# TOR FOR PREQUALIFICATION OF MANUFACTURERS/ BIDDERS FOR SUPPLY OF PIPE FITTINGS, GASKETS, STUDS & NUTS FOR THREE (03) YEARS ON AS AND WHEN REQUIRED BASIS.

The Basic concept is to prequalify the internationally/locally reputable Manufacturers for procurement of Pipe fittings, Gaskets, Studs & Nuts for a period of three years.

| Group | Item Description |
|---|---|
| A | Pipe Fittings (• Pipe Fittings will include Flanges, Anchor Flanges, Elbows, tee, Reducers, Nipples, Unions, Weldolets, Sockolets, Threadolets etc) |
| B | Gaskets |
| C | Studs & Nuts |

## Manufacturers/ Bidders to comply following mandatory requirements for acceptance:

1. Manufacturers/Bidders will be prequalified technically for a period of three (03) years as per "Evaluation Criteria" Annexure-VI. After the prequalification, tender enquiries will be sent only to pre-qualified Bidders and Purchase Order(s) will be awarded to financially lowest bidder.
2. Bidder to provide separate set of documents against each group in the light of document check list.
3. In case Single Bidder / manufacturer has more than one mill, authority letter should include names and addresses of all mills.
4. One manufacturer can authorize only one bidder to participate.
5. One bid should comprise of single manufacturer against each group. In case there are more than one manufacturer against each group, separate bid to be submitted.
6. Acceptable delivery time is 04 Months on C.F.R by Sea, Karachi for foreign bidders and F.O.R. Khadeji Base Store, Karachi basis for local manufacturers for All groups. Delivery period will start from Letter of Credit establishment date.
7. Local bidder/manufacturer to quote their prices in Pak Rupees (PKR).
8. Bidder will submit separate bid bond on case to case basis. Amount of bid bond will be specified in each tender enquiry.
9. After issuance of Letter of Intent bidder will submit Performance Bank Guarantee (PG).
10. Submission of documents should be as per check list.
11. After the award of contract, the supplier/manufacturer would arrange a five days visit (excluding travel time) of an OGDCL team comprising three professionals (Two engineers from technical department and One Official from SCM department) to manufacturing site before the first order placement. All the expenses for arrangement including Visa Processing Charges, Return Air Ticket, Inland foreign country travel, Boarding, lodging & Transportation will be borne by bidder/manufacturer. The agenda would comprise Project Kick Off, project QA/QC review, TPI scope finalization and techno/commercial capabilities of manufacturer demonstration/review etc.
12. Incomplete information in the bid may lead to non-compliant & rejection of bid.



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13. Third party inspection during manufacturing will be arranged by OGDCL at their own expense and manufacturer will facilitate accordingly.

14. Bidder to comply tender specifications and codes. In case of conflict most stringent requirement will prevail.

15. Authority letters in original from the manufacturer to bidder and from bidder to local agent for offered material with tender enquiry number must be furnished with the technical offer. The authority letter must be on company letter head in original duly signed and stamped.

16. In order to technically prequalify for a period of 03 years, the bidder must obtain 70% marks in the "Technical Evaluation Criteria". See Technical Evaluation criteria table (Annexure-VI).

17. Original Brochure/brochure on CD/USB of the manufacturer(s) containing technical literature/specifications sheets of all the quoted material must be submitted with the technical offer (both in hard and soft form)

18. Bidder to fill completely Annexures 1,2,3,4 & 5 and submit with technical bid.

19. The Manufacturer/Bidder must submit with technical bid, the printed Annual Audited Accounts reports of Manufacturer for the last 3 consecutive years in order to verify the liquidity position, revenues, profitability of the company. In case these reports are not in English Language, then in addition to these printed reports the English translation of the same must also be submitted with the technical bid, with each page to be signed and stamped by Notary Public & Foreign Officer to be certified as a true copy of the original.

20. In Case of Shipment from ACU Member Countries, The LC Beneficiary Should Be of That Particular Country from Where the Consignment Is Being Shipped.

21. Any information provided by the bidder that appears false and materially inaccurate or submitted forged/fake documents will be Rejected/blacklisted.

22. All the documents should be submitted in original, properly numbered, duly signed and stamped. Any document not signed and stamped will not be considered for evaluation purpose.

23. Any documents other than English language should be translated in English language first and should be duly attested by foreign office.

24. Clean acceptance of Terms & Conditions of Tender Documents, Schedule of Requirement is required from Manufacturer / Bidder.

25. The bank guarantee / bid bond (earnest money) / performance bond / Advance Bank Guarantees etc. of the bidder/vendor will be confiscated if they:

    a. Withdraw their bid during bid validity.
       Or
    b. Fails to provide performance and/or advance bank guarantees.
       Or
    c. Submit forged/fake document or inaccurate information in support of their bid.
       Or
    d. Fails to execute contract as per terms of contract.
       Or
    e. Fails to supply the short/wrong shipped items.
       Or
    f. Any other reason warranting the confiscation of the guarantee.



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26. OGDCL, at any stage of the procurement proceedings, having credible reasons for or prima facie evidence of any defect in firm's capacities may require them to provide information concerning their professional, technical, financial, legal or managerial competence of already pre-qualified firms. OGDCL, shall disqualify a supplier or contractor if it finds, at any time, that the information submitted by those concerning qualification as supplier or contractor were false and materially inaccurate or incomplete.

27. For supply of material all terms & condition of the Master Set of Tender Documents available on OGDCL's website will be applicable.

28. Submit certificate of Incorporation of Manufacturer/ Bidder.

29. Submit certificate that Manufacturer/ Bidder is not registered at places e.g. Virgin, Cayman, Nausa, Jersy and Bohaman Islands. The Offshore companies registered at places e.g. Virgin, Cayman, Nausa, Jersy and Bohaman Islands shall not be entertained and bids if submitted shall be rejected.

30. **FOREIGN PROCUREMENT PAYMENT TERMS (COMPETITIVE BIDDING, PREQUALIFICATION AND PROPRIETARY MODE OF PROCUREMENT).**

Clause No: 4 of Section-III (Part-B) i.e. Conditions of Contract "Special" of Tender Document has been amended as follows:

Following payments methods have been approved for Competitive Bidding/Press Tender, Prequalification and Proprietary mode of procurement effective from February 27, 2018.

i. **Tender value less than or equal to US$ 200,000:**

Payment to the Contractor/ bidder in foreign currency shall be made by establishing in favor of the Contractor an irrevocable Letter of Credit (hereinafter called the L/C). 70 % Payment (s) under the L/C will be made for the FOB/ CFR / CPT (as the case may be) price of material of each shipment upon submission of the shipping documents. Balance 30% Payment will be released after receipt, inspection and acceptance of material.

ii. **Tender value more than US$ 200,000:**

Payment to the Contractor/ bidder in foreign currency shall be made by establishing in favor of the Contractor an irrevocable Letter of Credit (hereinafter called the L/C). 80 % Payment (s) under the L/C will be made for the FOB/ CFR / CPT (as the case may be) price of material of each shipment upon submission of the shipping documents. Balance 20% Payment will be released after receipt, inspection (in addition of pre-shipment inspection) and acceptance of material.



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# LIST OF ANNEXURES

## LIST OF ANNEXURES

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**ANNEXURE-I**

## FORMAT OF CORPORATE & FINANCIAL INFORMATION
(To be filled by Bidder & Manufacturer Separately)

### PART - I
### GENERAL INFORMATION

1. Name (Full Company Name):

   - Postal Address :
   - Contact Person Name :
   - Contact Person Mobile No. :
   - Company Telephone:
   - Facsimile:
   - Valid e-mail for correspondence:
   - Website Address:

   1.1 Has the Company operated under any other name? If yes please give name, date of change and reason for change.

2. Type of Entity/Firm:
   - Corporation/Stock Company
   - Public Limited
   - Private Limited
   - Partnership
   - Proprietorship

3. Shareholders information/pattern with names and addresses of majority shareholders.

4. Place of Incorporation/Registration:

5. Year of Incorporation/Registration:
   (Please provide copies of Incorporation/Registration Certificates and Memorandum & Articles of Association)

6. Company's National Tax No.

7. Company's Core Business Areas and their annual sales revenue/earnings during last five (5) years.

8. Name & Address of Owners/Directors

9. Registration with Pakistan Engineering Council (PEC) as Contractor. Please provide copy of membership certificate issued by PEC.

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**PART - II**
**FINANCIAL STRENGTH**

1. Provide details with regard to the financial standing of the applicant including copies of last three (3) years annual audited profit & loss account and balance sheet. Complete postal address, email address and contact numbers of the audited firm should be provided along with the bid. Also, please fill the financial summary as per below table In USD only;

| S. No. | Description | Years | | |
|---|---|---|---|---|
| | | | | |
| 1 | Sales Revenue | | | |
| 2 | Paid Up Capital | | | |
| 3 | Profit Before Tax | | | |
| 4 | Profit After Tax | | | |
| 5 | Current Assets | | | |
| 6 | T. Asset | | | |
| 7 | Owner Equity | | | |
| 8 | Long Term Debt | | | |
| 9 | Current Liability | | | |
| 10 | Total Liabilities | | | |

2. Bank(s) credit worthiness certificates (Latest Period) of applicant organization and available credit ceiling/limits with Account Number/Title.

3. Detail record with regard to litigation/arbitration proceedings or any other dispute related to project undertaken/being undertaken by the Bidder their Sub-Contractors and Suppliers (Specially with OGDCL its Joint Venture Partners or other public and private organizations working in the Oil & Gas sector of Pakistan) during past five (05) years.

4. Any information including brochures, references and other documentary evidence of technical qualification, capability and experience of the Applicant to execute the Project.

The undersigned on behalf of _____ hereby declare that the statements made and the information provided official herewith is complete, true and correct in every detail

_____
Signature

Official Seal of the Company

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ANNEXURE - II

## RELATED PROJECTS BEING EXECUTED DURING LAST 5 YEARS

(To be filled by Bidder & Manufacturer Separately)

| Sr. No. | Name, Description & Capacity of the Project | Name & Address of Client | Country & Year | Project Completion Period | Contract Value* | | | Detailed Description of Work, Scope & Responsibilities** | Details of Equipment Procured (Including nature/type of equipment, its value* and origin/source) | Details of Qualification of Man-power Employed | Whether the Project is on Schedule? If not, specify reasons for delay and give expediting plans |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Foreign Currency | Local Currency | Total | | | | |
| | | | | | | | | | | | |
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*(*) Unit of currency to be in USD only.*

*(**) For example design engineering, procurement, manufacturing and commissioning.*

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ANNEXURE - III

## PROJECTS EXECUTED DURING LAST FIVE (05) YEARS TO RENOWNED AND LEADING OIL AND GAS E&P COMPANIES OF THE WORLD

(To be filled by Bidder & Manufacturer Separately)

| Sr. No. | Name, Description & Capacity of the Project | Name & Address of Client | Country & Year | Project Completion Period | | Contract Value* | | | Detailed Description of Work, Scope & Responsibilities** | Details of Equipment Procured (Including nature/type of equipment, its value* and origin/source) | Details of Qualification of Manpower Employed | Reason for Delay in Project Completion, if applicable |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Planned | Actual | Foreign Currency | Local Currency | Total | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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*(*) Unit of currency to be in USD only.*

*(**)For example design engineering, procurement, manufacturing and commissioning.*

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ANNEXURE - IV

## HSE DETAILS
(To be filled by Manufacturer)

1- Do you have a formal written Safety Policy? YES NO

If yes, please attach a copy(s)

Is safety policy distributed to all employees and posted at the offices? YES NO

2- Do you have a safety program manual? YES NO

If yes, please state scope

_____

_____

3- Do documented procedures exist to support the safety manual? YES NO

If no, how is your safety program implemented?

_____

_____

4- Do you operate a formal review/audit of the safety program? YES NO

How are review/audit results identified, documented and implemented?

_____

_____

5- Do you hold regular safety meetings for all employees YES NO

If yes, how frequently do you hold these meetings?

Weekly _____

Fortnightly _____

Monthly _____

Others _____ When? _____

_____

6- Do you hold regular safety inspection ? YES NO

If yes, please provide details.

_____

_____

_____

7- What Type of employee training programs is in place?

_____

_____

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| | | |
|---|---|---|
| Is training delivered to subcontractors / vendors? | YES | NO |
| Is training delivered to clients? | YES | NO |

8- How are accidents investigated and reports circulated to management? Give a copy of any report if available.

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Annexure "V"

## Documents submission check List

Bidder to submit following documents with bid for technical evaluation:

| Sr. No | Description | Bidder | Manufacturer |
|---|---|---|---|
| 1 | Compliance to Data Sheet & Specifications | Yes | Yes |
| 1 | Authority Letter | In favor of local agent | In favor of bidder |
| 2 | Quality Certificates | Yes | Yes |
| 3 | Supply record during last 5 years as per Annex II | Yes | Yes |
| 4 | Supply record to International E & P Companies during last 5 years as per Annex III | Yes | Yes |
| 5 | Copies of purchase orders | Yes | Yes |
| 6 | Copies of third party inspection reports | | Yes |
| 7 | Copies of performance certificates of Material supplied to companies. | | Yes |
| 8 | Proof of Prequalification with International E&P Companies. | | Yes |
| 9 | Audited financial reports for last three years | Yes | Yes |
| 10 | Delivery Schedule Confirmation | Yes | Yes |
| 11 | Corporate Information (Submit Annex 1) | Yes | Yes |
| 12 | Product Catalogue | | Yes |
| 13 | Quality Plan | | Yes |
| 14 | Equipment Details | | Yes |
| 15 | Manufacturer Specifications | | Yes |
| 16 | HSEQ Information as per Annex IV | Yes | Yes |

**Note:**

1. Bid documents should be signed and stamped by bidder and should be properly tagged and numbered.
2. Bid should be submitted in book binding form.
3. Contents of the authority letter should include the following:
   a. Tender Inquiry Number.
   b. Supply of new material as per tender specification.
   c. Signed / Stamped by manufacturer.
   d. Contact details (Name, address, telephone numbers, email).
   e. Delivery schedule.
   f. List of documents provided by manufacturer (Documents not mentioned in the authority letter but part of the bid will not be considered).

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## TECHNICAL EVALUATION CRITERIA (Group-A) ANNEXURE-VI

| Sr. No | REQUIREMENT / DESCRIPTION | TOTAL SCORE | SCORE OBTAINED |
|---|---|---|---|
| 1 | **Authority letter of Bidder /manufacturer & local agent( 05 Nos)**<br>i) Authority letter.<br>ii) Not Submitted. | <br>5<br>Rejected. | |
| 2 | **Compliance to Data Sheet & Specifications (10)**<br>i) Yes<br>ii) No | <br>10<br>Rejected | |
| 3 | **Certifications (10 Nos)**<br>i) ISO 9001<br>ii) ISO 14001<br>iii) API Q1<br>iv) OHSAS 18001<br>Note: Copies of valid certificate to be submitted. | <br>2.5<br>2.5<br>2.5<br>2.5 | |
| 4 | **Supply record during last 5 years to *International E&P Companies (25Nos) See Note 4.**<br>i) At least One Agreement with value greater than or equal to 0.5 MMUSD.<br>ii) At least One Agreement with value 0.3< x < 0.5 MMUSD<br>OR<br>iii) At least 03 Agreements with value 0.1< x < 0.3 MMUSD<br>iv) Noncompliance to any of the three conditions.<br>Note: Copies of Purchase Orders to be submitted.<br>▪ Supply record as per table attached at Annex-III | <br>25<br>20<br><br>20<br>Rejected. | |
| 5 | **Complete Copies of third party Inspection Reports of *International E&P Companies (5 Nos) See Note 4.**<br>i) If Submitted<br>ii) If not submitted | <br>5<br>0 | |
| 6 | **Copies of Performance Certificate of material Supplied to *International E&P Companies (05Nos) See Note 4.**<br>i) For X≥3<br>ii) For 1≤X<3<br>iii) For X=0 | <br>5<br>2<br>0 | |
| 7 | **Proof of Pre-qualification of manufacturer with *International E&P Companies (10 Nos) See Note 4.**<br>i) For X≥3<br>ii) For 1≤X<3<br>iii) For X=0 | <br>10<br>5<br>0 | |
| 8 | **Financial Strength of the Company (20 Nos)**<br>i. Three Years Audited Financial reports of the bidder / manufacturer.<br>ii. Non submission of Three years audited financial reports of bidder / manufacturer.<br>▪ Filling of information as per Annex-I. | <br>20<br><br>Rejected. | |
| 9 | **Manufacturer Document Compliance / Submission (10 Nos) .**<br>i) Product Catalogue.<br>ii) Quality Plan.<br>iii) Equipment Details.<br>iv) Manufacturer specifications. | <br>2.5<br>2.5<br>2.5<br>2.5 | |

**Note:**

1. Minimum pre-qualification criteria for agreement is 70 Score.
2. Bid exceeding 70 Score but rejected in any one of the sub category will be non-responsive i.e. sub category 1, 2, 4 and 8.
3. Date of tender opening will be considered to calculate 05 years requirement of API certificate.
4. International E&P Companies should be a upstream member of either International Association of Oil & Gas Producers (IOGP) or Pakistan Petroleum Exploration & Production Companies Association (PPEPCA).
5. In case Bidder supplied material to companies fall under note 4 through contractor, then proof to be submitted.

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## TECHNICAL EVALUATION CRITERIA (Group-B) ANNEXURE-VI

| Sr. No | REQUIREMENT / DESCRIPTION | TOTAL SCORE | SCORE OBTAINED |
|---|---|---|---|
| 1 | **Authority letter of Bidder /manufacturer & local agent( 05 Nos)**<br>i) Authority letter.<br>ii) Not Submitted. | <br>5<br>Rejected. | |
| 2 | **Compliance to Data Sheet & Specifications (10)**<br>i) Yes<br>ii) No | <br>10<br>Rejected | |
| 3 | **Certifications (10 Nos)**<br>i) ISO 9001<br>ii) ISO 14001<br>iii) API Q1<br>iv) OHSAS 18001<br>Note: Copies of valid certificate to be submitted. | <br>2.5<br>2.5<br>2.5<br>2.5 | |
| 4 | **Supply record during last 5 years to *International E&P Companies (25Nos) See Note 4.**<br>i) At least One Agreement with value greater than or equal to 0.5 MMUSD.<br>ii) At least One Agreement with value 0.3< x < 0.5 MMUSD<br>OR<br>iii) At least 0 Agreements with value 0.01< x < 0.1 MMUSD<br>iv) Noncompliance to any of the three conditions.<br>Note: Copies of Purchase Orders to be submitted.<br>▪ Supply record as per table attached at Annex-III | <br>25<br>20<br><br>20<br>Rejected. | |
| 5 | **Complete Copies of third party Inspection Reports of *International E&P Companies (5 Nos) See Note 4.**<br>i) If Submitted<br>ii) If not submitted | <br>5<br>0 | |
| 6 | **Copies of Performance Certificate of material Supplied to *International E&P Companies (05Nos) See Note 4.**<br>i) For X≥3<br>ii) For 1≤X<3<br>iii) For X=0 | <br>5<br>2<br>0 | |
| 7 | **Proof of Pre-qualification of manufacturer with *International E&P Companies (10 Nos) See Note 4.**<br>i) For X≥3<br>ii) For 1≤X<3<br>iii) For X=0 | <br>10<br>5<br>0 | |
| 8 | **Financial Strength of the Company (20 Nos)**<br>i. Three Years Audited Financial reports of the bidder / manufacturer.<br>ii. Non submission of Three years audited financial reports of bidder / manufacturer.<br>▪ Filling of information as per Annex-I. | <br>20<br>Rejected. | |
| 9 | **Manufacturer Document Compliance / Submission (10 Nos) .**<br>i) Product Catalogue.<br>ii) Quality Plan.<br>iii) Equipment Details.<br>iv) Manufacturer specifications. | <br>2.5<br>2.5<br>2.5<br>2.5 | |

**Note:**

1. Minimum pre-qualification criteria for agreement is 70 Score.
2. Bid exceeding 70 Score but rejected in any one of the sub category will be non-responsive i.e. sub category 1, 2, 4 and 8.
3. Date of tender opening will be considered to calculate 05 years requirement of API certificate.
4. International E&P Companies should be a upstream member of either International Association of Oil & Gas Producers (IOGP) or Pakistan Petroleum Exploration & Production Companies Association (PPEPCA).
5. In case Bidder supplied material to companies fall under note 4 through contractor, then proof to be submitted.

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## TECHNICAL EVALUATION CRITERIA (Group-C) ANNEXURE-VI

| Sr. No | REQUIREMENT / DESCRIPTION | TOTAL SCORE | SCORE OBTAINED |
|---|---|---|---|
| 1 | **Authority letter of Bidder /manufacturer & local agent( 05 Nos)**<br>i) Authority letter.<br>ii) Not Submitted. | <br>5<br>Rejected. | |
| 2 | **Compliance to Data Sheet & Specifications (10)**<br>i) Yes<br>ii) No | <br>10<br>Rejected | |
| 3 | **Certifications (10 Nos)**<br>i) ISO 9001<br>ii) ISO 14001<br>iii) API Q1<br>iv) OHSAS 18001<br>Note: Copies of valid certificate to be submitted. | <br>2.5<br>2.5<br>2.5<br>2.5 | |
| 4 | **Supply record during last 5 years to *International E&P Companies (25Nos) See Note 4.**<br>i) At least One Agreement with value greater than or equal to 0.5 MMUSD.<br>ii) At least One Agreement with value 0.3< x < 0.5 MMUSD<br>OR<br>iii) At least 05 Agreements with value 0.01< x < 0.1 MMUSD<br>iv) Noncompliance to any of the three conditions.<br>Note: Copies of Purchase Orders to be submitted.<br>▪ Supply record as per table attached at Annex-III | <br>25<br>20<br><br>20<br>Rejected. | |
| 5 | **Complete Copies of third party Inspection Reports of *International E&P Companies (5 Nos) See Note 4.**<br>i) If Submitted<br>ii) If not submitted | <br>5<br>0 | |
| 6 | **Copies of Performance Certificate of material Supplied to *International E&P Companies (05Nos) See Note 4.**<br>i) For X≥3<br>ii) For 1≤X<3<br>iii) For X=0 | <br>5<br>2<br>0 | |
| 7 | **Proof of Pre-qualification of manufacturer with *International E&P Companies (10 Nos) See Note 4.**<br>i) For X≥3<br>ii) For 1≤X<3<br>iii) For X=0 | <br>10<br>5<br>0 | |
| 8 | **Financial Strength of the Company (20 Nos)**<br>i. Three Years Audited Financial reports of the bidder / manufacturer.<br>ii. Non submission of Three years audited financial reports of bidder / manufacturer.<br>▪ Filling of information as per Annex-I. | <br>20<br>Rejected. | |
| 9 | **Manufacturer Document Compliance / Submission (10 Nos) .**<br>i) Product Catalogue.<br>ii) Quality Plan.<br>iii) Equipment Details.<br>iv) Manufacturer specifications. | <br>2.5<br>2.5<br>2.5<br>2.5 | |

**Note:**

1. Minimum pre-qualification criteria for agreement is 70 Score.
2. Bid exceeding 70 Score but rejected in any one of the sub category will be non-responsive i.e. sub category 1, 2, 4 and 8.
3. Date of tender opening will be considered to calculate 05 years requirement of API certificate.
4. International E&P Companies should be a upstream member of either International Association of Oil & Gas Producers (IOGP) or Pakistan Petroleum Exploration & Production Companies Association (PPEPCA).
5. In case Bidder supplied material to companies fall under note 4 through contractor, then proof to be submitted.

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| | | |
|---|---|---|
| **Customer** | **OGDCL** | **ANNEXURE A-1** |
| **Project** | **DEVELOPMENT PROJECT** | **DATA SHEET (Group-A) Pipe Fittings** |
| **Location** | **PAKISTAN** | |

| **GENERAL INFORMATION** | | **Compliance** |
|---|---|---|
| **Size Range, NPS :** | 1/2" to 24" As per ASME B | |
| **Rating** | Class 150- 2500 | |
| **Size Range, NPS :** | 26" to 30" As per ASME B16.47 & Rating as per standard. | |
| **Service :** | HC GAS WITH $H_2S$ | |
| **Gas Composition:** | $H_2S$: 0.0001, $CO_2$: 0.0764, $N_2$: 0.0967, Methane: 0.7677, Ethane: 0.0098, Propane: 0.0024, i-Butane: 0.0005, n-Butane: 0.0006, i-Pentane: 0.0003, n-Pentane: 0.0002, $C_6$+: 0.0022, $H_2O$: 0.0429 | |
| **Codes:** | Refer Para 3 of the Specifications for compliance ( SP-QP-11-L-00 | |

| **NOTES** |
|---|
| **1** (*) Vendor to supply information with Bid. |
| **2** All materials to be suitable for sour service as per NACE MR 01 75. |
| **3** Gas composition and Service will change according to actual requirement. |
| **4** Each item to be fitted with a stainless steel identification tag clearly stamped with SP Number, Nominal Size, PO Number and PO Item Number |
| 5 Bidder to confirm compliance to Specifications for Metallic Pipe, Fittings ( ANNEXURE VII) |

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| | | | |
|---|---|---|---|
| **Customer** | **OGDCL** | **ANNEXURE B-1** | |
| **Project** | **DEVELOPMENT PROJECT** | **DATA SHEET (Group-B) Gaskets** | |
| **Location** | **PAKISTAN** | | |

| **GENERAL INFORMATION** | | **Compliance** |
|---|---|---|
| **Size Range, NPS :** | 1/2" to 24" As per ASME B | |
| **Rating** | Class 150- 2500 | |
| **Size Range, NPS :** | 26" to 30" As per ASME B16.47 & Rating as per standard. | |
| **Service :** | HC GAS WITH $H_2S$ | |
| **Gas Composition:** | $H_2S$: 0.0001, $CO_2$: 0.0764, $N_2$: 0.0967, Methane: 0.7677, Ethane: 0.0098, Propane: 0.0024, i-Butane: 0.0005, n-Butane: 0.0006, i-Pentane: 0.0003, n-Pentane: 0.0002, $C_6$+: 0.0022, $H_2O$: 0.0429 | |
| **Codes:** | Refer Para 3 of the Specifications for compliance ( SP-QP-11-L-00 | |

| **NOTES** | |
|---|---|
| **1** (*) Vendor to supply information with Bid. | |
| **2** All materials to be suitable for sour service as per NACE MR 01 75. | |
| **3** Gas composition and Service will change according to actual requirement. | |
| **4** Each item to be fitted with a stainless steel identification tag clearly stamped with SP Number, Nominal Size, PO Number and PO Item Number | |
| 5 Bidder to confirm compliance to Specifications for Metallic Pipe, Fittings (Annexure VII) | |

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| | | |
|---|---|---|
| Customer | OGDCL | ANNEXURE C-1 |
| Project | DEVELOPMENT PROJECT | DATA SHEET (Group-C) Studs & Nuts |
| Location | PAKISTAN | |

| GENERAL INFORMATION | | Compliance |
|---|---|---|
| Size Range, NPS : | 1/2" to 24" As per ASME B16.5 | |
| Rating | Class 150- 2500 | |
| Size Range, NPS : | 26" to 30" As per ASME B16.47 & Rating as per standard. | |
| Flange Facing | RTJ, RF, Flat Face | |
| Service : | HC GAS WITH $H_2S$ | |
| Gas Composition: | $H_2S$: 0.0001, $CO_2$: 0.0764, $N_2$: 0.0967, Methane: 0.7677, Ethane: 0.0098, Propane: 0.0024, i-Butane: 0.0005, n-Butane: 0.0006, i-Pentane: 0.0003, n-Pentane: 0.0002, $C_6$+: 0.0022, $H_2O$: 0.0429 | |
| Codes: | Refer Para 3 of the Specifications for compliance ( SP-QP-11-L-00 | |

| NOTES |
|---|
| 1 (*) Vendor to supply information with Bid. |
| 2 All materials to be suitable for sour service as per NACE MR 01 75. |
| 3 Gas composition and Service will change according to actual requirement. |
| 4 Each item to be fitted with a stainless steel identification tag clearly stamped with SP Number, Nominal Size, PO Number and PO Item Number |
| 5 Bidder to confirm compliance to Specifications for Metallic Pipe, Fittings ( ANNEXURE VII) |

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ANNEXURE-VII

# SPECIFICATION

# FOR METALLIC PIPE, FITTINGS, FLANGES, BOLTING & GASKETS



| | | | | | |
|---|---|---|---|---|---|
| 0 | 29th Dec 2017 | Approved for Construction | SS | A.Ali | MSc |
| **REV** | **DATE** | **DESCRIPTION** | **PREP'D** | **CHECK'D** | **APP'D** |



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## 1 SCOPE

This Specification states the minimum technical, manufacturing and inspection requirements for the pipe, fittings, flanges, bolting and gasket materials for use on OGDCL wellhead piping for sour service.

All piping component design and materials shall meet the requirements of the referenced specifications and the latest editions of following Codes, Standards and Statutory Regulations (where applicable).

All exceptions or deviations between the requirements of this document and the referenced Codes and Standards shall be brought to the attention of CEIS for written resolution and approval.

## 2 REFERENCES

The following documents and specifications shall be read in conjunction with this specification:

- DATA SHEETS

## 3. CODES AND STANDARDS

Latest edition of the Codes and Standards referenced below shall be used.

### 3.1 American Society of Mechanical Engineers

| | |
|---|---|
| • ASME V | Boiler and Pressure Vessel Code<br>Section V – Non Destructive Examination |
| • ASME VIII | Boiler and Pressure Vessel Code<br>Section VIII Div.1 & Div. 2 Rules for Construction of Pressure Vessels |
| • ASME IX | Boiler and Pressure Vessel Code<br>Section IX - Welding Qualifications |
| • ASME B31.3 | Process Piping |
| • ASME B1.20.1 | Pipe Threads General Purpose (Inch.) |
| • ASME B16.1 | Cast Iron Pipe Flanges and Flanged Fittings |
| • ASME B16.5 | Pipe Flanges and Flanged Fittings |
| • ASME B16.9 | Wrought Steel Butt welding Fittings |
| • ASME B16.10 | Face-to-Face and End-to-End Dimensions of Valves |
| • ASME B16.11 | Forged Fittings, Socket-Welding and Threaded |
| • ASME B16.11 | Forged Fittings, Socket-Welding and Threaded |
| • ASME B16.20 | Metallic Gaskets for Pipe Flanges – Ring-Joint, Spiral-Wound, |



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- ASME B16.21 Non-Metallic Flat Gaskets for Pipe Flanges
- ASME B16.25 Butt welding Ends
- ASME B16.34 Valves – Flanged, Threaded and Welding End
- ASME B16.47 Large Diameter Steel Flanges
- ASME B16.48 Steel Line Blanks
- ASME B36.10M Welded and Seamless Wrought Steel Pipe
- ASME B36.19M Stainless Steel Pipe
- ASME B46.1 Surface Texture, Surface Roughness, Waviness & Lay

### 3.2 American Petroleum Institute

- API 5L Specification for Line Pipe

### 3.3 American Society for Testing and Materials

- ASTM A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- ASTM A105 Specification Carbon Steel Forgings for Piping Applications
- ASTM A106 Specification for Seamless Carbon Steel Pipe For High-Temperature Service
- ASTM A123 Specification for Zinc (Hot Dipped Galvanised) Coating on Iron and Steel Products.
- ASTM A193 Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service
- ASTM A194 Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High Temperature Service, or Both
- ASTM A234 Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
- ASTM A312 Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
- ASTM A320 Specification for Alloy / Steel Bolting Materials for Low Temperature Service
- ASTM A333 Specification for Seamless and Welded Steel Pipe for Low-Temperature Service
- ASTM A335 Specification for Seamless Ferritic Alloy Steel Pipe for High



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Temperature Service

- ASTM A350 — Specification for Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components
- ASTM A358 — Specification for Electric Fusion Welded Austentic Chromium-Nickel Alloy Steel Pipe for High Temperature Service
- ASTM A387 — Standard Specification for Pressure Vessel Plates, Alloy Steel, Chromium-Molybdenum
- ASTM A403 — Specification for Wrought Austenitic Stainless Steel Piping Fittings.
- ASTM A420 — Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low Temperature Service.
- ASTM A530 — Specifications for General Requirements for Specialized Carbon and Alloy Steel
- ASTM A516 — Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
- ASTM A671 — Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures.
- ASTM A672 — Specification for Electric-Fusion-Welded Steel Pipe for High Pressure Service at Moderate Temperatures.
- ASTM A694 — Specification for Carbon and Alloy Steel Pipe Flanges, Fittings, Valves and Parts for High Pressure Transmission Service.
- ASTM A707 — Specification for Forged and Alloy Steel Flanges for Low-Temperature Service
- ASTM A815 — Specification for Wrought Ferritic / Austenitic and Martensitic Stainless Steel Piping Fittings.
- ASTM A860 — Specification For Wrought High Strength Low Alloy Steel Butt Welding Fittings.
- ASTM A890 — Specification for Castings, Iron-Chromium-Nickel-Molybdenum Corrosion-Resistant, Duplex (Austenitic/Ferritic) for General Application
- ASTM A928 — Specification for Ferritic/Austenitic (Duplex) Stainless Steel Pipe Electric Fusion Welded with Addition of Filler Metal.
- ASTM A960 — Specification for Common Requirements for Wrought Piping Fittings.
- ASTM A999 — Specification for General Requirements for Alloy and Stainless Steel Pipe.
- ASTM B564 — Standard Specification for Nickel Alloy Forgings



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- ASTM G48 Standard Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by use of Ferric Chloride Solution.

### 3.5 British Standards Institution

- BS 3799 Steel Pipe Fittings, Screwed and Socket Welding

### 3.6 Manufacturer's Standardisation Society of the Valves & Fittings Industry

- MSS SP25 Standard Marking System for Valves, Fittings, Flanges and Unions.
- MSS SP44 Steel Pipe Line Flanges
- MSS SP97 Integrally Reinforced Forged Branch Outlet Fittings, Socket Weld, Threaded and Butt Welding Ends.

### 3.7 Australian Standards

- AS 2129 Flanges for Pipes, Valves and Fittings
- AS 4037 Pressure Equipment – Examination and Testing
- AS 4041 Pressure Piping
- AS 4343 Pressure Equipment – Hazard Levels

### 3.8 National Association of Corrosion Engineers

- NACE MR-01-75 Sulphide Stress Cracking Resistant Metallic Materials for Oilfiel Equipment.

## 4. GENERAL REQUIREMENTS

4.1 Component, type, material and grade together with the NPS and schedule/wall thickness shall be as specified in the data sheets.



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# 5. MATERIAL REQUIREMENTS

## 5.1 Carbon Steel and Impact Tested Carbon Steel

The chemical composition of carbon steel and impact tested carbon steel pipe, fittings and flanges shall be limited as follows:

- Carbon content 0.22% max
- Carbon equivalent 0.43% max by ladle analysis where :

$$CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu + Ni}{15}$$

Pipe to ASTM A106, Grade B.

- Sulphur content shall be 0.010% maximum.
- Phosphorous content shall be 0.10% maximum.
- All materials shall be normalised and tempered. The minimum tempering temperature shall be 720 °C.

Flanges - ASTM A 105

- Sulphur content shall be 0.010% maximum.
- Phosphorous content shall be 0.010% maximum.
- Carbon equivalent shall be 0.47% maximum for forgings with maximum section thickness of 2 in. or less and 0.48% for forgings with a maximum section thickness of greater than 2 in.

For non-NACE applications sulphur and phosphorous content shall be in accordance with the product standard.

Materials specified in accordance with NACE MR0175 shall also meet the following requirements :

- Seamless pipe, fittings and forged flanges:
  Sulphur 0.010% max. Phosphorous 0.030% max.
- Pipe, fittings and flanges manufactured from plate:
  Sulphur 0.005% max, Phosphorous 0.025% max.
- All materials supplied to NACE MR0175 requirements shall be fully killed, fine grained and vacuum degassed.
- All materials shall be supplied in a normalised condition and shall be marked as such in accordance with the product specification and the applicable supplementary requirement.
- All impact tested carbon steel supplied to ASTM A350 LF2 shall be Class 1.

## 5.2 Carbon Steel High Yield Material

All High Yield materials shall be supplied in the Quench and Tempered Condition.

The chemical composition of all pipe, fittings and flanges made from high yield Carbon Steel complying to NACE MR1075 shall be limited as follows:



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- Pipe to API 5L Gr. X52

  Carbon Content 0.22% max.
  Sulphur Content 0.005% max.
  Carbon equivalent 0.43% max (CEV by ladle analysis as defined in 5.1)

  Pipe shall be Seamless execution or EFW with 100% X-Ray.

- Pipe to API 5L Gr. X65

  Carbon Content 0.15% max.
  Sulphur Content 0.005% max.
  Carbon equivalent 0.43% max (CEV by ladle analysis as defined in 5.1)

  Pipe shall be Seamless execution or EFW with 100% X-Ray.

- Fittings to ASTM A860 WPHY65

  Carbon Content 0.18% max.
  Sulphur Content 0.005% max.
  Carbon equivalent 0.42% max (CEV by ladle analysis as defined in 5.1).

  Pipe shall be Seamless execution or EFW with 100% X-Ray.

- Forgings to ASTM A694 Gr. F65

  Carbon Content 0.18% max.
  Sulphur Content 0.005% max.
  Carbon equivalent 0.43% max (CEV by ladle analysis as defined in 5.1).

## 5.3 Austenitic Stainless Steel

Austenitic stainless steel shall be supplied in a solution annealed condition. Solution annealing shall be carried out after all welding.

All type 304 stainless steel shall be supplied **dual certified**, that is having the mechanical properties of 304 stainless steel and the chemical composition of 304L stainless steel.

All type 316 stainless steel shall be supplied **dual certified**, that is having the mechanical properties of 316 stainless steel and the chemical composition of 316L stainless steel.

## 5.4 Duplex and Super Duplex Stainless Steels

All materials shall meet the mechanical requirements and chemical composition of the following UNS designation as defined by its product specification:

| | | |
|---|---|---|
| Duplex stainless steel | - | UNS S31803 |
| Super Duplex stainless steel | - | UNS S32750 |

Alloy composition shall provide a minimum Pitting Resistance Equivalent (PRE) as defined by the equation:

PRE = %Cr + 3.3% Mo + 16% N (Calculated by % weight)

PRE for Duplex stainless steel to UNS S31803 shall be 35

PRE for Super Duplex stainless steel to UNS S32750 shall be 43

All components shall be supplied in a solution annealed condition. Solution annealing shall be carried out after all welding operations have been completed. Maximum hardness shall not exceed the following:



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| | |
|---|---|
| Duplex stainless steel UNS S31803 | - 28 HRC |
| Super Duplex stainless steel UNS 32750 | - 32 HRC |

Micrographic examination is required for both Duplex and Super Duplex stainless steel and shall cover the near surface and mid-thickness region. For welded pipe and fittings this shall also include the weld zone. The ferrite content shall be determined according to ASTM E562 or approved equivalent and shall be within 35 - 55 % for base material and 25 - 60 % for weld metal. The microstructure, as examined at 400X magnification on a suitably etched specimen, shall be free from intermetallic phases and precipitates.

Corrosion Testing is required for both Duplex and Super Duplex stainless steel and shall be carried out for each heat of material to establish sigma phase intergranular attack in accordance with ASTM G48 Method A. The samples shall be exposed to 10% $FeCl_3$ solution at 25°C for 72 hours. Test specimens shall be in the 'as delivered / manufactured' condition, no surface preparation is permitted, except for cut edges. The test specimens shall include the full section thickness. Visual examination shall be performed on all of the specimens with at least 20x magnification. No pitting is acceptable. Weight loss shall not exceed 4.0 g/m².

Vendors shall submit for review with bid, details of all Manufacturers and include any further standard production testing which demonstrates resistance to Pitting and Crevice Corrosion for evaluation.

Weld procedure qualification for all welded pipe and fittings shall include impact testing of weld deposits and heat affected zones at minus 46 Deg C. The absorbed energy values shall be 45 Joules minimum average and 35 Joules minimum individual.

## 5.5 Low Alloy Steel

Pipe to ASTM A335, Grade P11.

- Sulphur content shall be 0.010% maximum.
- Phosphorous content shall be 0.010% maximum.
- All materials shall be normalised and tempered. The minimum tempering temperature shall be 720 °C.

Fittings to ASTM A 234 Grade WPB

- Sulphur content shall be 0.010% maximum.
- The phosphorous content shall be 0.010% maximum.
- For welded fittings, these chemistry limits shall also apply to the weld.

Seamless fittings and fittings forged or extruded from welded pipe shall be normalised and tempered.

For fittings manufactured from plate, the plate shall be stress relieved or normalised and tempered and shall have tensile properties in accordance with ASTM A 387 Class 2.

Flanges - ASTM A 182 Grade F11-Class 2

- Sulphur content shall be 0.010% maximum.
- Phosphorous content shall be 0.010% maximum.
- Carbon content shall be 0.14% maximum.



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Flanges shall be normalized and tempered.

### 5.6 NACE MR0175

All materials specified to NACE MR0175 shall be manufactured, tested and inspected in accordance with NACE requirements.

### 5.7 Impact Testing

Impact Testing shall be carried out in accordance with ASTM A370. Minimum impact values, lateral expansion and minimum test temperature will be the most onerous as defined by this specification, the material description or the product specification.

## 6. MANUFACTURING REQUIREMENTS

### 6.1 Pipe

**Dimensions**

Pipe shall be dimensionally in accordance with ASME B36.10M or ASME B36.19M as applicable.

**Length**

Pipe shall be supplied in double random lengths (11m to 13m) or single random lengths (5m to 7m).

Pipe lengths, which include joiners, are not acceptable.

**Ends**

For pipe specified as bevelled both ends, bevelling shall be in accordance with ASME B16.25 Fig 2a or 3a as applicable.

All screwed pipe shall be supplied with ends threaded in accordance with ASME B1.20.1. Couplings shall be 3000lb rating and screwed on 'hand tight' as described in API 5L Para 7.2.

**Process**

The steel shall be killed steel, with the primary melting process being open-hearth, basic-oxygen, or electric-furnace, possibly combined with separate degassing or refining. If secondary melting, using electro slag remelting or vacuum-arc remelting is subsequently employed, the heat shall be defined as all of the ingots remelted from a single primary heat.

Steel cast in ingots or strand cast is permissible. When steels of different grades are sequentially strand cast, identification of the resultant transition material is required. The producer shall remove the transition material by any established procedure that positively separates the grades.

For pipe NPS 1½ [DN 40] and under, it shall be permissible to furnish hot finished or cold drawn.



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Unless otherwise specified, pipe NPS 2 [DN 50] and over shall be furnished hot finished. When agreed upon between the manufacturer and the purchaser, it is permissible to furnish cold-drawn pipe.

Galvanised pipe and couplings shall be supplied galvanised in accordance with ASTM A123. Threads shall be 'dressed' after galvanising to ensure correct thread engagement, the thread dressing shall not damage the coating effectiveness. The internal bore of galvanised pipe shall be free from blockage due to galvanising.

**Heat Treatment**

Hot-finished pipe need not be heat treated. Cold-drawn pipe shall be heat treated after the final cold draw pass at a temperature of 1200 °F (650 °C) or higher.

Carbon steel pipe shall be heat treated in accordance with product specification requirements after completion of all forming and welding operations.

**Hydrostatic Test**

All finished pipe shall be subjected to hydrostatic test without leakage through the pipe wall.

**Bending Requirements**

For pipe NPS 2 [DN 50] and under, a sufficient length of pipe shall stand being bent cold through 90° around a cylindrical mandrel, the diameter of which is twelve times the outside diameter (as shown in ASME B 36.10M) of the pipe, without developing cracks. When ordered for close coiling, the pipe shall stand being bent cold through 180° around a cylindrical mandrel, the diameter of which is eight times the outside diameter (as shown in ASME B 36.10M) of the pipe, without failure.

Subject to the approval of the purchaser, for pipe whose diameter exceeds 10 in. [250 mm], it shall be permissible for the bend test to be substituted for the flattening test. The bend test specimens shall be bent at room temperature through 180° with the inside diameter of the bend being 1 in. [25 mm], without cracking on the outside portion of the bent portion.

For pipe whose diameter exceeds 25 in. [635 mm] and whose diameter to wall thickness ratio (D/t = Specified Outside Diameter/Nominal Wall Thickness) is 7.0 or less, the bend test described in second para (above) of this section shall be conducted instead of the flattening test.

**Flattening Tests**

For pipe over NPS 2 [DN 50], a section of pipe not less than 2½ in. [63.5 mm] in length shall be flattened cold between parallel plates until the opposite walls of the pipe meet. Flattening tests shall be in accordance with Specification A 530/A 530M, except that in the formula used to calculate the "H" value, the following "e" constants shall be used:

0.08 for Grade A

0.07 for Grades B and C

When low D-to-t ratio tubulars are tested, because the strain imposed due to geometry is unreasonably high on the inside surface at the six and twelve o'clock locations, cracks at these locations shall not be cause for rejection if the D-to-t ratio is less than 10.



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**Nipples**

Nipples shall be cut from pipe of the same dimensions and quality described in this specification.

**Workmanship, Finish and Appearance**

The pipe manufacturer shall explore a sufficient number of visual surface imperfections to provide reasonable assurance that they have been properly evaluated with respect to depth. Exploration of all surface imperfections is not required but consideration should be given to the necessity of exploring all surface imperfections to assure compliance with the following:

Surface imperfections that penetrate more than 12½ % of the nominal wall thickness or encroach on the minimum wall thickness shall be considered defects. Pipe with such defects shall be given one of the following dispositions:

- The defect shall be removed by grinding, provided that the remaining wall thickness at any point shall not be more than 12.5 % under the specified wall thickness.
- The section of pipe containing the defect may be cut off within the limits of requirements on length.

- Rejected.

To provide a workmanlike finish the pipe manufacturer shall remove by grinding the following noninjurious imperfections:

- Mechanical marks, abrasions (Note 5) and pits, any of which imperfections are deeper than 1/16 in. [1.6 mm].

- Visual imperfections commonly referred to as scabs, seams, laps, tears, or slivers found by exploration to be deeper than 5 % of the nominal wall thickness.

At the purchaser's discretion, pipe shall be subjected to rejection if surface imperfections are not scattered, but appear over a large area in excess of what is considered a workmanlike finish. Disposition of such pipe shall be a matter of agreement between the manufacturer and the purchaser.

When imperfections or defects are removed by grinding, a smooth curved surface shall be maintained, and the wall thickness shall not be decreased below that permitted by this specification. The outside diameter at the point of grinding is permitted to be reduced by the amount so removed.

Wall thickness measurements shall be made with a mechanical caliper or with a properly calibrated non-destructive testing device of appropriate accuracy. In case of dispute, the measurement determined by use of the mechanical caliper shall govern.

The finished pipe shall be reasonably straight.

## 6.2 Butt Weld and Threaded Fittings

Fittings shall be dimensionally in accordance with ASME B16.9, ASME B16.11, MSS SP-97 and BS 3799 as applicable.



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Butt weld fittings shall have ends bevelled in accordance with ASME B16.25 Fig 2a or 3a.

Threaded fittings shall be supplied with ends threaded NPT in accordance with ASME B1.20.1.

Galvanised fittings shall be supplied galvanised in accordance with ASTM A153. Threads shall be 'dressed' after galvanising to ensure correct thread engagement, the thread dressing shall not damage the coating effectiveness. Galvanised fittings shall be supplied with the internal bore free from blockage due to galvanising.

Carbon steel and impact tested carbon steel butt weld fittings up to and including DN 400 shall be seamless. Fittings DN 450 and above may be seamless or EFW with 100% radiography of weld seam and have a joint factor of 1.0.

Stainless steel and Duplex Stainless steel butt weld fittings up to and including DN 150 shall be seamless. Fittings DN 200 and above may be seamless or EFW with 100% radiography of weld seam and have a joint factor of 1.0.

Fittings machined from solid forged blocks or solid bar are not acceptable.

Repair by welding of wrought fittings is not permitted.

All fittings shall be qualified by burst test certification, in accordance with ASME B16.9, which shall be available for Purchaser review if requested.

The design of Integrally Reinforced Forged Outlet Fittings shall be documented to demonstrate compliance with of ASME B31.3 para 304.3.2, Appendix D Table D300 and fulfil the following requirements.

- Integrally Reinforced Outlet Fittings shall be 'Bonney Forge' design, dimensions in accordance with MSS SP97, unless stated otherwise in the Material Requisition.
- Integrally Reinforced Outlet Fittings whose header wall thickness is Sch10/10s or less, shall be considered 'Lightweight Design' based upon the ASME B16.5 Class 300 pressure rating for the specified material. Typical drawings shall be submitted with bid
- The design shall be supported by area Reinforcement Calculations. The design shall not be dependent on weld material to provide the necessary area replacement required.
- Burst Test certification shall be available for all Reinforced Outlet Fittings and shall be in accordance with MSS SP97, Annex B.
- The internal bore of the Integrally Reinforced Outlet Fitting shall be tapered with a maximum slope of 30 degrees to match branch pipe.
- All Integrally Reinforced Outlet Fittings shall be forged as close as practicable to final shape with the exception of finish machining. Fittings machined from forged bar or forged rings are NOT acceptable.

Plugs shall be solid steel round or hexagonal bar stock.

Swage Nipples shall comply with BS 3799.

## 6.3 Flanges, Spectacle Blinds, Spades and Spacers



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Flanges DN 600 and smaller shall be in accordance with ASME B16.5. All flanges DN 650 and larger shall comply with ASME B16.47 series A.

All threaded flanges shall be supplied threaded NPT in accordance with ASME B1.20.1.

Galvanised flanges shall be supplied galvanised in accordance with ASTM A123. Threads shall be 'dressed' after galvanising to ensure correct thread engagement, the thread dressing shall not damage the coating effectiveness. Gasket contact area shall be free of galvanising and a suitable rust preventative applied.

Flange facing shall be as follows:

Class 150 to 600 – Raised face smooth spiral finish Ra 3.2 to 6.3µm.

Class 900 to 2500 – Ring type joint side wall finish Ra 0.4 to 1.6µm.

The minimum hardness of flange ring grooves shall be as follows:

- Carbon Steel - 110 HB
- Low Temperature Carbon Steel - 110 HB
- Austenitic Stainless Steel AISI 316 - 180 HB
- Duplex Stainless Steel - 200 HB
- Super Duplex Stainless Steel - 200 HB

Orifice flanges DN 600 and smaller shall be in accordance with ASME B16.36 and shall be supplied in pairs, complete with jackscrews to ASTM A193 Gr B7. Vendor shall supply with bid, dimensional details of assembly including tapping connections.

## 6.4 Bolting

Threading of all bolting shall be in accordance with ASME B 1.1, UNC series for diameters up to and including 1" and 8UN series for diameters 1-1/8" and larger. Stud bolts shall have Class 2A dimensions and nuts shall have Class 2B.

All stud bolts shall be threaded full length and supplied with two heavy series hexagon nuts. The length of Stud bolts 1-1/4" diameter and larger has been calculated to allow for the use of bolt tensioning equipment, the extra length is included in the lengths stated on the material requisition. Stud bolts 1-1/4" diameter and larger shall be supplied with thread protectors.

Hexagon head machine bolts shall be used with threaded lug Butterfly valves.

Washers, when specified in the material description (GRE piping systems) shall be 4mm thick steel to ASTM F436. Studbolts shall be supplied complete with 2 washers; machine bolts shall be supplied complete with 1 washer.

All jack screws and hexagon headed bolts shall have threads extended to the underside of the head.



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All ASTM A320 L7 and L43 bolting shall be impact tested at minus 101°C. All nuts to ASTM A194 Grade 4 and 7 shall be impact tested in accordance with the 'Supplementary Requirements' S3 of ASTM A194 at minus 101°C.

All bolting materials shall be supplied 'black' unless stated otherwise, the following options are provided for coating of bolting materials:

- For items are specified as galvanised, they shall be Hot Spun Galvanised in accordance with ASTM A153 and fully passivated. Nuts shall be re-tapped after galvanising and be fully assembled with stud bolts prior to despatch.
- For items specified as PTFE coated, they shall be Xylan 1070 (Whitford Corporation) or Purchaser approved equivalent. Details of PTFE coating shall be submitted for review with bid. PTFE coatings shall be 'Colour Coded' as follows:

| MATERIAL | COLOUR |
|---|---|
| ASTM A193 Gr B7 / A194 Gr 2H | Green |
| ASTM A193 Gr B7M / A194 Gr 2HM | Orange |
| ASTM A193 Gr B16 / A194 Gr 8 | Black |
| ASTM A320 Gr L7 / A194 Gr 4 | Blue |

The standard stamping required by the material specification shall be legible after the bolting components have been coated with the PTFE.

## 6.5 Gaskets

Flat ring gaskets shall be compressed non-asbestos fibre in accordance with ASME B16.21.

- Gasket thickness shall be 1.5mm unless specified otherwise.
- Asbestos in any form shall not be used in the manufacture and construction of gaskets.
- Gaskets shall be suitable for hydrocarbon gas/oil, hot oil, amine, potable water and wet sour service as defined in NACE MR0175.

Spiral wound gaskets shall be in accordance with API 601/ASME B16.20. Unless stated otherwise gaskets shall be 4.5mm thick graphite filled with an inner ring and 3mm thick centring ring to ASME B16.20.

- Material of inner ring and centering ring shall be stated on the requisition.
- Material of winding shall be 304L stainless steel unless stated otherwise on the requisition.
- All spiral wound gaskets shall comply with NACE MR0175.

Ring type gaskets, unless stated otherwise on the material requisition shall be, Style R Octagonal type in accordance with ASME B16.20.

- Soft iron ring joints shall be supplied with a maximum hardness of 90 HB.
- Austenitic stainless steel ring type joints AISI 316 shall be supplied in a fully solution annealed condition and minimum hardness of 160 NB.



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- Super Austenitic stainless steel ring type joints Alloy 904L and 254 SMo, shall be supplied in a fully solution annealed condition and have a maximum hardness of 180 HB.
- All ring joint gaskets (except soft iron) shall comply with NACE MR0175.

Neoprene gaskets shall have a hardness of between 55 to 65 Shore A.

## 7. MARKING

**7.1** In addition to the marking requirements of the relevant product standard and MSS SP-25, the following information shall be marked on each component:

- Specification and grade of material
- Nominal diameter and wall thickness
- Purchase order and item number.

**7.2** Marking shall be carried out on all individual components size DN 50 and larger and on corrosion resistant metal tags for components sizes less than DN 50, the tags being securely attached to each package.

**7.3** Marking of components DN 50 and larger shall be by stencilling with indelible paint, with pipe being marked 100mm from each end. The paint shall not contain any harmful metals such as zinc, or metallic salts, which would adversely affect the metal on heating or welding, with particular attention being paid to austenitic and duplex stainless steel.

**7.4** All components shall additionally be hard stamped or vibro etched with the heat number. For components manufactured from austenitic and duplex stainless steel, marking shall be by vibro-etching. Carbon steel and impact tested carbon steel shall be marked by round nosed low stress stamps.

## 8. COLOUR CODING

**8.1** To enable identification of materials on site, Vendors are required to mark all items, excluding bolting, with colour coding in accordance with the colour coding schedule shown in Table 1, 2 & 3 below.

**Table 1 – Colour Coding Schedule (excluding gaskets)**

| MATERIAL | COLOUR | AS 2700 REF. | BS 4800 EQUIV. |
|---|---|---|---|
| Carbon Steel (non-NACE) | Light Green | G37 | 14E51 |
| Carbon Steel (NACE) | Brown | X54 | 06C39 |
| Galvanised Carbon Steel | Self Colour | - | - |
| Impact Tested Carbon Steel | Silver Grey | N22 | 10A03 |
| Impact Tested Carbon Steel (NACE) | Off White | Y35 | 10B15 |
| High Yield Carbon Steel X65 / F65 / WPHY65 (NACE) | Pink | P33 | 24C33 |
| Austenitic Stainless Steel – 304 / 304L | Sapphire | B14 | 20D45 |
| Austenitic Stainless Steel – 316 / 316L | Pale Blue | B35 | 18E49 |



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| | | | |
|---|---|---|---|
| Duplex Stainless Steel –UNS S31803 (NACE) | Yellow | Y15 | 08E53 |
| Super Duplex Stainless Steel – UNS S32750 (NACE) | Red | R13 | 05E53 |
| Low Alloy Steel – 1 ¼ Cr ½ Mo | Violet | P13 | 24C39 |

**Table 2 – Colour Coding Schedule – Spiral Wound Gaskets**

| Strip Winding Matl | Filler Material | Outer Ring Material | Inner Ring Material | Outer Ring Colour | Filler Identifier 4 Stripes Colour |
|---|---|---|---|---|---|
| 304L SS | Flexible Graphite | 316 SS | 316 SS | Yellow | Grey |
| 316L SS | Flexible Graphite | Carbon Steel (Cad. Plated) | Carbon Steel | Silver | Grey |
| 316L SS | Flexible Graphite | 316 SS | 316 SS | Green | Grey |

**Table 3 – Colour Coding Schedule – Ring Type Joints**

| Ring Material | Colour |
|---|---|
| Soft Iron | Self Colour |
| 316 SS | Green |
| 904L SS | Magenta |
| 254 SMo | Violet |

**8.2** The paint shall not contain any harmful metals such as zinc, or metallic salts, which would adversely affect the metal on heating or welding, with particular attention being paid to austenitic stainless steel.

**8.3** Colour coding location shall be as follows, noting marking shall not encroach upon surfaces prepared for welding or gasket contact surfaces:

Pipe - DN 40 and smaller – broad rings painted 1.5 metres apart.
DN 50 and larger – a broad line painted down the entire length of the pipe.

Fittings - Socket weld and threaded ends – broad circumferential band painted at one end of the fitting.
Butt weld – broad line painted down entire longitudinal length of fitting.

Flanges - Weld neck flanges – broad circumferential band painted on the hub remote from the butt weld end. Blinds shall have bulls eye painted on the back.
Spectacle blinds – circumferential band painted on the edge of the spacer section



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Separate blind and spacer - circumferential band painted on the edge of each item.

Gaskets - Spiral wound type – outer edge of the outer ring as per ASME B16.20.

## 9. PREPARATION FOR SHIPMENT

**9.1** All pipe, fittings, flanges bolting and gaskets shall be protected against corrosion and mechanical damage. Vendors/Manufacturers procedures shall be supplied with bid for Purchaser review.

**9.2** All flange faces shall be supplied with proprietary heavy-duty plastic flange protectors or marine plywood; retained by a minimum of four bolts. Butt weld and threaded ends on pipes, fittings and flanges shall be supplied with suitable bevel and thread protectors.

## 10. INSPECTION REQUIREMENTS

**10.1** A typical Inspection and Test Plan shall be submitted for review with the bid. All pipe, fittings, flanges, bolting and gaskets will be subject to inspection in accordance with the Purchaser approved Manufacturer's Inspection and Test Plan.

## 11. CERTIFICATION AND TRACEABILITY

**11.1** Material Certificates in accordance with BS EN 10204.3.1.B / DIN 50049 3.1B are required for all pressure containing components. They shall be clearly legible, in the English language and as a minimum shall include:

- Chemical Analysis by Heat
- Mechanical Properties
- Heat Treatment Statement and Number
- Non Destructive Test results
- Hydrostatic and/or Pneumatic Test results
- Heat or Melt Number
- Compliance with NACE MR0175-97 and any additional requirements listed in this specification.

**11.2** All certificates shall state the Manufacturers name and location, all forging and plate certificates shall be from original steel manufacturers. Certificates shall include the Vendor's purchase order number and purchase order item number. Material certificates for dual certified stainless steel materials shall indicate compliance with the requirements of both grades of stainless steel as stated in the stock code description.

**11.3** All other components including gaskets not covered by BS EN 10204.3.1.B / DIN 50049 3.1B shall require a Certificate of Compliance in accordance with BS EN 10204.2.2 / DIN 50049 2.2.



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