



Exploration & Production

GENERAL SPECIFICATION

PIPING VALVES VESSELS

GS PVV 143

Metallic pipes

02	10/03	General review – Change of Group name and logo
00	02/01	First issue
Rev.	Date	Notes



Contents

1. Scope	4
2. Reference documents.....	4
3. Materials.....	5
3.1 Carbon steel pipes	5
3.2 Galvanised pipes	6
3.3 Austenitic stainless steel pipes.....	6
3.4 Copper alloy pipes	6
4. Substitution of equivalent materials.....	6
4.1 Substitutions acceptable without prior approval by the Engineering Company	6
4.2 Possible substitutions requiring prior approval by the Engineering Company	6
5. Dimensions.....	6
5.1 Schedules	6
5.2 Lengths.....	7
6. Ends	7
6.1 Plain (or square) ends.....	7
6.2 Bevel ends	7
6.3 Threaded ends.....	7
7. Manufacture.....	7
7.1 General.....	7
7.2 Fabrication of pipes.....	7
7.3 Machining	8
7.4 Repair of defects.....	8
8. Inspection	8
8.1 Quality control	8
8.2 Acceptance	8
9. Documentation	9
9.1 Certificates of conformity.....	9
9.2 Material certificates	9
9.3 Pressure test certificates.....	9



10. Preparation for shipment.....	9
10.1 Marking	9
10.2 Protection.....	10
10.3 Packing	10

1. Scope

This specification completes the description given in the requisitions issued by the Engineering Company and stipulates the particular requirements for the fabrication, inspection and shipment of pipes made of carbon steel, alloy steel, stainless steel and copper alloys.

This specification does not apply to pipes made of glass-reinforced plastic materials (GRP).

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Standards

Reference	Title
ASME B 1.20.1	Pipe Threads (Except Dryseal)
ASME B 16.25	Butt-Welding Ends
ASME B 36.10M	Welded and Seamless Wrought Steel Pipe
ASME B 36.19M	Stainless Steel Pipe
API 5 L	Line Pipe
ASTM A 106	Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A 120	Pipe Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses
ASTM A 312	Seamless and Welded Austenitic Stainless Steel Pipe
ASTM A 333	Seamless and Welded Steel Pipe for High Temperature Service
ASTM A 335	Seamless Ferritic Alloy Steel Pipe for High Temperature Service
ASTM A 358	Electric-Fusion-Welded Austenitic Chromium - Nickel Alloy Steel Pipe for High-Temperature Service
ASTM A 370	Mechanical Testing of Steel Products
ASTM A 530	General Requirements for Specialized Carbon and Alloy Steel Pipe
ASTM A 672	Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures
ASTM A 691	Carbon and Alloy Steel Pipe, Electric-Fusion-Welded for High-Pressure Service at High-Temperatures
ASTM B 466	Seamless Copper-Nickel Pipe and Tube
ASTM B 467	Welded Copper-Nickel Pipe

Professional Documents

Reference	Title
Not applicable	

Regulations

Reference	Title
Not applicable	

Codes

The main reference code shall be:

Reference	Title
ASME B 31.3	Process piping

Other documents

Reference	Title
Not applicable	

Total General Specifications

Reference	Title
Not applicable	

3. Materials

3.1 Carbon steel pipes

The carbon steel used for the fabrication of seamless pipe and pipes welded by Submerged Arc Welding process (SAW) shall be produced in an electric furnace or by the basic oxygen process.

All carbon steels, including normalised steels, used for the fabrication of pipes shall have a maximum carbon content of 0.23 %.

The carbon equivalent of these materials, calculated using the formula:

$$C_E = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15} \text{ shall be less than 0.42 (ladle analysis).}$$

If the content of alloying elements other than C or Mn is unknown, the formula to be used shall be: $C_E = C + \frac{Mn}{6}$ and, in this case, the carbon equivalent shall be less than 0.40 (ladle analysis).

All carbon steels materials must be impact tested at minus 29°C (- 20°F) in accordance with [ASME B 31.3](#) (paragraph 323.3), unless more stringent requirements (including lower impact test temperatures) are already required in the product specification. However, carbon steels to [API 5L B](#) or to [ASTM A 106 B](#) may not be tested if their nominal wall thickness is below 12.7 mm (½ inch).

All carbon steel materials for services at lower temperatures (i.e., below minus 29°C) shall undergo toughness testing in accordance with the requirements of their reference codes and standards.

Threaded pipes connected by couplings shall be supplied with threaded couplings; couplings shall be threaded per [ASME B 1.20.1](#) (NPT).

3.2 Galvanised pipes

Couplings for galvanised pipes shall also be galvanised.

3.3 Austenitic stainless steel pipes

321 stainless steel shall have a carbon content greater than or equal to 0.02 %.

Austenitic stainless steel pipes shall undergo an annealing heat treatment in accordance with the corresponding ASTM standards.

3.4 Copper alloy pipes

Seamless and welded pipes to [ASTM B 466](#) and [ASTM B 467](#) shall be annealed.

4. Substitution of equivalent materials

In general, carbon steel pipes for which grade B is specified shall in no case be replaced by grade A pipes. Substitution with ERW pipe, where SAW pipe is specified, is prohibited.

However, some other substitutions of materials may be accepted:

4.1 Substitutions acceptable without prior approval by the Engineering Company

Carbon steel pipes to [API 5L B](#) may be replaced with carbon steel pipes to [ASTM A 106 B](#).

4.2 Possible substitutions requiring prior approval by the Engineering Company

Stainless steel pipes to [ASTM A 312](#), welded by electric fusion (SAW) may be replaced with welded stainless steel pipes to [ASTM A 358](#) and vice-versa, subject to prior approval by the Engineering Company.

5. Dimensions

5.1 Schedules

Pipes for which schedules 10, 40, 80, etc. are specified must be in accordance with the standards [API 5L](#) or [ASME B 36.10M](#).

Pipes for which schedules 10S, 40S and 80S are specified must be in accordance with the standard [ASME B 36.19M](#).

5.2 Lengths

The standard pipe lengths shall never be less than:

- 5.33 m (17.5 ft) for diameters up to 4"
- 10.51 m (35.0 ft) for diameters 6" and above.

However, provided that they are limited to 5 % of the total length of the delivery, certain sections may have a minimum length equal to half these values.

6. Ends

6.1 Plain (or square) ends

Pipes less than 2" in diameter and made of carbon steel (except for galvanised carbon steel) or alloy steel, and all pipes made of stainless steel or copper alloys, regardless of diameter, shall have plain (or square) ends.

6.2 Bevel ends

Pipes 2" or more in diameter and made of carbon steel (including galvanised carbon steel) or alloy steel shall be delivered with ends bevel as per the standard [ASME B 16.25](#).

6.3 Threaded ends

The ends of galvanised steel pipes up to 2" in diameter must be threaded in accordance with the standard [ASME B1.20.1](#).

Threads of galvanised pipes and couplings shall be free of galvanising.

7. Manufacture

7.1 General

Except as otherwise indicated in the requisitions issued by the Engineering Company, seamless pipes shall be hot drawn. Seamless pipes shall be produced by the plug mill process. Pilger mill process is not acceptable.

Pipes 18" and over in diameter may be produced by rolling and longitudinal welding. This process shall never be used for diameters less than or equal to 8".

7.2 Fabrication of pipes

7.2.1 Seamless pipes

A seamless pipe shall be made in a single section. The length of the section shall lie within the limits stipulated in paragraph 5.2.

7.2.2 Longitudinally-welded pipes

The ERW welding process is not acceptable (the SAW process shall be used exclusively). The welds shall be made using an approved process. The weld seam shall also be welded on the inside if the welding process employed does not ensure full penetration, with the internal weld bead of uniform thickness, free of appreciable distortion. The weld seams shall be subjected to



full length (100 %) radiographic inspection, in accordance with the requirements of the **API 5L**, by the X-ray method onto radiographic films (Fluoroscopic inspection is not acceptable).

7.2.3 Jointers

Circular welds jointers to attain the minimum allowable length are not permitted unless authorised by the Engineering Company on a case by case basis.

7.3 Machining

7.3.1 Bevels

Any bevelling of the ends of the pipes shall be performed by machine or by flame-cutting. The process used shall assure the production of clean, square, burr-free bevel cuts. Wherever flame-cutting is employed, all oxides and traces of previously melted metal shall be removed by grinding or machining. For stainless steel pipe, cutting and bevelling shall be performed by mechanical means only; flame cutting is not permitted.

7.3.2 Weld reinforcement

The inside reinforcement of the weld must be ground-off at each end of the pipe. This machining shall be done over a length of 10 cm and must leave a gradual transition.

7.4 Repair of defects

Repairs of defects shall only be permitted if performed fully in accordance with the reference codes and standards.

8. Inspection

8.1 Quality control

The inspection and tests necessary to confirm that the products meet the requirements of the standards, specifications and requisition shall be carried out in the Vendor 's plant by personnel of the plant. This specially-qualified personnel shall be independent of the production department of the plant.

Products shall be guaranteed by an inspection certificate (conformity, material, test, etc.).

If the Vendor does not have the necessary means of examination, these tests may be carried out by an agency and at a place approved by the Engineering Company.

The Inspection Agency shall conduct inspections in the Vendor 's plant so as to make sure of the proper execution of the order and of the quality controls. It shall also witness final shop acceptance.

8.2 Acceptance

The Inspection Agency shall not grant any acceptance unless the certificates concerning the products submitted have been made available to it in advance.

In addition to checking the certificates, the Inspection Agency shall check the quantities presented and shall have checked, by sampling, the following characteristics:

- Any radiographic and ultra-sonic examinations reports
- Shapes and nominal dimension
- Dimensional tolerances
- Surface treatment and finish conditions
- Marking and finishing conditions.

This sampling shall cover at least 5 % of each of the items submitted for acceptance.

The non-conformity of any or all of the products submitted for acceptance may give rise:

- Either to a second submission after the products have been corrected, if this is possible
- Or to final rejection.

9. Documentation

9.1 Certificates of conformity

The Vendor shall submit certificates of conformity with the ASTM or API standards specified in the requisitions for pipes made of carbon steel, alloy steel, stainless steel or copper alloys.

9.2 Material certificates

The Vendor shall submit 3.1.B material certificates giving the results of the chemical analysis and of the mechanical tests carried out in accordance with the requirements of the reference codes and standards.

9.3 Pressure test certificates

The Vendor shall submit 3.1.B pressure test certificates.

10. Preparation for shipment

10.1 Marking

10.1.1 Identification of materials

The following information shall be marked by cold stamping on each length of pipe, for diameters 2" and over, and on two labels attached to each bundle of pipes, for diameters less than 2":

- Specification and grade of material
- Heat number
- Batch number.

However, pipes less than 3 mm thick shall not be marked by stamping but by etching.



10.1.2 Markings specific to the order

All lengths of pipes shall be identified by marking with colour marks and code numbers as and if specified in the order.

10.2 Protection

10.2.1 Carbon steel pipes

Threaded pipe ends shall be greased and protected by a female cap at one end and by the specified threaded coupling at the other end.

Bevelled carbon steel pipe ends shall be protected by a peel-off varnish.

10.2.2 Austenitic stainless steel pipes

All stainless steel pipes shall be protected against the risks of saline corrosion during cleaning, transport, fabrication, testing and/or storage. If paint is used to protect these pipes, it must not contain chlorides or other substances that might damage the stainless steel.

10.3 Packing

Sea-packing shall be used for all pieces of pipes; in the case of austenitic stainless steel, the packing must also be water-proof. It must meet the conditions of all stages of transport (rail, road, air and sea).