TENDER DOCUMENT FOR SUPPLY & INSTALLATION OF PE80 YELLOW MDPE GAS PIPELINE NETWORK ON TURNKEY BASIS FOR TRANSPORTATION OF NATURAL GAS
SPECIFICATION SCHEDULE

Assam Gas Company Limited (AGCL) incorporated under the Companies Act, 1956 and having its registered office at Duliajan (hereinafter called the COMPANY) of the one part and the bidder (hereinafter called the CONTRACTOR) of the other part. AGCL is in the business of transportation of Natural Gas to various consumers like Power, Fertilizer, Petrochemicals, CGD etc.

The “TURNKEY WORK” includes supply of PE80 yellow MDPE gas pipes, Electrofusion fittings, PE valves and testing & Inspection at plant, transportation, hauling of pipes, valves and fittings, Jointing, cleaning, trenching, lowering & back filling, testing and commissioning of the pipeline system up to the intake point of individual consumers. Any other related work to complete the project, will have to be carried out by the Contractor. The “TURNKEY WORK” shall conform to the notification of Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulation 2008 and its latest updation / revision if any. The entire process of manufacturing, testing & Inspection at plant, supply, installation, testing and commissioning shall be carried out in accordance with the guidelines of PNGRB, Govt. of India.

The work includes fitting and fixing of proposed PE80 yellow MDPE gas pipeline to the main mild steel (MS) pipeline( if required), arrangement of track crossing, anchorage against buoyancy and other works for this purpose to complete the pipeline as per relevant statutory regulations.

SCOPE OF WORK

a) Supply of PE 80 yellow MDPE Pipes manufactured using the raw materials as per the approved list.
b) Supply of PE 80 yellow MDPE Pipe Fittings and Valves manufactured using the raw materials as per the approved list.
c) Testing & Inspection of Pipes & Fittings at plant by approved Third Party Inspection Agency (TPIA).
d) Supply of materials at Site/ Stores at Duliajan.
e) Site Mobilization
f) Installation of pipes and pipes fittings at site along with related Civil Works.
g) Testing & Commissioning of pipeline network followed by submission of test report to AGCL.

h) Restoration of ROU.

**DETAILED TECHNICAL SPECIFICATION**

a) **Specification of PE 80 yellow MDPE Pipes and fittings:**

Pipes, fittings & valves shall be supplied which are to be produced with thermoplastic piping (MDPE) conforming to the notification of Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulation 2008 and its latest updation / revision if any and as per ISO 4437 and IS 14885 with yellow MDPE-80 material in manufacturing units. The bidder also must mention the names of such production/manufacturing units from where the pipes, fittings, valves will be procured for the projects, who is having experience in production and supply of MDPE pipe etc. as per specification mentioned above. The bidder must produced/enclosed the copies supply orders of such manufacturing units from any PSU or Govt. Sector. In any case the Bidder will not be allowed to supply pipes, fittings, valves etc other than the list submitted by the Bidder. In addition, the bidder must submit the license issued by BIS/ISO for the manufacturer for manufacturing of Natural Gas pipe as per required standard in support of the list submitted by the Bidder. Reprocessed materials shall not be used. The colour of pipes used for gas service shall be yellow for PE 80 grade MDPE pipes shall be permanently marked (either impressed or embossed to a depth / height of 0.02 to 0.15 mm). Marking shall show Owner’s name as AGCL on each pipes. The marking shall also show manufacturer’s name or trade name, material & designation, batch no. or lot no., internal fluid, SDR, reference of standard and marking shall be repeated at the interval of 1 (one) Mtr. Tensile yield strength of the pipes shall be minimum 15 MPa and Elongation at break shall be 350% or more.

Size of the pipes with wall thickness shall be as specified in the Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulation 2008 and ISO 4437 for the following:

i) Pipe size from 20mm to 63mm - as per SDR 11.

ii) Pipe size from 75mm to 225mm - as per SDR 17.6.

All fittings shall be manufactured conforming to the notification of Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulation 2008.
All fittings used shall be of electro-fusion type. Other types of fittings are not permitted. All MDPE fittings shall conform to ISO 8085 Part 3. The wall thickness of the fittings shall be more or equal to the wall thickness of the pipe jointed. MDPE thermoplastic fittings conforming to ISO 8085 Part 3 shall meet the following requirements.

a) Polyethylene resin used for manufacturing of thermoplastic fittings shall be virgin, cadmium free pigmented compound.

b) Anti-oxidant and UV stabilizers used in PE resin shall not exceed 0.3 and 0.5 percent respectively.

c) Reprocessed materials shall not be used.

d) Grade of PE compound used for the fittings shall not be less than that of PE pipes. In case fittings are of different grade than that of pipes, compatibility of the same with the pipes shall be established prior to their use. However, in case of higher grade fittings separate compatibility test shall not be required.

e) Heating element shall not be exposed and all coils are embedded in to the body of the fittings.

f) Colour of the fittings shall be yellow.

g) Electrofusion fittings complying with ISO 8085 Part 3 shall be used for all sizes of PE pipes.

h) Fittings fabricated from pipe shall not be used.

i) Only injection molded fittings are recommended.

j) For electro-fusion fittings external alignment clamp and tolling approved by the fitting manufacturer shall be used during welding.

k) All Electro-Fusion fittings shall be bar coded and the control unit shall be equipped with bar code reader to directly transfer fusion data to control unit. Bar coding shall be long lasting even when the joint is buried in corrosive soil, alternatively each fitting shall have a data card which can be read by the computer and thereafter the card is positioned with the joint. Fusion fittings shall have permanent fusion indicator or a data card conforming to ISO-7810/ISO-7811. The fusion jointing shall be carried out as per the procedure outlined in the standard DVS 2202 or equivalent. Carbon steel part of transition fittings used for connecting PE system with Carbon Steel System may have butt weld/plain/flanged ends.

l) Mechanical fittings for making hot taps on pipelines and mains shall not be used. Fittings for hot taps shall be welded type (for steel pipelines and mains) and electro-fusion type (for thermoplastic mains and service lines).
All MDPE pipes and fittings shall have type tested by an internationally recognized testing agency prior to their use. The manufacturing of pipes and the fittings as per ISO 4437 shall be inspected by AGCL approved internationally recognized Third Party Inspection Agency (TPIA) during the entire process of manufacturing and only on receipt of dispatch clearance from the Third Party Inspection Agency (TPIA), the materials shall be sent to AGCL (The cost for Inspection shall be borne by the Contractor).

The grade of material offered by the bidder must conform to the notification of PNG Regulatory Board, ISO 4437, IS 14885 and ISO 8085 Part 3.

List of approved manufacturer of raw materials are as below:

i) BORSAFE - ME 3441  
ii) SOLVOY ELTEX TUB- 172  
iii) FINATHENE 3802Y-CF  
iv) BP RIGIDEX PC2040  
v) REPSOL 3802 YC  
vi) ELENAC  
vii) DOW

The bidders to clearly mention acceptance of above raw materials and price shall be quoted accordingly.

The following are forbidden:

i) Reprocessed materials shall not be used for production of gas pipes, fittings & valves.  
ii) Mixer of different materials.  
iii) Addition of complementary materials by the manufacturer.

The pipes to be supplied by the bidder must withstand Working pressure of 4 kg/cm²(g) & test pressure of 6 kg/cm²(g).

The details of calculation for life of the pipe and pressure must accompany the tender. The contractor shall provide suitable number of fittings like Bends, Tees, End caps, Pipe Ends, Clamps or any other fittings, as per the directive of the Company and for completion of the job and to install the same. The Company’s representative(s) may visit the factory of the bidders for physical verification of the details of pipes and fittings produced.
b) Testing & Inspection of Pipes & Fittings at plant:

Bidder shall have to provide a list of 5 (five) internationally well known Third Party Inspection Agency (TPIA) for inspection of pipes and fittings manufactured in their plant. Only one agency out five agency may be approved by the Owner to perform the inspection work. The Bidder shall have to carry out inspection work at their own cost. This agency shall have to submit to Owner all relevant certificates as per specifications and codes before despatch of the materials.

Quality Assurance Plan shall be submitted by the bidder along with the Techno-commercial bid.

c) Supply of materials from factory to Owner’s Stores/ Site:

The Bidder shall be responsible for transportation of the pipes, fittings and valves from their factory to Owner’s stores at Duliajan or work site as the case may be and for secondary transportation from stores to site if required.

The Contractor will take delivery of pipes from the Company’s stores at Duliajan/ Site. Any damage to the pipes found during transit or by any means will be on contractor’s account and the Company will have the right to reject the same, if required.

d) INSTALLATION AND LAYING:

1. The entire pipeline shall be an all welded electro-fusion system conforming to the Notification of Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulation 2008 and its latest updation / revision if any. Plastic piping joints shall be made by Electro-Fusion method only. For electro-fusion fittings, pipe fixation shall be done with external alignment clamp and tolling approved by the fitting manufacturer during welding. The welding must be done with required pressure, temperature and allowable cooling time. Before welding, all foreign materials shall have to be removed from the pipe end and welding shall be made with utmost care. For any deviation occurred, the contractor should be responsible for the same. The entire pipeline network shall be pneumatically tested at a pressure of 6 kg/cm²(g) for a continuous period of 24 hours, any uneven behaviour /leakage in the pipeline shall have to be detected and to be repaired by the contractor immediately at their own cost.

Adequate nos. of experienced welders must be provided by the contractor for scheduled completion of the work. Welder engaged for the proposed work should
have similar type of electro-fusion welding experience in MDPE gas pipeline network. Proper documents of experience of the welders with name and work performed at site (name of the site and relevant documents) must be submitted to the company along with the tender paper. Company reserves the right to reject or accept the offer depending upon the work experience.

2. The Contractor shall furnish all labour /manpower, equipment, tools, welding machines, line up clamps and all other equipment required to complete the job. These must be of required standard and kept in good operating condition. The details of the equipment and machineries, manpower list with reasonable daily wages/rate to be deployed for this work must be enclosed along with this tender. The management of the Company reserves the right to inspect the equipment prior to considering their offer.

   All the equipment and machineries to be engaged for this work must be approved and certified by the Company before execution of the work. Any machineries or equipment if found defective must be replaced/removed/repaired as per company’s directive and in this respect the company’s decision will be final.

3. CONTRACTOR’S Engineers & authorised representative(s) must be at site during entire execution period. The COMPANY will not discuss any matter regarding execution with any other party except the Contractor’s authorised representative(s).

4. RIGHT OF WAY (ROW): ROW shall be procured by the Company in advance to permit uninterrupted laying operations along the entire pipeline. In case any help from local Law Enforcing Authority is required, the same will be requested by the company from the concerned District Administration. The ROW shall be cleaned and graded by the Contractor at its own cost. The Contractor shall clear only the necessary width of ROW for their work.

5. ROUTE OF THE PIPE LINE: The route of the pipelines may cross all sorts of soil such as low land/high land, nullah, marshy land, river, etc. The contractor shall quote rate covering these contingencies. The company reserves the right to change the ROW at any time to suit the conditions if required and the contractor will accept the same as per the quoted/ accepted rates.

6. HAULING AND STRINGING OF PIPES: The pipes are to be loaded and carried in truck or any other suitable transport from the pipe dumps to the site and these are to be unloaded from the truck and lowered along the Right of Way of the line by careful handling so that the pipes are not damaged. No extra payment will be made for this.
7. TRENCHING, LOWERING AND BACKFILLING: The contractor shall dig necessary trench in any sorts of soil suitable for laying/lowering the pipeline to a depth of minimum 1.00 mtr. from the average original ground to the top of the pipe. Trench width shall be at least 300mm. The bed of the trench shall be free from sharp object, stones, etc. In rocky areas trench shall be padded with soft soil or sand to minimum depth of 150mm below the pipes. The contractor shall also arrange for back filling of trench after lowering the pipeline as per Company’s directive. Adequate care should be taken by the Contractor at the time of lowering the pipes into the trench to avoid any damage in the pipes. The bottom of the trench should be cleared and free from all liquid like water and also from solid materials such as bricks, stones and collapsed/loose earth before lowering the pipes. Rubber pads slings shall be used at the time of lowering the pipes. Due to uneven ground level in some places, the depth of the trench may be more than that of standard requirement, to maintain the bed level of the trench at the same depth, the rate to be quoted at an average flat rate.

Any defect/failure or loss of pipes during field execution will be on contractor’s account and they will be responsible for the same.

7.1. WARNING TAPE: A Warning Tape of Yellow Colour shall be laid 200mm above the pipeline for its entire length.

- Size: 150mm(6”) width X 1 mm thickness
- Material: Polyethylene- High impact grade- Virgin quality.
- Colour of Sheet: Yellow
- Printing: Printed “AGCL- Phone-0374 2800466” in every 20 cm interval.
- Ink: Two colour (Red & Black legend)
- Packing of Roll: With PE woven sack material.
- Warning Tape shall have Anti-Rodent properties.

8. CROSSING: The carrier pipe shall cross various Roads, Drains/Nullahs, Embankment, Irrigation Canal, River, etc.

In case of cable crossing the contractor shall have to take necessary steps with the concerned cable authority for permission or any other damage made to the cable.

All related works of crossings from the end-to-end up to the joints with the main lines are to be included in the crossing rate.
All related works of any crossing except the weight blocks placed (if any) will be deducted from the mainline and will be as per the quoted rate of crossing only. In case of cased crossing, casing length will be considered for payment. In case of Nullah crossing/river crossing or any other submerged crossing the straight length between both the upper ends of the crossing that connects the main pipeline will be considered for payment. The minimum depth to be maintained for any type of crossing will be as per the respective drawing enclosed. The Company shall decide the size of the casing pipes for all purpose and supply the MS casing pipe required for any type of crossing or any other purpose.

Contractor should quote rates for these types of crossings on per meter basis as per the drawings enclosed and details below:

i) ROAD CROSSING: The pipeline shall cross roads at many places, which shall have to be done by boring or open cut method as per the enclosed drawing and directive of the Company. The contractor shall quote two separate rates for road crossing i.e. boring and open cut.

ii) RAILWAY CROSSING: The pipeline shall cross Railway lines at places by boring as shown in the drawing. Isolation valves on both sides and suitable venting to atmosphere shall have to be provided conforming to Railway Regulation Act, if any.

In Railway Track Crossing, road crossing or in normal pipe laying work adequate care should be taken by the contractor from all sides, so that traffic is not disturbed or blocked and to avoid any accident sufficient noticeable marks, board and red flag/red light at night must be displayed.

iii) DRAIN/NULLAH CROSSING: The Contractor shall have to complete the work as per the drawing enclosed. All related works must be completed with utmost care including the installation of casing pipes. The contractor shall quote two separate rates i.e. over ground and under ground drain/nullah crossing.

iv) EMBANKMENT CROSSING: The pipeline shall cross river embankment by boring only. The size of the casing pipe will be decided by the Company. A minimum of one meter depth has to be maintained from the bottom of the embankment level to the top of the casing pipe. Both ends of the casing pipe have to be sealed with concrete wall as per the drawing enclosed to prevent seepage of water through the surface of casing pipe along the boring. The rate quoted should be inclusive of civil work as per the drawing enclosed.
v) **IRRIGATION CANAL CROSSING**: The pipeline shall cross irrigation canal by boring only. The size of the casing pipe will be decided by the Company. A minimum of one meter depth has to be maintained from the bottom of the irrigation canal plinth to the top of the casing pipe.

vi) **RIVER CROSSING**: The pipeline shall cross river, as per the drawing enclosed. The rate may be quoted on per meter basis excluding the cost of weight blocks required. The number of weight block to be placed on the pipe will be decided by the Company.

9. **ANCHORAGE**: Proper anchorage on the pipe with RCC block of 1:2:4 ratio is to be provided as per the directive of the company. The quoted rate should be inclusive of supply of materials and installation of the same on the pipeline at site. Proper size is to be designed by the contractor considering the weight against buoyancy. In case of river/drain crossing two numbers of identical blocks shall have to be placed (one at bottom and another at top of the pipe and bolted with nuts and bolts) as per drawing enclosed.

10. **FITTINGS AND FIXING OF VALVES**: The contractor shall supply and install all the PE valves for entire system as per specifications.

   The exact number of valves to be fitted in the line shall be indicated in the work order.

11. **VALVE CHAMBER**: Contractor shall have to construct valve trap chamber with brickwork and RCC cover with required support(s).

   Size: (1200 x 1200 x 1200) mm³ and (1000 x 1000 x 1000) mm³ inside of the chamber, 100 mm thick cover on the top and 250 mm thick brick wall with plastering.

12. **MARKER POST**: The marker post will be constructed as per the enclosed drawing. The materials required for this will be provided by the contractor and marker post is to be fixed above the pipeline with grouting at the interval of 250 metre or as directed by the company.

14. **CLEANING OF PIPELINE NETWORK**: The inner surface of the pipeline after completion shall be thoroughly cleaned and purged with compressed air to the full satisfaction of the company. Such cleaning and purging shall be done before fitting of valves. The contractor at his own cost shall supply all the equipment and materials necessary for this work.
E) TESTING AND COMMISSIONING:

The pipeline network after completion of installation and laying in all respect is to be tested pneumatically at a pressure of 6 kg/cm²(g) for continuous 24 hours. Any defect/leakage occurred during testing shall have to be detected and repaired by the contractor at his own cost. After successful completion of testing work, the pipeline network shall have to be commissioned by purging the pipeline with natural gas considering all safety aspects by the contractor.

The necessary work to connect the intake of the PE pipe with the main mild steel pipeline shall have to be completed by the contractor as per the Company’s directive at his own cost.

F) PRESSURE REGULATING SKID (PRS):

i) The pressure regulating skid shall have to be designed as stipulated in the notification of Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulation 2008 and its latest updation / revision if any. The contractor to meet the following requirements and the same is to be enclosed with this tender for approval of the company. All materials required shall have to be supplied and installed by the contractor.

The major components and the Pressure Regulating Skid as a whole shall be designed and as per International Standard as well as Technical Standard and Specification (T4S) of PNGRB.

The complete Pressure Regulating Skid Unit shall include but not limited to the following major components:

1. Filter : 2 nos.
2. Isolation Valve : 6 nos.
3. Pressure Control Valve (Monitor) ; 2 nos.
4. Pressure Control Valve (Active) ; 2 nos.
5. Slam Shut Valve : 2 nos.
6. Creep Relief Valve : 2 nos.
7. Ball Valve: 6 nos.
8. Safety Valve : 1 no.
11. Piping (C.S.) Network or any other required equipment/accessories required.
12. Canopy.

TECHNICAL DETAILS:

**Capacity**: Flow rate –
1) Up to 1000 SCUM/HR.
2) 2000 SCUM/HR.
3) 2500 SCUM/HR
4) 3000 SCUM/HR

**Inlet Gas Pressure**: 2 – 19 Bar
**Outlet Gas Pressure**: 1.0 – 4.0 Bar

1. **Active / Monitor Regulator**:
   A) Type: Loading type Globe Regulators
   B) Regulator Certification: EN 334
   C) Regulator Leakage Class: Class VI
   D) Regulator Accuracy Class: +/- 1%
   E) Velocity through Regulators: Within 20 m/sec (Necessary calculation to be submitted)

2. **Slam Shut Valve**:
   A) Type: Globe type
   B) SSV Certification: EN 14382
   C) SSV Leakage Class: Class VI
   D) SSV Accuracy Class: +/- 1%
   E) SSV Response Time: </= 1 sec
   F) Velocity through SSV: Within 40 m/sec (Necessary calculation to be submitted)
   G) Tripping Mechanism: 3 Stage Tripping (1St Stage: Sensing, 2nd & 3rd Stage: mechanical tripping to avoid nuisance tripping)

3. **Filter**:
   A) Type: Dry Gas Filter
   B) Micron Rating: 5 micron

The DPRS designed must meet variable requirement of gas, as this may be required to accommodate higher flow rate.
ii) The entire system shall have to be put in a RCC/MS enclosure so that the inside space is enough considering safety of the DPRS and for subsequent maintenance etc. The rate may be quoted according to the drawing submitted. If the company is not satisfied with the drawing submitted by the contractor then the same is to be constructed as per the directive of the company at a negotiated price.

iii) The contractor will have to quote for various ranges of DPRS, which will include design, procurement, installation, testing and commissioning of the entire system.

iv) The contractor shall have to give all technical details including MAKE of all equipments, which are to be installed in the DPRS.

OR
Bidder may submit a complete design of PRS as per above requirement and under strict PNGRB Guideline with necessary supporting documents, Technical Specification, Drawing etc with total cost involvement as Optional Item.

G) OTHERS:

1. SUPERVISION: Normally all works are to be completed within the daytime only. In case of emergent work, permission in writing to continue work after the darkness is to be obtained from the company.

The work in progress and the work to be executed shall be supervised and examined by the company’s representative, who will keep proper record of the progress. Daily Progress Report (in an approved format of the company) must be submitted to the company from the contractor’s side. Otherwise no bills will be entertained. The Daily Progress Report must be signed by authorised representatives of both the contractor and the company.

2. OTHER FITTINGS AND FIXTURES:

i) The contractor may quote for incorporation of any other fittings and fixtures not mentioned in specifications but which are considered necessary for safe operation of the entire system of the design.
ii) The contractor shall execute any other item of works related to the pipe laying work not mentioned in the tender form enclosed as per the directive of the company and rate for such additional works will be fixed by negotiations with the company before starting of any such work. As far as possible it will be done between the officer on site duty and contractor’s representative(s) to avoid delay and future complications. In case of dispute between the two parties full details will put up to the managing director of the company for final decision.

iii) The contractor may submit their own design and specifications, which is different from the company’s specifications for better workmanship, safety, reliability and life of the system. This deviation shall be subject to approval of the company and shall be brought out in the tender along with drawing etc.

3. DOCUMENTS TO BE SUBMITTED FOR TECHNO-COMMERCIAL BID:

i) Bidder shall submit the QAP (Quality Assurance Plan) / QCP (Quality Control Plan) and HSE (Health Safety and Environment) Policy along with the Techno-commercial bid.

ii) Bidder shall submit Manufacturing planning including Inspection and Testing Procedure, Construction Methodology & Project Management Plan along with the Techno-commercial bid.

iii) Bidder shall submit the details of source of raw materials and grade including certificate from AGCL approved manufacturers of raw materials and for using such grade of material for transportation of natural gas along with the Techno-commercial bid.

iv) Bidder shall submit Licenses issued by Bureau of Indian Standard (BIS)/ ISO for the listed manufacturer of pipes and pipe fittings.

v) Bidder shall submit the calculation for life of the pipes and pressure conditions along with the Techno-commercial bid.

vi) The bidder shall submit the Regression Analysis of the PE 80 yellow MDPE pipe compound according to ISO 9080 along with the techno-commercial bid.
SPECIFICATION SCHEDULE

ATTACHMENT - I

POLYETHYLENE VALVES FOR NATURAL GAS DISTRIBUTION IN UNDERGROUND NETWORK

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1. SCOPE AND FIELD OF APPLICATION

This General Technical Specification specifies the requirements for valves and its component made from extruded or injected moulded polyethylene (PE) and which are intended to be used for the Natural gas distribution systems where the maximum operating pressure (MOP) is equal to 4 bar.

In addition, it specifies some general properties of the materials from which these valves are made.

It applies to bi-directional valves with spigot ends or Electrofusion sockets intended to be fused with polyethylene pipes.

This specification is limited to valves with a nominal diameter (do) up to and including 225 mm.

2. NORMATIVE REFERENCES

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<th>Description</th>
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<td>prEN 1555-4</td>
<td>Plastics piping systems for the supply of gaseous fuels-Polyethylene (PE) - part 4: Valves</td>
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<td>prEN 1555-7</td>
<td>Plastics piping systems for the supply of gaseous fuels-Polyethylene (PE) -part 7 : Guidance for assessment of conformity</td>
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<td>ISO CD 12176-4</td>
<td>Plastics pipes and fittings - Equipment for fusion jointing polyethylene system - part 4 : Traceability coding</td>
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<tr>
<td>ISO TR 13950</td>
<td>Plastics pipes and fittings - Automatic recognition systems for Electrofusions</td>
</tr>
</tbody>
</table>

3. DEFINITIONS
3.1. NOMINAL SIZE DN/OD

Nominal size, related to the outside diameter.

3.2. NOMINAL OUTSIDE DIAMETER (do)

Specified outside diameter, in millimetre, assigned to a nominal size DN/OD.

3.3 NOMINAL WALL THICKNESS (en)

Numerical designation of the wall thickness of a component, which is a convenient round number, approximately equal to the manufacturing dimension in millimetre (mm).

Note: For thermoplastics components conforming to prEN 1555; the value of the nominal wall thickness, is identical to the specified minimum wall thickness at any point, emin.

3.4 COMPOUNDS

Homogenous mixture of base polymer (PE) and additives, i.e. anti-oxidants, pigments, UV-stabilizers and others, at a dosage level necessary for the processing and use of components conforming to the requirements of this standard.

3.5 MAXIMUM OPERATING PRESSURE (MOP)

Maximum effective pressure of the fluid in the piping system, expressed in bar, which is allowed in continuous use. It takes into account the physical and the mechanical characteristics of the components of a piping system.

Note: It is calculated using the following equation:

\[
MOP = \frac{20 \times \text{MRS}}{C \times (\text{SDR}-1)}
\]

3.6 VALVES
An obturating device designed to stop or restore the gas flow by operating and closing mechanisms.

3.7 BASE PLATE

The Valves are split into two models.

<table>
<thead>
<tr>
<th>MODEL 1</th>
<th>Valve Supply without base plate</th>
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<tr>
<td>MODEL 2</td>
<td>Valve Supply with a base plate fixed or integrated</td>
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3.8 SPINDLE PROTECTION SLEEVE

A sleeve tube that protect the valve spindle. The protection sleeve exists in two models

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<tr>
<th>Ventilated</th>
<th>The sleeve is provided with opening and wrapped with textile fabric in order to let the gas escape and prevent the soil to go in</th>
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<td>Non Ventilated</td>
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</tr>
</tbody>
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3.9. External Leak Tightness

The tightness of the body enveloping the space containing the gas, with respect to the atmosphere.

3.10. INTERNAL LEAK-TIGHTNESS

The tightness between the inlet and the outlet of the valve, obtained by closing the operating mechanism.
3.11. LEAK-TIGHTNESS TEST

Test to determine

- the internal leak-tightness of the valve’s closing seat when closed and pressurised from either side;

- the external leak-tightness of the valve when half open.

3.12. INITIATING TORQUE

Torque required to initiate movement of the obturator.

3.13. RUNNING TORQUE

Torque required to achieve full opening or closing of the valve at maximum allowable operating pressure.

3.14. LEAKAGE

Emission of gas through the body, sealing membrane or any other component of the valve.

4. GENERAL SPECIFICATION

The present specification is based on the European Standards EN 1555 series prepared by technical committee CEN/TC 155 plastic technical and ducting system.

The requirements of this technical specification are chosen in order to guarantee a high quality gas system which will respond to the European Standards for gas supply systems.
• the valves described in this technical specification comply with the standard prEN1555-4 and the complementary particular requirements or options of the present GTS.

• the valves are intended to be use in gas distribution networks made of PE 80 yellow MDPE pipes and accessories

5. MATERIAL PARTICULARITIES

5.1. GENERAL

All parts of the valve in contact with the gas stream shall be resistant to the gas, its condensates and other occurring substances such as dust.

All metallic parts of the PE valve shall resist to both internal and external corrosion.

5.2. PE COMPOUND FOR POLYETHYLENE VALVES BODIES

• The PE compound from which the valve body, with spigot end or electrofusion socket is made out, shall conform to prEN1555-1.

• The PE valves bodies are PE 80 class made from approved material as specified in the technical specification.

Following are forbidden:

• use of recycled materials,
• mixture of different materials,
• addition of complementary materials.

5.3. SEALS

• The seals shall be homogeneous, without any inner crack, inclusion or impurities and cannot contain any component that can alter the properties of the materials.
they are in contact with, and prevent the nonconformity of those materials with the present specification.

- additives shall be distributed evenly.

- The rubber seal rings shall comply with standard EN 682

- Other seals shall comply with the relevant standard and be suitable for gas service

5.4 LUBRICANTS

Lubricants cannot have any adverse effects on the long term performance of the valve parts.

5.5. OPERATING CAP

Operating cap are in plastic material or in metal, protected against corrosion.

6. VALVES GENERAL PARTICULARITIES

6.1.1. TECHNICAL FILE

The manufactures of the valves-shall deliver for each type of valve a technical file which includes:

- Raw material used,

- drawings, dimensions and tolerances, including for the accessories,

- application range (temperature and pressure limits),

- running torque and initiating torque,

- pressure drop and flow diagram,

- test results and data proving the conformity of the valve in accordance with prEN1555-4 and prEN1555-7,
• the assembly pipes/valves realised during testing shall be in conformity with the manufactures instructions and the extreme installation conditions.

• For the test assembly due consideration should be taken regarding the fabrication tolerances and the variation of the outside ambient temperature.

6.2. DESIGN

• The valves will be designed for a maximum operating pressure (MOP) equal to 10 bar.

• The wall thickness of the PE valve body shall be equal or greater than the minimum wall thickness of the corresponding SDR 11/17.6 series pipes.

• Valves body and valves ends form an indivisible whole.

• Except otherwise stated in the Owner purchase order, all valves will be “ball, valve” type.

• The operating cap shall be designed in a way that it cannot be ejected ‘non blow out” type.

• The design of the extension spindle and the spindle protection sleeve will be such that they will never, in any case, even due to soil settlement, lay on the non reinforced part of the valve body or the valve ends. The spindle protection sleeve cannot turn during valve turning operation.

• The owner will specify if the spindle protection sleeve is a ventilated or non-ventilated type.

• The spindle protection sleeve ventilated type will have holes (mm. diameter 10 mm) or slot type holes (mm. width 1 mm) all around the sleeve in sufficient number in order to assure a maximum permeability for the gas.

• The sleeve will be covered by a non-waved geo-textile fabric (90 pm). The geo-textile fabric with a 50 mm overlap will be well secured on the sleeve;
• The valves should be equipped with a base plate. In order to achieve this, the valve body will be design with a flat base (model 1) or with an attached base plate or an integrated one (model 2). The Owner or his representative will specify the model.

• The operating mechanism and the stop wedges will be protected against water intrusion.

• The valve body is completely sealed except a passage for the spindle mechanism.

6.3. APPEARANCE AND COLOUR

• The internal and external surfaces of valves shall be smooth clean and shall have no scoring, cavities or other defects to an extent that would prevent non-conformity to the present TS or to the standard prEN1555-4.

• The colour of the PE valves shall be either yellow, black or orange.

• The colour of the valve shall be specified by the Owner or his representative in the purchase order;

6.4. DIMENSIONS

• The dimensions will be in conformity with the standard prEN1555-3 and prEN1555-4.

• The dimensions of the extensions spindle are detailed in appendix A.

• The operating cap will be design as per appendix B, C or D.

The type of the operating cap will be specified by the Owner or his representative in the purchase order.

• The design of the extension spindle is such that the extension can be turn easily at any time to suit the site conditions.
7. MECHANICAL CHARACTERISTICS FOR ASSEMBLED VALVES

7.1. GENERAL

The valve shall have mechanical characteristics and be tested as specified in the standard prEN 1555-4.

7.2 RUNNING TORQUE

The running torque and the concept of the valve shall prevent the valve from being easily operated (by hand) without an operating key. To operate the valve designed with running torque as specified in the standard prEN 1555-4, the use of an operating key is requested. Neither the operating cap nor the spindle shall be damaged when operating at maximum operating torque as specified in the standard prEN 1555-4.

7.3. INDIVIDUAL TEST (BATCH RELEASE TEST)

Before delivery each valves will be individually tested for mechanical strength and leak-tightness as per standard prEN 1555-4.

A combined mechanic resistance and leak-tightness test shall be performed in conformity with the prEN 1555-4.

By batch of valves a supplementary leak-tightness test (25 mbar) shall be performed in conformity with the prEN 1555-4 on 3 valves taken at random.

7.4. PRESSURE DROP AT LOW PRESSURE

The drop of pressure is measured with natural gas as a medium and according to the diagram specified in the standard EN 12117 (fig.1).

The maximum drop of pressure measured with natural gas (inlet pressure 25 mbar) will be limited to 0,2 mbar for a nominal gas flow as per table below.
dn (mm) | FLOW (m³/h)
---|---
32 | 10
63 | 10
125 | 40
180 | 40

8. MARKING

At least the information given below shall be printed or formed directly on the valve:

a) Manufacturer’s name and/or trademark;
b) Material and designation (e.g. PE 80);
c) Design application series (e.g. SDR 11/17.6);
d) Nominal diameter;
e) Internal fluid “gas”;
f) Traceability code (valve and component) as per standard ISO/FDIS 12176-4;
g) Number of the system standard (e.g. prEN 1555-4) this information can be printed/formed directly on the valve or on a label associated with the valve or on an individual bag.
h) Production period, year and month;
The marking shall stay legible during normal manipulation, storage and installation.
The marking shall not adversely influence the performance of the valve and prevent the non-conformity of the valve.

No marking will be accepted at the valve spigot ends.
9. PACKAGING AND DELIVERY

The valve and its accessories shall be packaged individually in plastic bags in order to prevent them from deterioration. The valves ends shall be protected with external caps. The cartons and/or individual bags shall bear at least one label with the manufacturer’s name, type and dimensions of the part number, number of units in the box and, any special storage conditions and storage time limits.

10. GUARANTEE

The manufacturer will extend his guarantee for each part for 10 years after production. This guarantee period is valid if the parts are kept in proper conditions and in the original packaging. The valves equipped with electrofusion sockets will be supplied with a magnetic card and a code bar tag containing the welding parameters. The coding of the parameters shall be in conformity with the standard ISO TR 13950.

The operating manual (in English) will be inserted in the individual part package.

11. QUALITY CONTROL

11.1. GENERAL RULINGS

11.1.1. Manufacturer’s responsibility

The manufacturer is entirely responsible for the quality of the PE valves manufactured by his firm. All control checks prescribed above do not relieve him of this responsibility.

To ensure that all PE valves are in compliance with the specification in all aspects, they must be controlled by the plant control service, which must be independent from the manufacturing department.
All PE valves supplied are guaranteed for 10 years after the date of production.

11.1.2. Quality assurance

The manufacturer must have some form of quality control to ensure that products comply with EN standards 29001 or 29002. The quality assurance manual must be made available to the Owner Control Service or an external Control laboratory appointed by him.

The system of quality assurance must be certified by an authorized body.

11.2. CONTROLS

11.2.1. Control testing by the manufacturer

11.2.1.1. By material batch.

The manufacturer demands a certificate from the raw material manufacturer including the following:

• Fluid index
• Water content
• Volume mass
• Carbon black or yellow stabilizing agent content
• Carbon black or yellow stabilizing agent quality
• OIT value (thermal stability)

11.2.1.2. By accessory batch

The manufacturer must run control checks as specified in the standard prEN 1555-4 and prEN 1555-7:

Control checks and the number of tests must be carried out according to the prescriptions of the EN standard 1555-4.
Also refer to table No. 8, paragraph 4.2.3. “lot release tests” of standard prEN 1555-7.

The results must be written out in documents that contain the complete identification of the accessory batch.

These documents must be made immediately available for the Owner representative.

11.2.2. Plant Reception by the Owner/Owner’s representative

11.2.2.1. General information

All quality controls must be run in the presence of the Owner / Owner’s representative. A complete Quality Assurance procedure shall be submitted by the manufacturer depicting the various stages of quality control and checks thereof which has to be duly approved by Owner/Owner’s representative prior to actual inspection at manufacturer’s works.

All tests and control checks must comply with appropriate standard prescriptions and with the specific specifications established with the order.

At each visit by the Owner representative, the manufacturer must provide, free of charge, all means and personnel necessary for running the established control checks.

While the order is under production, the Owner representative must have access to stocking installations of all raw materials before manufacturing, manufacturing and control installations, as well as the accessory stocking areas for any control checks he is responsible for.

During his visits, the Owner representative will receive a certificate as soon as he reaches the plant for each batch of accessories presented for reception.
Each time this is requested by the Owner representative, the manufacturer must provide recent reports of all control checks and measuring instrument results and testing results.

11.22.2. Convocation for reception

Convocation instructions for reception are to be defined with the order.

11.2.2.3. Reception control checks

For each accessory batch or any fractions of the batch, minimal batch sampling is established in annexed enclosure 3. These control checks and tests are to be run according to the prescriptions of standard prEN15554.

11.3. ACCEPTANCE OR REFUSAL

11.3.1. Appearance, measurements and marking

Any requirements not supplied will lead to the refusal of the complete batch. However in the case where a batch is refused, it can be presented for approval again after a control check, on agreement with the Owner Control Service.

11.3.2. Control check on characteristics

All results that do not comply with the specification prescriptions and the particular specifications requested with the order, demand counter-testing on at least double the number of the samples previously tested. If the undesirable result is confirmed, then the batch is refused permanently. If the result is positive, then the batch will be accepted.

As a complementary control check, other analyses and/or tests can be run after common agreement, and at the manufacturer’s cost.