ having its registered office at _____ and _____
(hereinafter referred to as _____)

The above companies are hereinafter also called, separately a "Party", and collectively the "Consortium".

WHEREAS

- A. _____, the lead partner of the consortium is a company in Sri Lanka having experience in _____ similar works _____) / having annual financial turnover _____).
- B. _____ is a party having experience in _____ similar works _____) / having annual financial turnover _____).
- C. _____ is a party having experience in _____ similar works _____) / having annual financial turnover _____).
- D. Lanka IOC PLC has issued Tender no. _____ for empanelment for Supply and Laying of onshore Pipelines for Petroleum Product (MGO) from Jetty to Product Tank At LIOC Terminal Trincomalee, Sri Lanka (hereinafter called the "Project").
- E. The Parties wish to cooperate to prepare and submit a tender for the Project as a consortium with _____ acting as the Consortium lead partner (hereafter, called "Lead Partner").
- F. It is considered desirable to record in this Memorandum of Understanding the terms of the agreement between the consortium partners, with respect to bidding & executing the Project.

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Now, therefore, in the spirit of mutual trust, mutual benefits and equally, the above parties hereto agree as follows:-

1. Against this tender, _____ shall be the consortium leader.
2. Subject to a full evaluation of the tender documents and consideration by Lanka IOC PLC for empanelment/award of work, we hereby agree that the empanelment /award of work shall be done in the name of Lead Partner _____, who shall be obliged to discharge all the contractual obligations, terms & conditions of the tender/ contract.
3. We also mutually agree that the work order shall be placed and payment shall be released by Lanka IOC PLC in the name of Lead Partner. Documents such as Permanent Account Number, Business Registration and VAT registration certificates etc. shall be required to be submitted in the name of Lead partner.
4. We hereby agree that the factory premises owned/leased by the lead partner only will be offered for inspection for verification of manufacturing facilities with respect to the pre-qualifying criteria of the tender.
5. The consortium partners also mutually agree that all the correspondence with respect to this empanelment/tender /contract shall be made by the Lead Partner.
6. The parties hereby acknowledge that the above points constitute the framework of the consortium and are statements of intentions of the parties as to the subject matter.
7. The consortium agreement is valid for the period till the complete closure of the contract(s).
8. We confirm that we have not participated individually or in any other consortium against this tender of Lanka IOC PLC.

IN WITNESS WHEREOF, ABOVE PARTIES HERETO EXECUTED THIS MEMORANDUM OF UNDERSTANDING ON THE DATE AND YEAR FIRST ABOVE WRITTEN.

1. For and on behalf of

2. For and on behalf of

Seal & Signature

Seal & Signature

3. For and on behalf of

Seal & Signature

SIGNATURE OF TENDERER

SEAL