

ASTM A335 P5 ALLOY STEEL PIPE

Trade Name: 5 Chrome

Grade: P5

UNS #: K41545

Pipe: A335/SA335

Forged/Bored Pipe: A369/SA369

A335/SA335 P5 is a seamless ferritic alloy-steel pipe used for high-temperature applications. These pipes are versatile and can be used to transmit water, oil and natural gas.

Alloying elements

The addition of Molybdenum ("Moly") increases the strength of the steel and its elastic limit, enhance the steel resistance to wear, its impact qualities, and the hardenability. It also improves the resistance to softening, makes chromium steel less prone to embrittlement and prevents pitting.

Chromium, a key element also for stainless steel alloys, prevents steel oxidation at elevated temperatures and increases the resistance of steel to corrosion. It enhances the tensile, yield, and hardness properties of low-alloy pipes at room temperatures.

Other alloying elements, present in various degrees in pipes of all grades are:

- Aluminum: decreases oxygen from steelmaking
- Boron: used to produce fine grain size and enhance steel hardness
- Cobalt: used to enhance the steel's heat and wear-resistance
- Manganese: gives better steel hardenability
- Nickel: Enhances toughness, hardenability and impact strength at low temperatures
- Silicon: decreases oxygen, enhances hardenability and toughness
- Titanium: prevents precipitation of chromium carbide
- Tungsten: refines steel grain size and enhance the steel hardness, especially at high temperatures
- Vanadium: gives steel enhanced fatigue resistance

As mentioned, low-alloy steels have a total amount of alloying elements below 5%; high alloy steel has a higher percentage of these elements.

Each length of pipe shall be subjected to the hydrostatic test. Also, each pipe shall be examined by a non-destructive examination method in accordance to the required practices.

The range of ASTM A335 P5 pipe sizes that may be examined by each method shall be subjected to the limitations in the scope of the respective practice.

The different mechanical test requirements for pipes, namely, transverse or longitudinal tension test, flattening test, and hardness or bend test are presented. Both ends of each crate will indicate the order no., heat no., dimensions, weight and bundles or as requested.

ASTM A335 P5 PIPES CHEMICAL COMPOSITION:

GRADE	C,max	Mn	P, max	S, max	Si	Cr	Mo
P5	0.15	0.30-0.60	0.025	0.025	0.25-1.00	8.00-10.00	0.90-1.10

ASTM A335 P5 PIPES MACHANICAL PROPERTY:

Tensile Strength(min., psi): ksi 60; MPa 415;

Yield Strength(min., psi): ksi 30; MPa 205;

Outer Dimensions: 19.05mm – 610mm

Wall Thickness: 2.0mm – 70 mm

Length: max 16000mm

Steel grade: ASTM A335 P5

A335 p5 PIPE OUTER DIAMETER TOLERANCE

A335 Pipe NPS [DN]	Over		Under	
	in.	mm	in.	mm
1/8 to 1 1/2 / DN 6 to 40	1/64 (0.015)	1.6	1/64 (0.015)	0.4
Over 1 1/2 to 4 / DN 40 to 100	1/32 (0.031)	0.79	1/32 (0.031)	0.79
Over 4 to 8 / DN 100 to 200	1/16 (0.062)	1.59	1/32 (0.031)	0.79
Over 8 to 12 / DN 200 to 300	3/32 (0.093)	2.38	1/32 (0.031)	0.79

Over 12 / 300

+/- 1% of the specified outside diameter

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A335 p5 PIPE Wall Thickness

NPS [DN] Designator	Tolerance, % from Specified	
	Over	Under
1/8 to 2 1/2 [6 to 65] incl., all t/D ratios	20.0%	12.5%
Above 2 1/2 [65], t/D < or = 5%	22.5%	12.5%
Above 2 1/2 [65], t/D > 5%	15.0%	12.5%
<i>(t = Specified Wall Thickness; D = Specified Outside Diameter)</i>		

Packing:

Bare packing/bundle packing/crate packing/wooden protection at the both sides of tubes and suitably protected for sea-worthy delivery or as requested.

Inspection and Test:

Chemical Composition Inspection, Mechanical Properties Test(Tensile Strength, Yield Strength, Elongation, Flaring, Flattening, Bending, Hardness, Impact Test), Surface and Dimension Test, Non-destructive Test, Hydrostatic Test.

Surface treatment:

Oil-dip, Varnish, Passivation,
Both ends of each crate will indicate the order no., heat no., dimensions, weight and bundles or as requested.

Material & Manufacture

Pipe may be either hot finished or cold drawn with the finishing heat treatment noted below.

Heat Treatment

A / N+T

N+T / Q+T

N+T

Mechanical Tests Specified

Transverse or Longitudinal Tension Test and Flattening Test, Hardness Test, or Bend Test

For material heat treated in a batch-type furnace, tests shall be made on 5% of the pipe from each treated lot. For small lots, at least one pipe shall be tested.

For material heat treated by the continuous process, tests shall be made on a sufficient number of pipe to constitute 5% of the lot, but in no case less than 2 pipe.

Notes for Bend Test:

For pipe whose diameter exceeds NPS 25 and whose diameter to wall thickness ratio is 7.0 or less shall be subjected to the bend test instead of the flattening test.

Other pipe whose diameter equals or exceeds NPS 10 may be given the bend test in place of the flattening test subject to the approval of the purchaser.

The bend test specimens shall be bent at room temperature through 180° without cracking on the outside of the bent portion.

