



INDRADHANUSH GAS GRID LIMITED (IGGL)

(Joint Venture of IOCL, ONGC, GAIL, OIL and NRL)

GUWAHATI, ASSAM

**NORTH -EAST GAS GRID PIPELINE PROJECT
(PIPELINE SECTION 4, 6, 7, 8, 9, 12, 13 & 14)**

BID DOCUMENT FOR PROCUREMENT

OF

FLOW TEES

OPEN DOMESTIC COMPETITIVE BIDDING

Tender No.: 05/51/23VC/IGGL/011A

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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PROJECT : NORTH -EAST NATURAL
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MATERIAL REQUISITION

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MATERIAL REQUISITION

MR DOCUMENT NO. : MEC/23VC/05/28/M/000/S011, Rev. 0

PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID (PHASE-2) PROJECT

CLIENT : INDRADHANUSH GAS GRID LIMITED

ITEM : FLOW TEES

SCOPE OF SUPPLY

The scope of supply includes but not limited to Design, Engineering and Procurement of Materials and bought out components, Manufacture & Fabrication, assembly at shop, inspection, testing at manufacturer's works, preparation of shipment / packing, transport / delivery, Unloading and stacking of FLOW TEES suitable for passing intelligent pigs & other cleaning / displacement / gauging pigs. Scope of supply shall include supply of all documentation as per the Material Requisition, Notes to Material Requisition, Data sheet, MECON's Standard specifications etc. and other codes and standards attached or referred.

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FLOW TEES #600 class - MECON's specification no. MEC/TS/05/21/011 and data sheets given below :-

MR Sl. No.	Mainline Size NB, mm (Inches) X Branch Size NB, mm(Inches)	SEC-4	SEC-6	SEC-7	SEC-8	SEC-9	SEC-12	SEC-13	SEC-14	TOTAL	Datasheet No.
	Delivery State	ASSAM	ASSAM / MEGHALAYA	TRIPURA / MANIPUR	ASSAM	TRIPURA	TRIPURA	TRIPURA	MEGHALAYA		
1	450 (18") ×450 (18")	1	4	0	0	0	0	0	0	5	MEC/23VC/0 5/21/M/000/D S-011-01
2	450 (18") ×300 (12")	1	9	0	0	0	0	0	0	10	MEC/23 VC /05/21/M/000/ DS-011-02
3	450 (18") ×250(10")	1	14	0	0	0	0	0	0	15	MEC/23 VC /05/21/M/000/ DS-011-03
4	300 (12") ×300 (12")	6	0	2	7	2	2	2	0	21	MEC/23 VC /05/21/M/000/ DS-011-04
5	300 (12") ×200 (8")	4	0	6	5	0	4	0	0	19	MEC/23 VC /05/21/M/000/ DS-011-05
6	300 (12") ×150(6")	8	0	12	14	0	8	0	0	42	MEC/23 VC /05/21/M/000/ DS-011-06
7	200 (8") ×200 (8")	1	0	0	0	0	0	0	3	4	MEC/23 VC /05/21/M/000/ DS-011-07
8	200 (8") ×150(6")	1	0	0	0	0	0	0	2	3	MEC/23 VC /05/21/M/000/ DS-011-08

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Notes:

1. **Material Delivery Requirements:** The finished material are to be delivered by the supplier at the designated store as stated above. The supplier shall be responsible for all handling and transportation from their production plant to the designated delivery point in accordance with this specification.
2. **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 attachment thereto. Flow Tees shall be provided with EN 10204-3.2 certificates.
3. **Vendor's Scope:** Vendor scope of work includes the equipment with all internals and accessories shown on the datasheets, specifications and all unmentioned parts necessary for a satisfactory operation and testing except those which are indicated to be out of the vendor's supply.
4. **Inspection:**

Inspection shall be in accordance with EN 10204 3.2 certification shall be issued for each dispatched valve. Vendor shall appoint anyone of the TPIA for inspection purpose. Vendor has to intimate the TPIA name from below listed agencies to IGGL / MECON prior to perform any inspection activity.

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

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5.0 DOCUMENTS & DATA REQUIREMENTS

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

5.1.1 The documents required at the inquiry stage and to be included in the bid are listed under column A of table below under note no. 5.6.

5.1.2 The documents required after award of the Contract and subject to the written approval of the Purchaser are listed under column B of table below under note no. 5.6.

5.1.3 The final and certified documents are listed under column C of table below under note no. 5.6.

5.2 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.

5.3 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.

5.4 Review/Approval of the successful Bidder/supplier drawings 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 MR 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.

5.5 The successful Bidder/ Supplier shall submit a pre recorded training pen drive and it shall comprise the basic theories and fundamentals, related standards, design parameters, manufacturing & inspection methods, operating & maintenance instructions and other relevant details. The pen drives shall have to be self-contained, user-friendly using animation/videos and other multimedia techniques.

5.6 THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTS COMPLYING FULLY WITH THE MATERIAL REQUISITION REQUIREMENTS ARE RECEIVED BY THE PURCHASER.

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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 Dispatch)
1.	Completed Data Sheets	3	3	1 Week	3	2 Weeks (with final technical file)
2.	Drawing / Data Submittal list / schedule	-	3	2 Weeks + monthly	3	2 Weeks
3.	Fabrication, test and delivery schedule (per item)	3	3	2 Weeks + monthly	3	2 Weeks
4.	Progress Report	-	3	2 Weeks + monthly	3	2 Weeks
5.	Catalogues / References	3	-	-	3	With final technical file
6.	GA drawings + Sectional drawings + Material specification (all above for each size of quoted FLOW TEE)	3	3	2 Weeks	3	With final technical file
7.	Packing / shipping list with weights and dimensions	3	3	2 Weeks before shipping	3	2 Weeks (with final technical file)
8.	Design calculations for pressure containing parts	3	3	1 Week	3	2 Weeks (with final technical file)
9.	Bill of materials (on drawings)	-	3	1 Week	3	2 Weeks (with final technical file)
10.	Welding procedure specification and records WPS / PQR	-	3	1 Week	3	2 Weeks (with final technical file)
11.	Inspection and Test Procedures along with Quality Assurance Plan	3	3	1 Week	3	2 Weeks (with final technical file)
12.	Test Reports	-	-	-	3	2 Weeks (with final technical file)
13.	NDE / NDT Reports	-	-	-	3	2 Weeks (with final technical file)
14.	Heat Treatment Reports	-	-	-	3	2 Weeks (with final technical file)

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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 Dispatch)
15.	Hydrotest and air test report	-	-	-	3	2 Weeks (with final technical file)
16.	Maintenance and operating manuals	-	-	-	3	2 Weeks (with final technical file)
17.	Installation instructions & Site inspection procedure	-	-	-	3	2 Weeks (with final technical file)
18.	Material certificate as per EN 10204 - 3.2	-	-	-	3	2 Weeks (with final technical file)
19.	Painting system description & procedure	-	3	1 week	3	2 Weeks (with final technical file)
20.	List of sub-vendors with their scope	3	3	1 week	-	-
21.	Training CDs/DVDs covering design, operation & maintenance	-	-	-	3	2 Weeks (with final technical file)
22.	Final technical file, preliminary copy for approval (in soft & hardcopy)	-	3	2 weeks before Dispatch/ shipping	-	-
23.	Final technical file (in soft & hardcopy)	-	-	-	3	Before shipping

NOTES

- In case of e-bids, only single copy of documents / drawings / data under column A need be uploaded.
- Durations in column B (required date) are weeks after FOI/FOA or as indicated in Table.
 - Durations in column C (required date) are weeks after document approval or as indicated in Table.
 - Due date of each document may be proposed.
- Final technical file shall be supplied in hard copy as indicated and in electronic format (.pdf Acrobat files) on six (6) CD-ROMs.

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IV. **The above documents & data requirements shall also be supplemented by all requirements of clause 10.0 of MECON's T.S. No. MEC/TS/05/21/011, R-0. Edition-1.**

6. Bidder / Supplier shall submit hard copies of all documents / drawings to MECON as listed in column B & C of table for document and data requirement under clause 5.0 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 error / deficiency noticed during review / approval stage, in that event the additional time required by the bidder/supplier to get the revised document/drawing reviewed / approved by MECON shall be solely to bidder's / supplier's account and in no case the bidder / supplier shall be entitled for any time or cost benefit.
7. Vendor to indicate in his offer the gross weight (in kg or Metric Tonne) per unit, volume (in m3) per unit and dimensions (L x B x H) of package (wooden box, etc.) to accommodate unit quantity.
8. Vendor shall establish the equivalence/superiority of any material proposed (With justification of material properties and availability) other than that specified in Datasheet. Vendor shall also indicate the ASTM equivalent of his proposed material as well as of all the AISI designated materials specified in datasheets.
9. Vendors to note that for minimum inspection and testing requirement of the supplied item shall be governed by attached QAP with this MR. However; Vendor shall submit their QAP for Approval covering the requirement specified in attached QAP.
10. 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.
11. 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
 - 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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12. Bidders to note that the Flow Tee supplied by them shall be capable to withstand the field hydro test pressure (i.e., 1.5 times of design pressure) for 6 to 24 hours test holding duration under field / site conditions. The Flow Tees shall be kept for entire test duration and test medium will be non-corrosive water. The vendor shall be liable for replacement of Flow Tee if found faulty during site hydro test at his risk & cost. All cost for associated activities like packaging, transportation, etc. in connection to replacement of Flow Tee shall be borne by the bidder. No claim shall be entertained by the Owner/Purchaser in this regard.
13. Successful Bidder shall submit reinforcement calculation for extruded header of non-standard sizes (i.e. sizes not available in ASME B16.9) of Tees used for making Flow Tees as per applicable code.

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TECHNICAL SPECIFICATION

SPECIFICATION FOR FLOW TEES

SPECIFICATION NO.: MEC/TS/05/21/011




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

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PREPARED BY: (Amit Lavania)	CHECKED BY: (A.K. Gupta)	APPROVED BY: (A.K. Johri)	ISSUE DATE : Oct. 2008
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AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Revision	Date	By (Name)	Verified (Name)

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1.0 **SCOPE**

This specification covers the basic requirements for the design, manufacture and supply of carbon steel flow tees to be installed in pipeline system for handling hydrocarbons in liquid or gaseous phase.

2.0 **REFERENCE DOCUMENTS**


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

- | | | | |
|----|----------------|---|---|
| a) | ASME B 31.4 | : | Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia and Alcohols. |
| b) | ASME B 31.8 | : | Gas Transmission and Distribution Piping System |
| c) | ASME B 16.9 | : | Factory made wrought steel butt welding fittings. |
| d) | ASME Sec. VIII | : | Boiler & Pressure Vessels Code-Rules for the construction of pressure vessels. |
| e) | ASME Sec. IX | : | Boiler & Pressure Vessel Code-Welding & Brazing Qualifications. |
| f) | ASTM A 370 | : | Mechanical Testing of Steel Products |
| g) | MSS-SP-53 | : | Quality Standard for Steel Castings and Forgings for Valves, Flanges and fittings and other Piping components and - Magnetic Particle Examination Method. |
| h) | MSS-SP-75 | : | Specification for High Test Wrought Butt Welding Fittings |
| i) | API 1104 | : | Specification for Welding Pipeline and Related Facilities |
| j) | SSPC-VIS-1 | : | Steel Structures Painting Council |

2.2 In case of conflict between the requirements of this specification and any code, Standard and Specification referred in Clause 2.1 above. Order of precedence shall be as follows :

- Data Sheets
- This Specification
- Other Referred Codes & Standards
- Manufacturer's Standard.

3.0 **MANUFACTURER'S QUALIFICATION**

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Manufacturer who intend bidding for flow tees must possess the records of a successful proof test for tees used in the fabrication of flow tees, in accordance with the provisions of ASME B16.9/ MSS-SP-75. These records shall be submitted at the time of bidding.

4.0 **MATERIALS**

4.1 Material for the pressure containing parts of the flow tees shall be indicated in the data sheet. Other parts shall be as per manufacturer's standard suitable for the service conditions indicated in data sheet and shall be subjected to approval by Purchaser.

4.2 Fully killed Carbon steel shall be used in the manufacture of flow tees.

4.3 Each heat of steel used for the manufacture of pressure containing parts of the flow tees shall have carbon equivalent (CE) not greater than 0.45 calculated from the check analysis in accordance with the following formula.

$$CE = C + Mn/6 + (Cr+Mo+V)/5 + (Ni +Cu)/15$$

4.4 When specified in Data sheet, Charpy V-notch test shall be conducted for each heat of steel used in manufacture of pressure containing parts of flow tee. Test shall conform to the provisions of MSS-SP-75 / ASTM A-370 and at a temperature of 0°C for pressure containing parts material. The Charpy impact test specimen shall be taken in the direction of principal grain flow and notched perpendicular to the original surface of the plate or forging. The average impact energy values of full sized three specimens shall be as follows, unless indicated otherwise in the data sheets:

Diameter (inches)	Base Metal (joules)	Weld Metal and HAZ (joules)
For all sizes	27	27


Minimum impact energy value of any one specimen shall not be less than 80% of the above average values.

When Low Temperature Carbon Steel (LCTS) materials are specified in Datasheet or offered by Manufacturer, the Charpy V-notch test requirements of applicable material standard shall be complied with.

4.5 When specified in the data sheet, hardness test shall be carried out as per ASTM A 370 for each heat of steel used. The maximum hardness of base metal, weld metal and HAZ of all pressure containing parts shall be 248 HV₁₀, unless otherwise specified.

5.0 **DESIGN AND CONSTRUCTION REQUIREMENTS**

5.1 Flow tees shall be designed and manufactured in accordance with the provisions of codes and standards referred in Section 2.0 of this specification. Design factor and corrosion allowance indicated in data sheet shall be taken into account for design of

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flow-tees.

5.2 Flow tees shall generally conform to the figure shown in the data sheet and shall meet following requirements as minimum:

- a) An internal pipe having the same diameter as the connecting pipeline allowing the passage of scraper/ instrumented pigs, provided with holes/slots located in the centre line of the branch. The holes shall be oriented at 45° angle. The holes shall be designed to prevent the pig getting stuck or damaged without affecting the flow through the branch line. The area of the holes/slots shall be atleast equal to the internal area of branch size.
- b) A forged / submerged arc welded 'tee' as per ASME B 16.9/ MSS-SP-75 enclosing the internal pipe fixed to it by suitably shaped forged steel rings. Machined steel rings shall not be used. The centre-to-end dimension of the outlet shall meet the minimum recommended dimension of the referred standard. Circumferential welding on the branch outlet is not acceptable. Pup shall not be provided either at the run or at the branch.
- c) Tees used for fabrication of flow tees shall be seamless type for run sizes DN ≤ 350 mm (14") and shall be either welded or seamless type for run sizes DN ≥ 400 mm (16"). Tees shall conform to ASME B16.9 for run size up to DN 350(14"). For run size DN ≥ 400 mm (16"), the tees shall conform to MSS-SP-75/ASME B16.9.

5.3 Butt weld ends shall be beveled as per MSS-SP-75.


5.4 All flow tees shall be completely stress relieved as per MSS-SP-75.

5.5 Stub-in or pipe to pipe connection shall not be used in the manufacture of flow tees. Flow tees shall be manufactured by forging or extrusion methods. In case flow tees are manufactured using welded tees, the longitudinal weld seam shall be at least 90° to the branch connection.

5.6 All welds shall be made by welders and welding procedures qualified in accordance with ASME Section-IX. The welding procedure qualification test shall include charpy impact test and hardness test and shall meet the requirements of clause 4.4 and 4.5 of this specification respectively.

5.7 Repair by welding on parent metal is not allowed. Repair of welds shall be carried out only after specific approval by Purchaser's Representative for each repair. The repair welding shall be carried out by the welders and welding procedures duly qualified as per ASME Section-IX and records for each repair shall be maintained. Repair welding procedure qualification shall include all test, which are applicable for regular production welding procedure qualification.

6.0 **INSPECTION AND TESTS**

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6.1 The manufacturer shall perform all inspections and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his works. Such inspection and tests shall be, but not limited to the following :

6.1.1 All flow tees shall be visually inspected. The internal & external surfaces of the flow tees shall be free from any strikes, gauges & other detrimental defects.

6.1.2 Dimensional checks shall be carried out as per the approved drawing.

6.1.3 Chemical composition and Mechanical properties shall be checked as per MSS-SP-75 and this specification for each heat of steel used.

6.1.4 Non destructive examination of individual flow tees shall be performed as given below:

- a) 100% inspection by radiography shall be carried out on all butt welds of pressure containing parts. Acceptance limits shall be as per API 1104.
- b) Welds which in Purchaser's Representative's opinion 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.
- c) 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%. The examination shall be carried out as per the supplementary Requirement SR 3 of MSS-SP-75.
- d) All finished wrought weld ends shall be 100% ultrasonically tested for lamination type defects for a distance of 25mm from the end. Any lamination larger than 6.35mm shall not be acceptance.
- e) All forgings shall be wet magnetic particle examined on 100% of the forged surfaces. Method and acceptance shall comply with MSS-SP-53.


6.2 Purchaser's Representative shall also perform stage wise inspection and witness tests as indicated in clause 6.1 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 Representative.

Inspection and tests performed/ witnessed by Purchaser's Representative shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

7.0 **TEST CERTIFICATES**

7.1 Manufacturer shall submit following certificates to Purchaser's Representative :

- a) Test certificates relevant to the chemical analysis and mechanical properties of the materials used for construction as per this specification and relevant

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- b) Test reports on radiographic, ultrasonic inspection & wet magnetic particle examination.
- c) Certificates for each flow tee stating that it is capable of withstanding without leakage for a test duration of 15 minutes and test pressure which results in a hoop stress equivalent to 95% of the specified minimum yield strength and for the pipe with which the flow tee is to be attached without impairing its serviceability.
- d) Test reports on heat treatment carried out.
- e) Welding Procedures & Welders qualification reports.

8.0 **PAINING, MARKING AND SHIPMENT**

8.1 Flow tees entire surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of standard mill coating / corrosion resistant paint, after all the required tests have been performed and accepted by Purchaser's Representative. The surface preparation shall be carried out by shot blasting to SP 6 in accordance with "Steel Structures Painting Council - Visual Standard - SSPC-VIS-1".

8.2 Manufacturer shall indicate the type & recommended coats of standard mill coating / corrosion resistant paint used, in the drawing submitted for approval.

8.3 Flow tees shall be marked with indelible paint with the following data :


- a) Manufacturer's Name
- b) Nominal diameter in inches D1 x D2
- c) End thickness in mm T1 x T2
- d) Material
- e) Tag numbers

8.4 Flow tees shall be suitably protected to avoid any damage during transit. Metallic or high impact plastic bevel protectors shall be provided for weld ends.

9.0 **WARRANTY**

Purchaser will be reimbursed by Manufacturer for any flow tee furnished to this specification which fails under field hydrostatic testing or does not perform satisfactory during the pigging operation and if such failure or non-performance is caused by a defect in the flow tees which is outside the acceptance limits of this specification. The reimbursement cost shall include cost of flow tee, labour and equipment rental for finding, excavating, cutting, and installation of replaced flow tee in position.

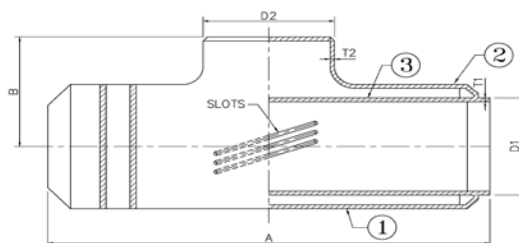
10.0 **DOCUMENTATION**

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	FLOW TEES	DOCUMENT NO.	Page 6 of 6
		MEC/TS/05/21/011	REVISION : 0
			EDITION : 1

- 10.1 At the time of bidding, bidder shall submit the following documents :-
- General arrangement drawing of flow tees with overall dimensions and details of internal sleeve and cross sectional drawings.
 - Reference list of previous supplies of flow tees of similar specification with relevant details viz Project, Year of supply, Client, size, Rating and service for the last five years.
 - Clausewise list of deviation from this specification, if any.
 - Records of successful proof test for tees used for fabrication of flow tees, qualifying the range of sizes quoted.
 - Brief description of the manufacturing, heat treatment and quality control facilities of the manufacturer's work.
- 10.2 Within two weeks of placement of order, the manufacturer shall submit four copies, of but not limited to, the following drawings, documents and specifications for approval.
- Fabrication drawings and relevant calculations for pressure containing parts.
 - Calculation for the holes/slots sizes/ flow area.
 - Method of manufacture, welding procedure and heat treatment details.
 - Quality control Manual & Quality Control Plan.
 - Type of mill coating / anti-corrosion paint / anti-fouling paint.
- Once the approval has been given by Purchaser, any change in design, material method of manufacture shall be notified to Purchaser whose approval in writing of all changes shall be obtained before the flow tees are manufactured.
- 10.3 Within four weeks from the approval date Manufacturer shall submit one reproducible and six copies of the approved drawings, documents and specification as stated in clause 10.2 of this specification.
- 10.4 Prior to shipment, Manufacturer shall submit one reproducible and six copies of test certificates as listed in clause 7.0 of this specification.
- 10.5 All documents shall be in English Language.

DATASHEETS OF FLOW TEES

DATA SHEET FOR FLOW TEES



1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm²(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 450 X 450 X 450 (18" X 18" X 18")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm²(g)
13. CHARPY TEST(TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 70
 - 2) END PIECES : ASTM A 694 Gr. F - 70
 - 3) INTERNAL SLEEVE : API 5L Gr. X-56, PSL-2

18. CONNECTING PIPE SPECIFICATION

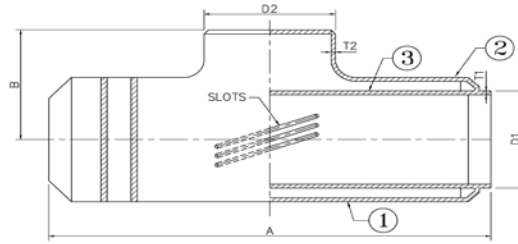
Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	18	12.7	API 5L Gr. X-70, PSL-2	18	19	API 5L Gr. X-52, PSL-2

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
- 1 MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
 - 2 MANUFACTURER TO FURNISH DETAILS OF THE SLOTS IN INTERNAL SLEEVE. THE AREA OF THE SLOTS SHALL BE MINIMUM EQUAL TO THE INTERNAL AREA OF THE BRANCH PIPE. RELEVANT CALCULATIONS TO THIS EXTENT SHALL BE FURNISHED.
 - 3 MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.
 4. Tag numbers shall be provided to the successful bidders.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD		
REVISIONS						REFERENCES	DRG. NO.
SECTION OIL & GAS			CLIENT : IGGL				MECON LIMITED
	NAME	DATE	CHKD	DATE			
DSGN	ASHISH	08.12.21	HARSH	08.12.21			
DRWN							
APPROVED			I.SEN CGM			DATA SHEET FOR FLOW TEE	
						SCALE : Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-01	
						REV 0	

DATA SHEET FOR FLOW TEES



1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm²(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 450 X 450 X 300 (18" X 18" X 12")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm²(g)
13. CHARPY TEST(TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 70
 - 2) END PIECES : ASTM A 694 Gr. F - 70
 - 3) INTERNAL SLEEVE : API 5L Gr. X-56, PSL-2
18. CONNECTING PIPE SPECIFICATION

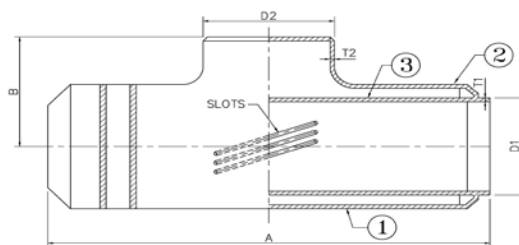
Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	18	12.7	API 5L Gr. X-70, PSL-2	12	14.3	API 5L Gr. X-52, PSL-2

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
1. MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
 2. MANUFACTURER TO FURNISH DETAILS OF THE SLOTS IN INTERNAL SLEEVE. THE AREA OF THE SLOTS SHALL BE MINIMUM EQUAL TO THE INTERNAL AREA OF THE BRANCH PIPE. RELEVANT CALCULATIONS TO THIS EXTENT SHALL BE FURNISHED.
 3. MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.
 4. Tag numbers shall be provided to the successful bidders.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD		
REVISIONS						REFERENCES	DRG. NO.
SECTION OIL & GAS							MECON LIMITED
CLIENT : IGGL							
PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID (PHASE-2) PROJECT							
DSGN	ASHISH	08.12.21	CHKD	HARSH	08.12.21		
DRWN							
APPROVED			I.SEN CGM			DATA SHEET FOR FLOW TEE	
						SCALE : Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-02	
						REV 0	

DATA SHEET FOR FLOW TEES



1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm2(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 450 X 450 X 250 (18" X 18" X 10")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm2(g)
13. CHARPY TEST(TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 70
 - 2) END PIECES : ASTM A 694 Gr. F - 70
 - 3) INTERNAL SLEEVE : API 5L Gr. X-56, PSL-2

18. CONNECTING PIPE SPECIFICATION

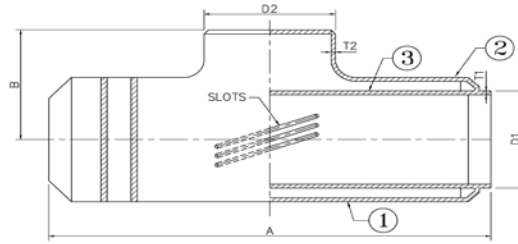
Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	18	12.7	API 5L Gr. X-70, PSL-2	10"	12.7	API 5L Gr. X-52, PSL-2

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
1. MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
 2. MANUFACTURER TO FURNISH DETAILS OF THE SLOTS IN INTERNAL SLEEVE. THE AREA OF THE SLOTS SHALL BE MINIMUM EQUAL TO THE INTERNAL AREA OF THE BRANCH PIPE. RELEVANT CALCULATIONS TO THIS EXTENT SHALL BE FURNISHED.
 3. **MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.**
 4. **Tag numbers shall be provided to the successful bidders.**

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD			
REVISIONS						REFERENCES	DRG. NO.	
SECTION OIL & GAS			CLIENT : IGGL				MECON LIMITED	
	NAME	DATE	CHKD	DATE				
DSGN	ASHISH	08.12.21	HARSH	08.12.21				
DRWN								
APPROVED			I.SEN CGM	DATA SHEET FOR FLOW TEE			SCALE :	REV
						Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-03		0

DATA SHEET FOR FLOW TEES



1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm2(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 300 X 300 X 300(12" X 12" X 12")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm2 (g)
13. CHARPY TEST(TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 70
 - 2) END PIECES : ASTM A 694 Gr. F - 70
 - 3) INTERNAL SLEEVE : API 5L Gr. X-56, PSL-2

18. CONNECTING PIPE SPECIFICATION

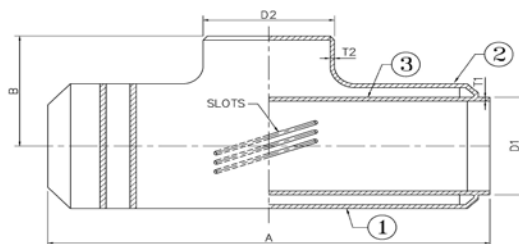
Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	12	9.53	API 5L Gr. X-70, PSL-2	12	14.3	API 5L Gr. X-52, PSL-2

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
1. MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
 2. MANUFACTURER TO FURNISH DETAILS OF THE SLOTS IN INTERNAL SLEEVE. THE AREA OF THE SLOTS SHALL BE MINIMUM EQUAL TO THE INTERNAL AREA OF THE BRANCH PIPE. RELEVANT CALCULATIONS TO THIS EXTENT SHALL BE FURNISHED.
 3. MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.
 4. Tag numbers shall be provided to the successful bidders.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD															
REVISIONS						REFERENCES	DRG. NO.													
SECTION OIL & GAS							MECON LIMITED													
CLIENT : IGGL																				
PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID (PHASE-2) PROJECT																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NAME</th> <th>DATE</th> <th>CHKD</th> <th>DATE</th> </tr> <tr> <td>DSGN ASHISH</td> <td>08.12.21</td> <td>HARSH</td> <td>08.12.21</td> </tr> <tr> <td>DRWN</td> <td></td> <td></td> <td></td> </tr> </table>					NAME	DATE	CHKD	DATE	DSGN ASHISH	08.12.21	HARSH	08.12.21	DRWN				DATA SHEET FOR FLOW TEE		SCALE : Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-04	REV 0
NAME	DATE	CHKD	DATE																	
DSGN ASHISH	08.12.21	HARSH	08.12.21																	
DRWN																				
APPROVED I.SEN CGM																				

DATA SHEET FOR FLOW TEES




1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm²(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 300 X 300 X 200 (12" X 12" X 8")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm² (g)
13. CHARPY TEST(TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 70
 - 2) END PIECES : ASTM A 694 Gr. F - 70
 - 3) INTERNAL SLEEVE : API 5L Gr. X-56, PSL-2
18. CONNECTING PIPE SPECIFICATION

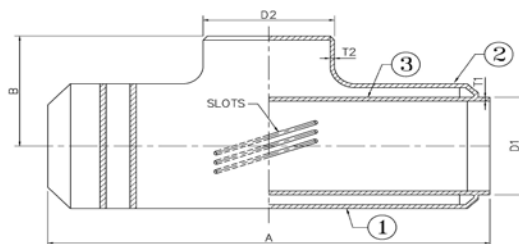
Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	12	9.53	API 5L Gr. X-70, PSL-2	8	14.3	API 5L Gr., B, PSL-2

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
1. MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
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 3. MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.
 4. Tag numbers shall be provided to the successful bidders.

REV. NO.	DATE	ZONE	DESCRIPTIONS			BY	APPRD			
REVISIONS							REFERENCES	DRG. NO.		
SECTION OIL & GAS					CLIENT : IGGL PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID (PHASE-2) PROJECT				MECON LIMITED	
	NAME	DATE	CHKD	DATE						
DSGN	ASHISH	08.12.21	HARSH	08.12.21						
DRWN										
APPROVED					I.SEN CGM	DATA SHEET FOR FLOW TEE			SCALE : Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-05	REV 0

DATA SHEET FOR FLOW TEES



1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm2(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 300 X 300 X 150 (12" X 12" X 6")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm2 (g)
13. CHARPY TEST (TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 70
 - 2) END PIECES : ASTM A 694 Gr. F - 70
 - 3) INTERNAL SLEEVE : API 5L Gr. X-56, PSL-2
18. CONNECTING PIPE SPECIFICATION

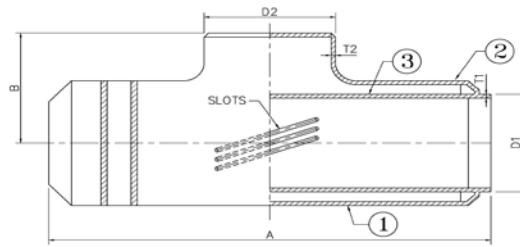
Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	12	9.53	API 5L Gr. X-70, PSL-2	6	10.97	ASTM A106, Gr.B(CHARPY)

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
1. MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
 2. MANUFACTURER TO FURNISH DETAILS OF THE SLOTS IN INTERNAL SLEEVE. THE AREA OF THE SLOTS SHALL BE MINIMUM EQUAL TO THE INTERNAL AREA OF THE BRANCH PIPE. RELEVANT CALCULATIONS TO THIS EXTENT SHALL BE FURNISHED.
 3. **MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.**
 4. Tag numbers shall be provided to the successful bidders.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD			
REVISIONS						REFERENCES	DRG. NO.	
SECTION OIL & GAS			CLIENT : IGGL				MECON LIMITED	
DSGN	NAME	DATE	CHKD	DATE	PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID (PHASE-2) PROJECT			
DRWN	ASHISH	08.12.21	HARSH	08.12.21				
APPROVED			I.SEN CGM			DATA SHEET FOR FLOW TEE		
						SCALE : Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-06		
						REV 0		

DATA SHEET FOR FLOW TEES




1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm²(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 200 X 200 X 200 (8" X 8" X 8")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm² (g)
13. CHARPY TEST (TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 56
 - 2) END PIECES : ASTM A 694 Gr. F - 56
 - 3) INTERNAL SLEEVE : API 5L Gr.B, PSL-2
18. CONNECTING PIPE SPECIFICATION

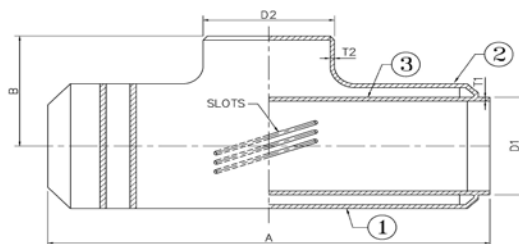
Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	8	7.92	API 5L Gr. X-56, PSL-2	8	14.3	API 5L Gr.B, PSL-2

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
1. MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
 2. MANUFACTURER TO FURNISH DETAILS OF THE SLOTS IN INTERNAL SLEEVE. THE AREA OF THE SLOTS SHALL BE MINIMUM EQUAL TO THE INTERNAL AREA OF THE BRANCH PIPE. RELEVANT CALCULATIONS TO THIS EXTENT SHALL BE FURNISHED.
 3. MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.
 4. Tag numbers shall be provided to the successful bidders.

REV. NO.	DATE	ZONE	DESCRIPTIONS			BY	APPRD				
REVISIONS						REFERENCES	DRG. NO.				
SECTION OIL & GAS					CLIENT : IGGL PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID (PHASE-2) PROJECT				MECON LIMITED		
DSGN	NAME	DATE	CHKD	DATE							
	ASHISH	08.12.21	HARSH	08.12.21							
DRWN											
APPROVED					I.SEN CGM	DATA SHEET FOR FLOW TEE			SCALE : Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-07		REV 0

DATA SHEET FOR FLOW TEES



1. FLOW TEE MFR. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/011
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm2(g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : NATURAL GAS / RLNG
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM(INCHES) : 200 X 200 X 150 (8" X 8" X 6")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME B31.8
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm2 (g)
13. CHARPY TEST(TEES, END PIECES) : REQUIRED AS PER SPECIFICATION & ASTM- A370
14. HARDNESS TEST : REQUIRED AS PER SPECIFICATION & ASTM- A370
15. SUITABILITY OF FLOW TEE : FOR INTELLIGENT PIGS
16. FLOW DIRECTION : BI - DIRECTIONAL
17. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - 1) TEE : MSS - SP - 75 Gr. WPHY 56
 - 2) END PIECES : ASTM A 694 Gr. F - 56
 - 3) INTERNAL SLEEVE : API 5L Gr. B, PSL-2
18. CONNECTING PIPE SPECIFICATION

Sl. No.	Run Pipe Details			Branch Pipe Details		
	Dia	Thk (Min.)	Materials	Dia	Thk (Min.)	Materials
	NB (Inch)	(mm)		NB (Inch)	(mm)	
1	8	7.92	API 5L Gr. X-56, PSL-2	6	10.97	ASTM A106, Gr.B (CHARPY)

19. SPECIAL REQUIREMENTS : FLOW TEE SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

- NOTE:
1. MANUFACTURE TO INDICATE DIMENSIONS MARKED A & B IN THE SKETCH ABOVE.
 2. MANUFACTURER TO FURNISH DETAILS OF THE SLOTS IN INTERNAL SLEEVE. THE AREA OF THE SLOTS SHALL BE MINIMUM EQUAL TO THE INTERNAL AREA OF THE BRANCH PIPE. RELEVANT CALCULATIONS TO THIS EXTENT SHALL BE FURNISHED.
 3. **MANUFACTURER SHALL ENSURE THAT THE WALL THICKNESS (W.T) OF ALL PARTS OF FLOW TEE SHALL BE ADEQUATE TO SUSTAIN DESIGN PRESSURE AND THE THICKNESS OF RUN SIZE ENDS (T1) & BRANCH SIZE END (T2) OF FLOW TEE SHALL BE SAME AS CONNECTING RUN PIPE AND BRANCH PIPE W.T. AS INDICATED ABOVE.**
 4. Tag numbers shall be provided to the successful bidders.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD			
REVISIONS						REFERENCES	DRG. NO.	
SECTION OIL & GAS			CLIENT : IGGL				MECON LIMITED	
DSGN	NAME	DATE	CHKD	DATE	PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID (PHASE-2) PROJECT			
DRWN	ASHISH	08.12.21	HARSH	08.12.21				
APPROVED			I.SEN CGM			DATA SHEET FOR FLOW TEE		
						SCALE : Data Sheet No.: MEC/23VC/05/21/M/000/DS-011-08		
						REV 0		

QAP FOR MANUFACTURING OF FLOW TEES



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1	14-12-2021	Scope Of Inspection Modified	Ashish Mathur	Harsh Kumar	INDRANILSEN
0	20.02.2020	ISSUED FOR IMPLEMENTATION	Ashish Mathur	Harsh Kumar	AK Gupta
Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by

Format No. : 05/21/FT/001



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APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/011, R-0 WITH AMENDMENTS								SCOPE OF INSPECTION		
SL. NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORMS	RECORD	Vendor	TPIA	MECON / IGGL
1.	RAW MATERIAL INSPECTION									
2.	Material	EQUAL/ UNEQUAL TEE AS PER EN 10204,3.2	Visual, Dimension, Finish, Mechanical Properties(Tensile, Impact (-0 Degree C) Hardness & Others, Chemical Properties, Supply condition(Heat Treatment), Deoxidation (As per applicable specification)	Visual, dimensions verification of markings with MTC, Review MTC	100%	Applicable Material Specificatio n, MECON specification ,Approved Drawing	MTC	P	W	R
3.	Material	EQUAL/UNE QUAL TEE AS PER EN 10204,3.2	Soundness of Tee(NDT)	Ultrasonic test of entire surface	100%	Applicable Material specification,MECO N specification ,Approved Drawing	MTC	P	W	R
4.	Material	END COVER/FOR GED RINGS	Visual, Dimension, Finish, Mechanical Properties(Tensile,	Visual, dimensions verification of markings with MTC,	100%	Applicable Material specification,MECO N specification	MTC	P	W	R

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SL. No.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORMS	RECORD	Vendor		TPIA	MECON / IGGL
		AS PER EN 10204,3.2	Impact (-20 Degree C) Hardness & Others, Chemical Properties, Supply condition(Heat Treatment)	Review MTC		,Approved Drawing					
5.	Material	END COVER/ FORGED RINGS AS PER EN 10204,3.2	Soundness of End cover/Forged Rings(NDT)	Review of Magnetic particle test reports Or Ultrasonic test of entire surface	100%	Applicable Material specification,MECON specification ,Approved Drawing	MTC	P	W	R	
6.	Material	INTERNAL SLEEVE	Visual, Dimension, Physical & Chemical properties	Review MTC	100%	Applicable Material specification,MECON specification ,Approved Drawing	MTC	P	R	R	
7.	IN PROCESS QUALITY CONTROL										
8.	IN	Welding procedure	Welding parameters	Verification of parameters &	100%	ASME SECIX	ASME SECIX	-	P	Review of existing	R



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SL. NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORMS	RECORD	Vendor	TPIA	MECON / IGGL
	Process	Specification (WPS)		Mechanical testing /Review of establish WPS			& Addenda		WPS/PQR/WQR by TPIA if suitable, In the non suitability of established WPS/PQR shall be witness by TPIA	
9.	IN Process	Welding procedure Qualification Record	Mechanical Testing & Welding parameters	Verification of parameters & Mechanical testing /Review of establish PQR	100%	ASME SECIX	ASME SECIX & Addenda	P	Same as SI No.8	R
10.	IN Process	Welder performance qualification	Welder's ability weld soundness radiography	Verification of Parameters & Mechanical testing/ Review of established WPS	100%	ASME SECIX	ASME SECIX & Addenda	P	Same as SI No.8	R

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S. NO	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORMS	RECORD	Vendor	TPIA	MECON / IGGL
11.	IN Process	Fit up of Circ. Seam Joints	Visual dimension set up	Visual,dimensions.DP at edges	100%	Approved Drawings,ASME/ANSI B31.8	IIR	P	R	R
12.	IN Process	Internal Sleeve Weld	Soundness of weld	UT/MPI	100%	ASME SEC V & ASME SEC VIII,Div I	IIR	P	W	R
13.	IN Process	Butt Welds(Tee to forged ends)	Soundness of weld	Radiography	100%	ASME SEC V & ASME SEC VIII,Div IAPI 1104	RT report	P	R	R
14.	IN Process	Bevel Ends	Lamination & other defects	MPI	100%	ASME SEC V & ASME SEC VIII,Div I	MPI report	P	W	R
15.	IN Process	Post weld Heat Treatment	-	Review of Heat Treatment chart	100%	ASME SEC VIII,Div I /Apppd procedure	H.T.Chart	P	R	R
16.	FINAL INSPECTION /TESTING									
16.	Final Inspection	Hardness at body, weld & HAZ	Hardness	Measurement	100%	Approved Drawing/Specification	Inspection Report	P	R	R

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S. NO	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORMS	RECORD	Vendor	TPIA	MECON / IGGL
17.	Final Inspection	Product	Completeness & dimensional Visual	Visual & Measurement	100%	Approved Drawing/Specification	Inspection Report	P	W	W
18.	Final Inspection	Finished Weld ends of Flow Tee	Lamination	Ultrasonic testing(with D meter)	100%	Approved Drawing/Specification	Inspection Report	P	W	W
19.	Hydro Testing	Product	Soundness of Flow Tee	-	100%	Approved Drawing/Specification	Hydro test report for each Flow Tee capable of withstanding without leakage for at least 15 minutes.	P	W	W

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S. NO	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORMS	RECORD	Vendor	TPIA	MECON / IGGL
20.	FINISHING & PAINTING									
21.	Finishing	Product surface preparation	Surface cleaning	Visual	100 %	Approved Drawing/Specification	IIR	P	W	R
22.	Finishing	product	Painting	Visual & Measurement	100 %	Approved Drawing/Specification	IIR	P	W	R
23.	FINAL DOCUMENTATION AS PER EN 10204-3.2									
24.	FINAL DOCUMENTATION AS PER EN 10204-3.2		RECORD	CHECK	100 %	Approved Drawing/Specification	IIR	P	C	H
25.	Release Note						EN 10204-3.2 certificate	H	-	P



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

Legends : H – Hold (Offer for Witness & obtain clearance), W – Witness, P-Perform, R – Review ,C- CERTIFICATION – Information, X – Submit, PO – Purchase Order, PR – Purchase Requisition, N-Normalizing, N&T – Normalizing & Tempering, SA – Solution annealing, N & SR – Normalizing & Stress relieving.

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

For CONTRACTOR/ SUB-CONTRACTOR

(Stamp & Signature)

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