ASTM A333 Grade 6 Pipe

The ASTM A333 Grade 6 low alloy steel seamless pipes are intended for low temperature services with minimum design temperature -45°C [-50°F] requiring notch toughness. They are usually furnished in nominal pipe size (NPS) and nominal wall thickness with schedule numbers in accordance with ASME B36.

What is ASTM A333 Grade 6 Pipe?

ASTM A333 Grade 6 is a low temperature carbon steel pipe and is widely used in low temperature services such as the transportation of water, oil, and gas. It is designed to meet the requirements of various industrial sectors where high-quality pipes are needed for low-temperature services. The seamless pipe has excellent toughness, durability, and strength, making it suitable for various applications in industries such as oil and gas, petrochemical, and power generation. It has a minimum yield strength of 35,000 psi and a tensile strength of 60,000 psi. Additionally, it comes in different sizes and thicknesses to meet the specific requirements of each application.

ASTM A333 Grade 6 Seamless Pipe involved is similar to AISI 4032 low alloy steel. The ASTM A333 Grade 6 low alloy steel seamless pipes are intended for low temperature services with minimum design temperature -45°C [-50°F] requiring notch toughness. They are usually furnished in nominal pipe size (NPS) and nominal wall thickness with schedule numbers in accordance with ASME B36.10M. They are often connected with flanges of ASTM A350 LF2 and butt-weld pipe fittings of ASTM A420 WPL6. Seamless pipes made from ASTM A333 Gr.6 are primarily used for the construction of pipelines in the production of ethylene, propylene, urea, ammonia, and N-P-K compound fertilizer. They may be involved in the scrubber, purification, desulfurization and degreasing processes in oil & gas, petrochemical, coal and pharmaceutical industries. They can also be used for the fabrication of cryogenic equipment as well as refrigeration houses.

Raw material

What is ASTM A333 Grade 6?

ASTM A333 Grade 6 is a low temperature carbon steel pipe used in various industrial applications such as petrochemical plants, power plants, and refineries. It is characterized by its high tensile strength, good toughness, and excellent resistance to corrosion and cracking at low temperatures. ASTM A333 Grade 6 has a nominal carbon content of 0.30% and is designed for temperatures as low as -50°F (-45°C). It is also known as LTCS (low temperature carbon steel) pipe.

Mechanical properties of ASTM A333 Grade 6 Pipe

Properties	Data
Tensile strength, min, (MPa)	415 Mpa
Yield strength, min, (MPa)	240 Mpa
Elongation, min, (%), L/T	30/16.5

Seamless and Welded Steel Pipe size for Low-Temperature Service

- Outer Dimensions: 19.05mm – 114.3mm
- Wall Thickness: 2.0mm – 14 mm
- Length: max 16000mm

Chemical Compositions(%) of ASTM A333 Grade 6 Pipe

Compositions	Data
Carbon(max.)	0.30
Manganese	0.29-1.06
Phosphorus(max.)	0.025
Sulfur(max.)	0.025
Silicon	…
Nickel	…
Chromium	…
Other Elements	…

Impact requirements

the notched-bar impact properties of each set of three impact specimens, when tested at temperature specified shall be not less than the values prescribed.

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Size inspection

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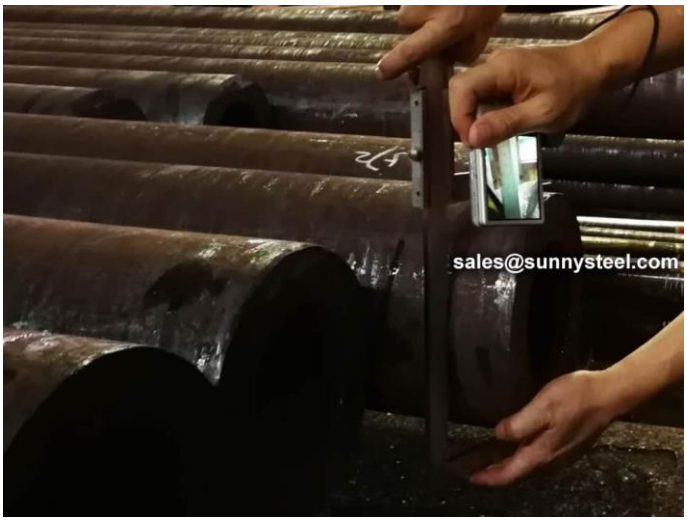


Scope

Several grades of ferritic steel are included. Some product sizes may not be available under this specification because heavier wall thicknesses have an adverse affect on low-temperature impact properties. The pipe shall be made by the seamless or welding process with the addition of no filler metal in the welding operation. All seamless and welded pipes shall be treated to control their microstructure. Tensile tests, impact tests, hydrostatic tests, and nondestructive electric tests shall be made in accordance to specified requirements.

ASTM A333 steel pipe production includes a series of visual surface imperfections to guarantee that they have been properly manufactured. ASTM A333 steel pipe shall be subject to rejection if surface imperfections acceptable are not scattered, but appear over a large area in excess of what is considered a workmanlike finish. The finished pipe shall be reasonably straight.

Surface inspection requirements

Surface imperfections that penetrate more than 12½ % of the nominal wall thickness or encroach on the minimum wall thickness shall be considered defects. ASTM A333 steel pipe with such defects shall be given one of the following dispositions:

- The defect may be removed by grinding provided that the remaining wall thickness is within specified limits.
- Repaired in accordance with the repair welding provisions.

- The section of pipe containing the defect may be cut off within the limits of requirements on length.
- The defective pipe may be rejected.

Referenced Documents

- A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- A671 Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures
- A999/A999M Specification for General Requirements for Alloy and Stainless Steel Pipe
- E23 Test Methods for Notched Bar Impact Testing of Metallic Materials

What Is The Difference Between A106 And A333 Pipes?

ASTM A333 Grade 6 pipe is a low-temperature carbon steel pipe that is typically used in applications where the pipe will be exposed to temperatures below -45°C. Because of its superior notch toughness, it performs well in cryogenic conditions and has demonstrated durability at temperatures as low as -452°F. This makes it the perfect candidate for applications where the pipe will be subject to cold temperatures throughout construction and/or operation.

A333 Seamless Pipe (ASME S/A-333) comes in nominal pipe sizes 1/4″ to 24″ O.D.

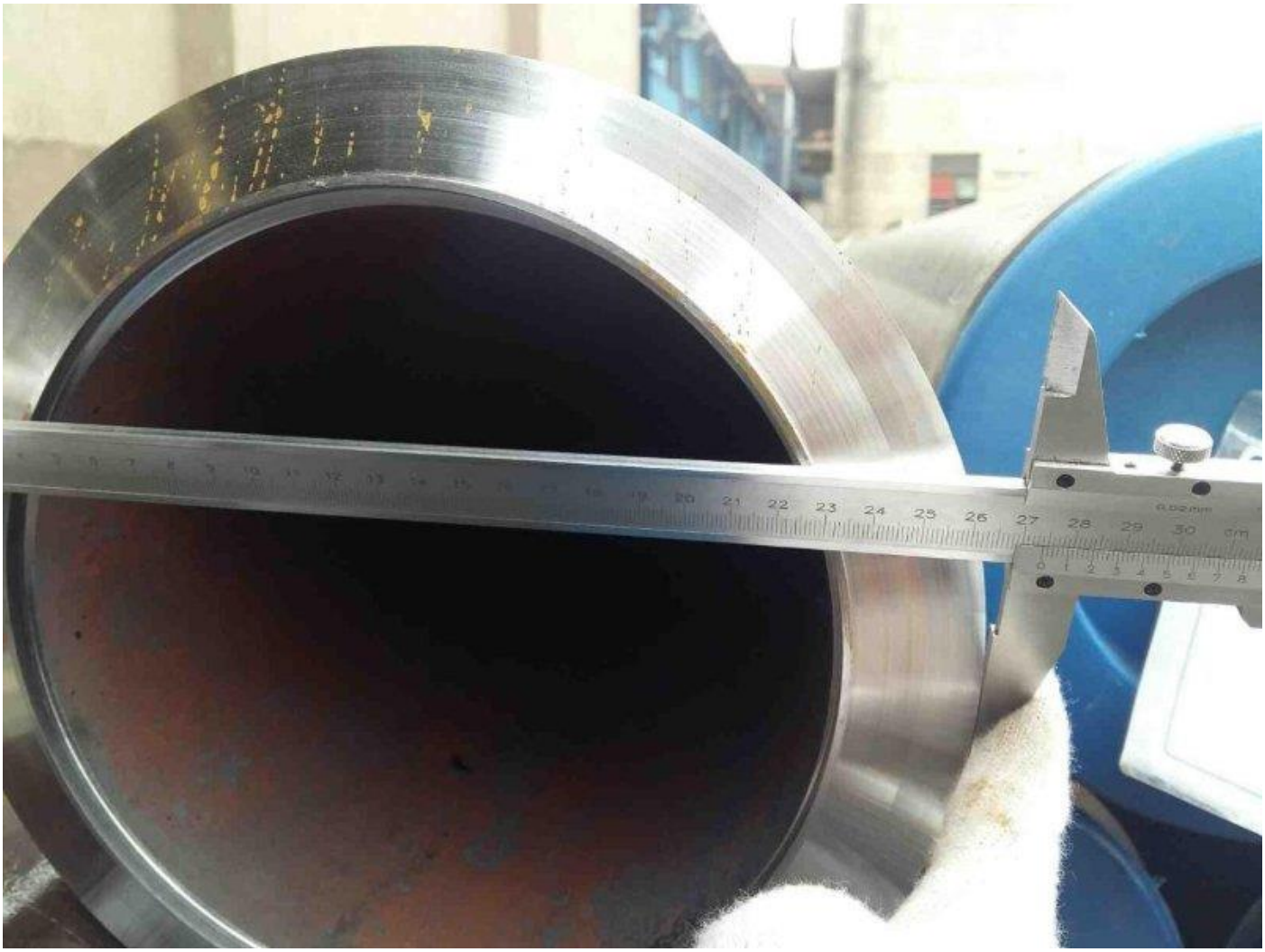
Pipe dimensions range from 1/2″ to 24″ O.D. for A333 welded pipes (ASME S/A-333).

Carbon and alloy steel pipe with a nominal (average) wall thickness intended for low temperature operation is covered by ASTM A333. There are several ferritic steel grades included in this standard. A106 GR. B Carbon Steel Seamless Pipes Some product sizes may not be available under this specification because heavier wall thicknesses harm low-temperature impact properties.

The difference between ASTM A333 and ASTM A106 is that ASTM A333 is a low-temperature carbon steel pipe that can be used as a structural pipe, while ASTM A106 is a non-structural carbon pipe that is used in high-temperature applications.

The ASTM A106 Gr.B carbon steel Pipe is valued for its high tensile strength and toughness, high oxidation resistance, and prolonged durability. Additionally, the Seamless Pressure ASTM A106 Pipe has wide applications in industries such as the gas and oil industry, water, heating, pipeline construction, and many others.

However, the ASTM A106 Gr.B carbon steel Pipe should be used only at temperatures less than 430°C, as exceeding this temperature can result in a reduction in its mechanical properties. The pipe is therefore not suitable for very high-temperature services.



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Acceptable for ASME Codes

ASME Codes	ASTM A333 Gr.6
B31.1	Yes
B31.3	Yes
B31.4	Yes
B31.5	Yes
31.8	Yes
Section I	Yes
Section III	Yes
Section VIII-1	Yes
Section XII	Yes
Section VIII-2	Yes

*The UNS number of ASTM A333 Gr.6 is K03006, with the P-number of 1.

Note: Mill test certificates will be issued according to EN10204.3 3.1 or 3.2