



INDRADHANUSH GAS GRID LIMITED (IGGL)
(Joint Venture of IOCL, ONGC, GAIL, OIL and NRL)
GUWAHATI, ASSAM
NORTH -EAST GAS GRID PIPELINE PROJECT
(PIPELINE SECTION 1,2,3,5 & 9)

BID DOCUMENT FOR PROCUREMENT
OF

FLANGES & FITTINGS

OPEN DOMESTIC COMPETITIVE BIDDING

Tender No.: 05/51/23VC/IGGL/026

VOLUME – II OF II

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PREPARED AND ISSUED BY

MECON LIMITED
(A Govt. of India Undertaking)
Delhi, India

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INDRADHANUSH
GAS GRID LIMITED

Project :
NORTH -EAST NATURAL GAS PIPELINE
GRID (PHASE-I & PHASE-II) PROJECT

Document No. :
MEC/23VC/05/21/
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MATERIAL REQUISITION

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1.0 SCOPE OF SUPPLY

The Scope of supply includes Flanges and Fittings conforming to Size, Rating Schedule/Thickness, Dimension standard, Material Grade, Type/Facing/ End Details and other details mentioned in the material requisition and meeting other technical requirements as specified in bid document, getting approvals from Purchaser/ Consultant, procurement of raw material, manufacturing, testing & inspection, packing, forwarding & transportation, delivery, unloading and stacking at owner's store in the states of Assam, Arunachal Pradesh, Nagaland, Meghalaya, Tripura & Mizoram as per tender terms & conditions. The details of Flanges and fittings to be supplied are given in following MR.

MATERIAL REQUISITION

GROUP-A : Carbon Steel Flanges

MR Item No.	Size, (Inch)	Rating	Dimension Standard	Material Grade	Flange Type / Facing	Quantity (Nos)	Remarks
A1	24"	600#	ASME B16.47 (series A)	ASTM A 694 GR. F-52 (CHARPY)	WNRF / WN thickness to match pipe thickness, RF 125 AARH	35	Connecting pipe thickness 23.8 mm
A2	18"	600#	ASME B16.5	ASTM A 694 GR. F-52 (CHARPY)	WNRF / WN thickness to match pipe thickness, RF 125 AARH	04	Connecting pipe thickness Sch. 60

GROUP-B : Carbon Steel Blind Flanges

MR Item No.	Size (Inch)	Rating	Dimension Standard	Material Grade	Flange Facing	Quantity (Nos)	Remarks
B1	24"	600#	ASME B16.5	A105	RF 125 AARH	08	---
B2	18"	600#	ASME B16.5	ASTM A350 GR.LF-2, CL-1	RF 125 AARH	01	---

GROUP-C : Carbon Steel Spectacle Blinds

MR Item No.	Size, (Inch)	Rating	Dimension Standard	Material Grade	Flange Facing	Quantity (Nos)	Remarks
C1	24"	600#	ASME B 16.48	A105 (CHARPY)	RF 125 AARH	21	---
C2	18"	600#	ASME B 16.48	ASTM A 105 (CHARPY)	RF 125 AARH	03	---

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GROUP-D: Carbon Steel Butt Welded Tees

MR Item No.	Size, (Inch)	Thickness / Schedule	Dimension Standard	Material Grade	End Details	Quantity (Nos)	Remarks
D1	24" x 24"	19.1 mm x 19.1 mm	ASME B 16.9	MSS-SP-75 Gr. WPHY-52	BW	08	---
D2	24" x 12"	19.1 mm x S60	ASME B 16.9	MSS-SP-75 Gr. WPHY-52	BW	06	---
D3	24" x 8"	19.1 mm x 14.3	ASME B 16.9	MSS-SP-75 Gr. WPHY-52	BW	08	---
D4	18" x 18"	Sch. 60	ASME B 16.9	MSS-SP-75 Gr. WPHY-52	BW	01	---

GROUP-E: Carbon Steel 90° Elbow

MR Item No.	Size, (Inch)	Thickness / Schedule / Rating	Dimension Standard	Material Grade	End Details	Quantity (Nos)	Remarks
E1	24"	19.1 mm	ASME B 16.9	MSS-SP-75 GR. WPHY-52	BW	10	1.5 D
E2	18"	Sch.60	ASME B 16.9	MSS-SP-75 GR. WPHY-52	BW	02	1.5 D

GROUP-F: Carbon Steel 45° Elbow

MR Item No.	Size, (Inch)	Thickness / Schedule / Rating	Dimension Standard	Material Grade	End Details	Quantity (Nos)	Remarks
F1	24"	19.1 mm	ASME B 16.9	MSS-SP-75 GR.W PHY-52	BW	14	1.5 D
F2	18"	Sch.60	ASME B 16.9	MSS-SP-75 GR.W PHY-52	BW	02	1.5 D

GROUP-G: Carbon Steel Concentric Reducer

MR Item No.	Size, (Inch)	Thickness / Schedule / Rating	Dimension Standard	Material Grade	End Details	Quantity (Nos)	Remarks
G1	10" x 8"	XS x 14.3mm	ASME B 16.9	MSS-SP-75 GR. W PHY 52	BW	32	---

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G2	6" x 4"	XS x XS	ASME B 16.9	ASTM A 234 GR WPB (CHARPY)	BW	02	---
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2.0 DOCUMENTS & DATA REQUIREMENTS

- 2.1 The table hereunder specifies the quantities and the nature of the documents to be submitted by the Package Contractor to Purchaser.
- 2.1.1 The documents required at the inquiry stage and to be included in the bid are listed under column A of clause 2.6 below.
- 2.1.2 The documents required after award of the Contract and subject to the written approval of the Purchaser are listed under column B of clause 2.6 below.
- 2.1.3 The final and certified documents are listed under column C of clause 2.6 below.
- 2.2 Any document, even when preliminary, shall be binding and therefore duly identified and signed by the Vendor. It shall bear the Purchaser's Project reference, the Material Requisition number and the identification number.
- 2.3 The drawings/documents shall be reviewed, checked, approved and duly signed/stamped by successful Bidder/supplier before submission. Revision number shall be changed during submission of the revised successful Bidder/supplier documents and all revisions shall be highlighted by clouds. Whenever the successful Bidder/supplier require any sub-supplier drawings to be reviewed by MECON, the same shall be submitted by the supplier after duly reviewed, approved and stamped by the successful Bidder/supplier. Direct submission of the sub-supplier's drawings without contractor's approval shall not be entertained.
- 2.4 Review/Approval of the successful Bidder/supplier drawings/documents by MECON would be only to review the compatibility with basic designs and concepts and in no way absolve the successful Bidder/supplier of his responsibility/contractual obligation to comply with tender requirements, applicable codes, specifications and statutory rules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the successful Bidder/supplier without any extra cost or time, whether or not comments on the same were received from MECON during the drawing review stage.
- 2.5 The successful Bidder/ Supplier shall submit a pre-recorded Training CDs/DVDs and it shall comprise the basic theories and fundamentals, related standards, design parameters, manufacturing & inspection methods, operating & maintenance instructions and other relevant details. The CDs/DVDs shall have to be self-contained, user-friendly using animation/videos and other multimedia techniques.

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- 2.6 THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTS COMPLYING FULLY WITH THE TENDER REQUIREMENTS ARE RECEIVED BY THE PURCHASER.

Item	Documents & Data	A		B		C	
		No. of Copies	No. of Copies	Required Date (from FOI)	No. of Copies	Required Date (before Despatch)	
1.	Drawing / Data Submittal list / schedule	-	6	2 Weeks + monthly	6	2 Weeks	
2.	Fabrication, test and delivery schedule (per item)	3	6	2 Weeks + monthly	6	2 Weeks	
3.	Progress Report	-	6	2 Weeks + monthly	6	2 Weeks	
4.	Catalogues / References	3	-	-	3	With final technical file	
5.	Welding procedure specification and approved WPS / PQR records	-	6	2 Weeks	6	2 Weeks (with final technical file)	
6.	Brief Description of Manufacturing and QA / QC Process & facilities at Manufacturer's works.	3	6	2 Weeks	6	2 Weeks (with final technical file)	
7.	Inspection and Test Procedures along with Quality Assurance Plan	-	6	2 Weeks	6	2 Weeks (with final technical file)	
8.	Duly signed & stamped accepted Quality Assurance Plan enclosed with tender document.	3	-	-	-	-	
9.	Test Reports	-	-	-	6	2 Weeks (with final technical file)	
10.	NDE / NDT Reports	-	-	-	6	2 Weeks	

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Item	Documents & Data	A		B		C	
		No. of Copies	No. of Copies	Required Date (from FOI)	No. of Copies	Required Date (before Despatch)	
						(with final technical file)	
11.	Heat Treatment Reports	-	-	-	6	2 Weeks (with final technical file)	
12.	Successful Proof Test report covering all offered items of fittings as per clause no. 3.0 of TS.	3	6	2 Weeks	6	2 Weeks (with final technical file)	
13.	Material certificate as per EN 10204 - 3.2	-	-	-	6	2 Weeks (with final technical file)	
14.	Painting system description & procedure	-	6	2 weeks	6	2 Weeks (with final technical file)	
15.	List of sub-vendors with their scope	3	6	2 weeks			
16.	CDs/DVDs covering design & manufacturing process	-	-	-	6	2 Weeks (with final technical file)	
17.	Final technical file, preliminary copy for approval (in soft & hardcopy)	-	3	2 weeks before dispatch/ shipping	-	-	
18.	Final technical file (in soft & hardcopy)	-	-	-	6	Before shipping	

3.0 NOTES

- 3.1 In case of e-bids, only single copy of documents / drawings / data under column A need be uploaded.
- 3.2 Durations in column B (required date) are weeks after FOI or as indicated in Table.
- 3.3 Durations in column C (required date) are weeks after document approval or as indicated in Table. Due date of each document may be proposed.

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- 3.4 Final technical file shall be supplied in hard copy as indicated and in electronic format (.pdf Acrobat files) on six (6) CD-ROMs.
- 3.5 The above documents & data requirements shall also be supplemented by all requirements of clause 9.0 of MECON's T.S. No. MEC/TS/05/21/025, Ed.-1, Rev-0.

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NOTES TO MATERIAL REQUISITION

NOTES TO MR



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1.0 Introduction

INDRADHANUSH GAS GRID LIMITED intend to lay a new pipeline for their North -East Natural Gas Pipeline Grid (Phase-I & Phase-II) Project in the states of Assam, Arunachal Pradesh & Nagaland, Meghalaya, Tripura & Mizoram. For this project, it is proposed to procure various flanges & fittings.

2.0 Compliance with Specification: The Vendor shall be completely responsible for the design, materials, manufacture & fabrication, testing, inspection, preparation for shipment and transport of the above equipment strictly in accordance with the MR and all attachments thereto. All items shall be inspected and certified as per EN 10204-3.2 .

3.0 Vendor's Scope: Vendor scope of work includes the equipment with all internals and accessories shown on the datasheets, drawings, specifications and all unmentioned parts necessary for a satisfactory operation and testing, except those which are indicated to be out of the vendor's supply.

4.0 Inspection:

"The Successful Vendor shall propose minimum four (4) nos. of TPIA's from the below listed TPIA's along with QAP submission. IGGL/MECON shall approve any one TPIA out of the four (4) nos. proposed TPIA's. The Successful Vendor shall appoint the approved TPIA for inspection purpose and mention name of the approved TPIA in QAP.

- i. Det Norske Veritas (DNV)
- ii. Germanischer Lloyd
- iii. Bureau Veritas
- iv. Moody International
- v. SGS
- vi. Certification Engineer International Ltd(CEIL)
- vii. Technische Ulierwachungs Verein (TUV)
- viii. Velosi
- ix. American Bureau Services (ABS)
- x. AB-Vincotte
- xi. Lloyd Register of Industrial Services
- xii. Meenar Global
- xiii. VCS Quality Services Private Limited

Apart from inspection by TPIA, inspection shall also be performed by MECON / IGGL's delegate, as set out and specified in the codes and particular documents forming this MR.

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5.0 Material shall be delivered at Purchaser's designated stores /storage yard. The exact location of designated storage yards shall be intimated to the successful bidder(s) for respective MR items. State-wise distribution shall be as below :-

MR Items – A1, B1, C1, D1, D2, E1, E2, F1, F2, F3, G1, H1 & I1 shall be delivered in the state of Assam.

MR Items – A2, B2, C2, F4, F5, F6, G2 & H2 shall be delivered in the states of Assam/ Meghalaya/ Tripura.

6.0 For all flanges / fittings to be used in Gaseous Hydrocarbons service, impact test, hardness tests, transverse guided weld bend test and transverse weld tensile test shall be conducted and their value will be as per clause 4.4, 4.5, 4.6 & 4.7 of specification no. MEC/TS/05/21/025, Ed. 1, Rev. 0.

7.0 Vendor must submit duly filled up & signed drawing, check list and forms along with his offer.

8.0 Vendors to note that for minimum inspection and testing requirement of the Flanges and fittings shall be governed by attached QAP with this MR. However; vendor shall submit their QAP for approval covering the requirement specified in attached QAP after placement order.

9.0 Bidders to note that all the documents/drawings submitted by them as a part of bid shall be considered only to assess Bidder's technical capability and shall in no way absolve them from complying with all the requirements of the Tender. All items to be supplied by the Bidder shall be strictly in accordance with tender requirements.

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

- Material / Purchase Requisition
- Datasheets & Drawings (if any).
- Technical Specification
- Codes and Standards
- Vendor's Standards

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

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- 11.0** Bidder/supplier shall submit hard copies of all documents/ drawings to MECON, as listed in columns B & C of table for document and data required under Clause 2.0 of MR and also in all technical specifications. The date of receipt of these documents/ drawings at MECON shall be deemed as the date of submission. If any documents/ drawings require re-submission due to any error/ deficiency noticed during review/ approval stage, in that event the additional time required by the supplier to get the revised document/ drawing reviewed/approved by MECON shall be solely to supplier's account and in no case the bidder/ supplier shall be entitled for any time/cost benefit.
- 12.0** Bidder to note that the all flanges / fittings supplied by them shall be capable to withstand the field / site hydrotest pressure (i.e. 1.5 times of design pressure) for 6 to 24 hours hydrotest pressure holding duration under field / site conditions. The test medium will be non-corrosive water. The vendor / supplier shall be liable for repair / replacement of flanges / fittings, if found faulty during field / site hydrotest at his risk of cost. All cost for associated activities like packaging, transportation etc. in connection to repair / replacement of flanges / fittings shall be borne by the vendor / supplier. No claim shall be entertained by the owner / purchaser in this regard.

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TECHNICAL SPECIFICATION

**SPECIFICATION
FOR
FLANGES AND WELDED FITTINGS
[SIZE DN 450 mm (18") AND ABOVE]**

SPECIFICATION NO.: MEC/TS/05/21/026




**(OIL & GAS SBU)
MECON LIMITED
DELHI 110 092**

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
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7.0	TEST CERTIFICATES
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9.0	DOCUMENTATION

PREPARED BY: (Shalini Singh)	CHECKED BY: (Sunil Kumar)	APPROVED BY: (A.K. Johri)	ISSUE DATE : Dec. 2008
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1.0 SCOPE

This specification covers the minimum requirements for the design, manufacture and supply of following items to be installed in pipeline system handling hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG) :


- Carbon Steel Welded Fittings 450 mm (18") NB and above, such as tees, elbows, reducers, caps, outlets etc.
- Carbon Steel Flanges 450mm (18") NB and above, such as welding neck flanges, blind flanges, spectacle blind, spacers & blinds etc.

This specification does not cover the above mentioned items which are to be installed in pipeline system handling sour hydrocarbons (liquid/ gas) service as defined in NACE Standard MR-01-75.

2.0 REFERENCE DOCUMENTS

2.1 Reference has been made in this specification to the latest edition (edition enforce at the time of issue of enquiry) of the following Codes, Standards and Specifications :

ASME B31.4	-	Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids
ASME B31.8	-	Gas Transmission and Distribution Piping Systems
ASME B16.5	-	Pipe Flanges and Flanged Fittings
ASME B16.9	-	Factory Made Wrought Steel Butt Welding Fittings
ASME B 16.11	-	Forged Steel Fittings, Socket Welding and Threaded
ASME B 16.48	-	Steel Line Blanks
ASME Sec VIII	-	Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels
ASME Sec IX	-	Boiler and Pressure Vessel Code - Welding and Brazing Qualifications
ASTM A 370	-	Standard Test Methods and Definitions for Mechanical Testing of Steel Products.

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- MSS-SP-44 - Steel Pipeline Flanges 22" & 26" and above.
- MSS-SP-25 - Standard Marking System for Valves, Fittings, Flanges and Unions
- MSS-SP-97 - Forged Carbon Steel Branch Outlet Fittings - Socket Welding, Threaded and Butt welding Ends.

2.2 In case of conflict between the requirements of this specification and the requirements of above referred Codes and Standards, the requirements of this specification shall govern.

3.0 MANUFACTURER'S QUALIFICATION

The design of fittings shall be established by mathematical analysis contained in ASME Sec. VIII/ ASME B31.3. The design of fittings for which mathematical analysis is not available shall be established by proof testing. These records shall be submitted at the time of bidding, qualifying the complete range of fittings offered. Manufacturer who intends bidding for fittings must possess the records of a successful proof test in accordance with the provisions of ASME B16.9 and/ or MSS-SP-75. These records shall be submitted at the time of bidding, qualifying the complete range of fittings offered. Failure to submit such records at the time of bidding may become a cause of rejection of the offer.


4.0 MATERIALS

4.1 The steel used in the manufacture of fittings and flanges shall be fully killed carbon steel with a grain size of ASTM 7 or finer as defined in ASTM E112. This requirement shall not apply to quenched and tempered fittings. The basic material for fittings and flanges shall be as indicated in the Material Requisition. Additionally, the material shall also meet the requirements specified hereinafter.

4.2 Each heat of steel used for the manufacture of fittings and flanges shall have carbon equivalent (CE) not greater than 0.45 calculated from check analysis in accordance with the following formula:

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

4.3 Carbon contents on check analysis shall not exceed 0.22%.

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4.4 For flanges and fittings specified to be used for Gas service or LPG service, Charpy V-notch test shall be conducted on each heat of steel. Unless specified otherwise, the Charpy V-notch test shall be conducted at 0°C in accordance with the impact test provisions of ASTM A 370 for flanges and MSS-SP-75 for all fittings.

The average absorbed impact energy values of three full-sized specimens shall be 27 joules. The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 22 Joules.

When Low Temperature Carbon Steel (LTCS) materials are specified in Material Requisition for flanges and fittings, the Charpy V-notch test requirements of applicable material standard shall be complied with.

4.5 Hardness test shall be carried out as per ASTM A370 for each heat of steel used. A full thickness cross-section shall be taken for this purpose and the maximum hardness of base metal, weld metal and heat affected zone shall not exceed 248 HV₁₀. Hardness testing shall cover at least 10% per item, per size, per heat, per manufacturing method.

4.6 One transverse guided weld bend test shall be performed for each lot of welded fittings produced from the same heat in accordance with provisions of MSS-SP-75. The dimension "A" in guided bend test shall not exceed 4.0 times the nominal wall thickness and dimension "B" shall be equal to $A+2t+3.2\text{mm}$, where "t" is nominal wall thickness.


4.7 One transverse weld tensile test shall be conducted on each heat/ lot of welded fittings in accordance with the requirements of MSS-SP-75.

4.8 In case of RTJ (Ring Type Joint) flanges, the groove hardness shall be minimum 140 BHN. Ring Joint flanges shall have octagonal section of Ring Joint.

5.0 **DESIGN AND MANUFACTURE**

5.1 Flanges such as weld neck flanges and blind flanges shall conform to the requirements of ASME B16.5 upto size DN 600mm (24") excluding DN 550mm (22"), MSS-SP-44 for sizes DN 550mm (22") and ASME B16.47 for sizes DN 650mm (26") and above.


5.2 Spectacle blind and Spacer & blind shall conform to the requirements of API 590 upto sizes DN 600mm (24"). For sizes above DN 650mm (26") and above, Spectacle blind and Spacer & blind shall conform to Manufacturer's standard.

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- 5.3 Type, face and face finish of flanges shall be as specified in Material Requisition.
- 5.4 Fittings such as tees, elbows and reducers shall be either welded or seamless type. All fittings shall comply with the requirements of MSS-SP-75. Fittings such as weldolets etc. shall be manufactured in accordance with MSS-SP-97.
- 5.5 Tees shall be manufactured by forging or extrusion method. Stub-in or pipe to pipe connection shall not be used in the manufacture of tees. The longitudinal weld seam shall be kept at 90° from the extrusion. Fittings shall not have any circumferential weld joint.
- 5.6 All butt weld ends shall be bevelled as per ASME B16.5/ MSS-SP-44/ ASME B16.47 as applicable for flanges and MSS-SP-75 / MSS-SP-97 as applicable for fittings.
- 5.7 Inside weld projection for welded fitting shall not exceed 1.6 mm. The reinforcement of inside weld seam shall be removed for a distance of 100mm from each end of welded fittings.
- 5.8 All welds shall be made by welders and welding procedures qualified in accordance with provisions of ASME Sec. IX. The procedure qualification shall include impact test for weld/ heat affected zone, hardness test and guided bend test and shall meet the requirements of Clauses 4.4, 4.5 and 4.6 of this specification, respectively.
- 5.9 Repair by welding on flanges and parent metal of fittings is not allowed. Repair of weld seam by welding shall be carried out by welders and welding procedures duly qualified as per ASME Section IX and API 1104 and records for each repair shall be maintained. Repair welding procedure qualification shall include all tests which are applicable for regular production welding procedure qualification.

6.0 **INSPECTION AND TESTS**

- 6.1 The Manufacturer shall perform all inspections and tests as per the requirement of this specification and the relevant codes, prior to shipment at his works. Such inspections and tests shall be, but not limited to, the following :
- 6.1.1 All fittings and flanges shall be visually inspected. The internal and external surfaces of the fittings shall be free from any strikes, gouges, burrs and other detrimental defects.
- 6.1.2 Dimensional checks shall be carried out on finished products as per ASME B16.5/ MSS-SP-44/ ASME B16.47 as applicable for flanges and ASME B16.9/ MSS-SP-75 /

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MSS-SP-97 as applicable for fittings and as per this specification. Fittings not covered in MSS-SP-75 shall be checked as per Manufacturer's standard.

6.1.3 Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.

6.1.4 The non-destructive inspection shall be carried out as given below :

- a) All butt and repair welds for welded fittings shall be examined 100% by radiography. Acceptance limits shall be as per API 1104.
- b) When elbows of size $\geq 18"$ NB are manufactured, the first elbow of each radius, diameter and wall thickness shall be ultrasonically checked for sufficient wall thickness in areas where a minimum wall thickness is to be expected. This shall be followed by random inspection of one out of every three elbows of the same radius, diameter and wall thickness.
- c) All finished wrought weld ends shall be 100% tested for lamination type defects by ultrasonic test. Any lamination larger than 6.35mm shall not be acceptable.
- d) Magnetic particle or liquid penetrant examination shall be performed on cold formed butt welding tees with extruded outlets, that are subjected to an extreme fiber elongation of greater than 5% shall be carried out as per the Supplementary Requirement SR3 of MSS-SP-75.
- e) Welds which cannot be inspected by radiographic methods shall be checked by ultrasonic or magnetic particle methods. Acceptance criteria shall be as per ASME Section VIII Appendix 12 and Appendix 6, respectively.

6.2 Purchaser's Inspector reserves the right to perform stagewise inspection and witness tests, as indicated in Clause 6.1 of this specification at Manufacturer's Works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide, without charge, reasonable access and facilities required for inspection, to the Purchaser's Inspector. Inspection and tests performed/ witnessed by Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

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7.0 TEST CERTIFICATES

Manufacturer shall furnish the following certificates :

- a) Test certificates relevant to the chemical and mechanical properties of the materials used for manufacture of flanges and fittings as per relevant standards and this specification.
- b) Test Reports on radiography, ultrasonic inspection and magnetic particle examination.
- c) Test reports of heat treatment carried out as per the specification.
- d) Welding procedures and welders' qualification reports.
- e) Test certificates for each fitting stating that it is capable of withstanding without leakage a test pressure which results in a hoop stress equivalent to 100% of the specified minimum yield strength for the pipe with which the fitting is to be attached without impairment of serviceability.

8.0 PAINTING, MARKING AND SHIPMENT

- 8.1 After all required inspection and tests have been carried out, all external surfaces shall be thoroughly cleaned to remove grease, dust & rust and shall be applied with standard mill coating for protection against corrosion during transit and storage. The coating shall be easily removable in the field. Manufacturer shall furnish the details of paint used at the time of bidding.
- 8.2 Ends of all fittings and weld neck flanges shall be suitably protected to avoid any damage during transit. Metallic or high impact plastic bevel protectors shall be provided for fittings and flanges. Flange face shall be suitably protected to avoid any damage during transit.
- 8.3 All fittings and flanges shall be marked as per applicable dimension / manufacturing standard.
- 8.4 Package shall be marked legibly with suitable marking ink to indicate the following :
 - a) Manufacturer's Name
 - b) Type of flange(s) and fittings(s)
 - c) Nominal diameter, thickness and material grade
 - d) Purchase order number and item serial number

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9.0 **DOCUMENTATION**

9.1 Manufacturer shall furnish at the time of bidding, the following documents:

- a) Reference list of similar supplies including all relevant details, viz. Project, Year, Client, Location, Size and Service.
- b) Record of successful qualification test of fittings in compliance with the requirement of this specification.
- c) Brief description of the manufacturing, heat treatment and quality control facilities of the Manufacturer's Works.
- d) Clause-wise list of deviations from this specification, if any.

9.2 Within three weeks of placement of order, Manufacturer shall submit four copies of method of manufacture, testing and quality control procedure for raw material and finished product for Purchaser's approval.

Once the approval has been given by Purchaser, any changes in design, material and method of manufacture shall be notified to the Purchaser, whose approval in writing of all changes shall be obtained before the flanges and fittings are manufactured.

9.3 Within four weeks from the approval date, Manufacturer shall submit six copies of all documents as listed in Clause 9.2 of this specification.

9.4 Prior to shipment, the Manufacturer shall submit six copies of the test certificates as listed in Clause 7.0 of this specification.

9.5 All documents shall be in English Language only.

**QUALITY ASSURANCE PLAN
FOR
FLANGES & FITTINGS**



MECON Limited
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S. NO.	STAGE	CHARACTERISTICS	CATEGORY	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON
1.	Review of PO / Drg.	Review of PO Doc. / Drg.	Critical	Scrutiny / Verification	Each doc. of P.O.	Appl. Spec. / STD	-	-	P	R	R
2.	Raw Material	1. Manufacturing process of steel 2. Visual 3. Dimensional 4. Chemical Composition	Critical	Verification with M.T.C. Spectro Analysis	Each Heat Each Heat	Appl. Material Specification / STD	As per tender document / Material Specification / STD	Material Test Certificate and MI Register	P	R	R
3.	Forgins	1. Reduction Ratio 2. Temperature During Forging 3. Forging Dimensions	Critical	Measurement Optical Pyrometer Measurement	Minimum 1 per size	Standard Manufacturing Procedure	Std. Procedure As per Std. AMSE B16.5	Forging process record / internal Register	P	R	R
4.	Heat Treatment (as applicable)	Heat Treatment Cycle	Major	Verification of Heat Treatment Cycle	Each Heat / HT Lot	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	T.P.M. Sheet, Heat Treatment Graph	P	W	R
5.	Mechanical Testing (as applicable)	1. Tensile Test (TS, YS, RA%, EL%) 2. Hardness 3. Charpy V-Notch Test	Major	Tensile Testing IMPACT Testing	One / HT / Lot / Group	As per Tender Doc. / Material Specification / STD	Std. Procedure As per Tender Doc. / Material Specification / MECON Std	Mechanical Test Report & T.C.	P	W	R



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S. NO.	STAGE	CHARACTERISTICS	CATEGORY	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON
6	NDT	1. DP 2. UT 3. MPI	Major	DP Testing Ultrasonic Flaw Detector MPI Testing	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Mechanical Test Report & T.C.	P	W	R
7.	Final Inspection	Visual & Dimensions	Major	Visual / Measurement	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Dimension Report Format	P	W	W/R
8.	Making, Colour Coding, Rust Prevension & Packing	Making, Colour Coding, Rust Prevension & Packing	Major	Visual	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Packing List	P	W	R
9.	Certification	As per EN 10204 Type 3.2	Major	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	TC & Reports	P	C	R
10.	Release Notes	Inspection Release Note	Major	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Release Note	H	-	IR



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S. NO.	STAGE	CHARACTERISTICS	CATEGORY	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON
11.	Shipping	Verification of surface coating / type of packing	Major	-	-	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Shipping documents	H	R	IR

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

Legends : H – Hold (Offer for Witness & obtain clearance), W – Witness, R – Review, A – Approval, I – Information, IR – Issue Release Note, C – Certify, X – Submit, PO – Purchase Order, PR – Purchase Requisition, SR – Stress Relieving, MPI – Magnetic Particle Inspection, DI-Dye Penetrant Test , UT – Ultrasonic examination, TS – Technical Specification, WPS – Welding Procedure Specification, PQR – Procedure Qualification Record, WQT – Welder Qualification Test.

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

For CONTRACTOR/ SUB-CONTRACTOR

(Stamp & Signature)



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S. NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON
1.	Material	FITTINGS	Fully killed steel	MTC	100%	PO & Std. Spec.	PO QAP & Std. Spec.	MTC	P	R	R
2.	Inspection	FITTINGS									
i)	Visual Inspection	FITTINGS	Visual Imp.	Visual Internal & External Surface	100%			Inspection Report	P	W	R
ii)	NDT	FITTINGS	Soundness of Tee & Butt Welds	UT, RT & MPI	100%	PO & Std. Spec.	PO QAP & Std. Spec.	Inspection Report	P	W & Evaluation of RT Films	R
iii)	NDT	FITTINGS	Forgings	WET MPI	100%	PO & Std. Spec.	To comply with MSS-SP-53	Inspection Report	P	W	R
iv)	NDT	FITTINGS	End Laminations	UT for Distance of 25 mm on ends.	100%	PO & Std. Spec.	Any lamination than 6.35 mm not accepted	Inspection Report	P	W	R
v)	Testing Destructive	FITTINGS	Properties of Mech. / Chemical & Impact Test	Chemical by Spectro and other test as per ASTM A - 370	As per Heat / Lot	PO & Spec.	MSS-SP-75	IMP Lab Report	P	W	R



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S. NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON
3.	Final Inspection	FITTINGS	Dimensional	-	As per lot	PO & Spec.	PO & Spec.	Inspection Report	P	W	W/R
4.	Marking	FITTINGS	Identification manufacturer's Name, nominal diameter end thickness malts & Tag No.	By painting	100%	PO & Spec.	-	-	P	W	W/R
5.	Certification	FITTINGS	As per EN 10204 Type 3.2	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	TC & Reports	P	C	R
6.	Release Notes	FITTINGS	Inspection Release Note	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Release Note	H	-	IR



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7.	Shipping	FITTINGS	Verification of surface coating / type of packing	-	-	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Shipping documents	H	R	R

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

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