AMERICAN PIPING PRODUCTS

A/SA333
LOW TEMP PIPE OVERVIEW

ASTM A333 and **ASME SA333** are standard specifications for seamless steel pipe intended for use at low temperatures (cryogenic and sub-zero service). These specs cover several grades of carbon and alloy steel pipe designed to maintain toughness and ductility when exposed to cold environments.

APP STOCKS A FULL RANGE OF A/SA333 PIPE IN:

- Grades 1, 3 and 6
- NPS ¼" to 24" OD
- Schedules STD through XXH
- Wall Thickness up to 5.500" Thick
- A671 Welded Alternative Available

COMMON GRADES

GRADE	MINIMUM IMPACT TEST TEMP	NOTES
GRADE 1	–50°F (–45°C)	Once common, increasingly difficult to find
GRADE 3	–150°F (–100°C)	Nickel steel, available but rare
GRADE 6	–50°F (–45°C)	Most common grade available in USA

OUR VALUE-ADDED SERVICES

- Saw & Torch Cutting, Miter Cutting, Pipe Profiling
- Pipe Beveling, Roll-Grooving & Threading
- ID & OD Cleaning
- Coating (FBE, Galvanizing & Prime/Paint)
- Boring, Honing, OD Turning, Heat Treating & Plating
- In-House or 3rd Party Testing

* This information is provided for quick references, always consult applicable ASME, ASTM and Manufacture's standards.

1.636.536.1775 amerpipe.com sales@amerpipe.com

Scan here for more info

AMERICAN PIPING PRODUCTS

A/SA333
LOW TEMP PIPE OVERVIEW

KEY CHARACTERISTICS

The defining feature of A/SA333 pipe is its ability to resist brittle fracture at low temperatures. Regular carbon steel becomes brittle and can crack suddenly when cold, so A333 pipe is manufactured with controlled chemistry and treatment to pass Charpy impact testing at specified low temperatures, confirming the material won't fail catastrophically in cold service. Most grades are only available in seamless, and they conform to standard ASME/ANSI pipe dimensions.

COMMON APPLICATIONS

- **LNG (LIQUEFIED NATURAL GAS) PLANTS** - transport and storage of gas chilled to – 260°F
- **CRYOGENIC GAS PROCESSING FACILITIES** - air separation units producing liquid oxygen, nitrogen, and argon
- **REFRIGERATION PIPELINES** - amonia and CO_2 refrigerant systems in industrial cold storage
- **PETROCHEMICAL PLANTS** - cold fractionation and ethylene/propylene processing
- **COLD STORAGE FACILITIES** - industrial freezer and refrigerated warehouse piping
- **OFFSHORE AND ARCTIC PIPELINES** - environments subject to extreme ambient cold
- **PHARMACEUTICAL AND FOOD PROCESSING** - cryogenic freezing systems
- **RESEARCH AND LABORATORY FACILITIES** - cryogenic fluid distribution

Unless noted, A/SA333 pipe will typically be heat treated one of the following methods:

- Normalized by heating to a uniform temperature of not less then 1500°F and cool in air or in the cooling chamber of an atmosphere controlled furnace.

- Quenched and Tempered to a uniform temperature of 1475°F (+/- 25°F); hold at this temperature for a minimum time in the ratio of 1 h/in. of thickness, but in no case less than 15 min; quench by immersion in circulating water. Reheat until the pipe attains a uniform temperature within the range from 1050-1125 °F; hold at this temperature for a minimum time in the ratio of 1 h/in. of thickness, but in no case less than 15 min; cool in air or water quench at a rate no less than 300°F/h.

* This information is provided for quick references, always consult applicable ASME, ASTM and Manufacture's standards.

1.636.536.1775 amerpipe.com sales@amerpipe.com

Scan here for more info

AMERICAN PIPING PRODUCTS

A/SA333
LOW TEMP PIPE OVERVIEW

TENSILE REQUIREMENTS

	GRADE 1		GRADE 3		GRADE 6	
	psi	MPa	psi	MPa	psi	MPa
TENSILE STRENGTH,MIN	55,000	380	65,000	450	60,000	415
YIELD STRENGTH, MIN	30,000	205	35,000	240	35,000	240

CHEMICAL REQUIREMENTS

ELEMENT	GRADE 1	GRADE 3	GRADE 6
CARBON, MAX	0.30	0.19	0.30
MANGANESE	0.40 - 1.06	0.31 - 1.64	0.29 - 1.06
PHOSPHOROUS, MAX	0.025	0.025	0.025
SULFUR, MAX	0.025	0.025	0.025
SILICON		0.18 - 0.37	0.10 min
NICKEL		3.18 - 3.82	

For each reduction of 0.01% carbon below 0.30%, an increase of 0.05% manganese above 1.06% would be permitted to a maximum of 1.35% manganese. When Grade 6 is ordered under this specification, supplying an alloy grade that specifically requires the addition of any element other than those listed for the ordered grade is not permitted. However, the addition of elements required for the deoxidation of the steel is permitted.

* This information is provided for quick references, always consult applicable ASME, ASTM and Manufacture's standards.

1.636.536.1775 amerpipe.com sales@amerpipe.com

Scan here for more info

AMERICAN PIPING PRODUCTS

A/SA333
LOW TEMP PIPE OVERVIEW

IMPACT REQUIREMENTS

For Grades 1, 3 and 6, the notched-bar impact properties of each set of three impact specimens, including specimens for the welded joint in welded pipe with wall thicknesses of 0.120 in. [3 mm] and larger, shall not be less than the values prescribed:

SIZE OF SPECIIMEN, MIN	MINIMUM AVERAGE NOTCHED BAR IMPACT VALUE OF EACH SET OF THREE SPECIMENS		MINIMUM NOTCHED BAR IMPACT VALUE OF ONE SPECIMEN ONLY OF A SET		IMPACT TEMPERATURE		
	FT-LBF	J	FT-LBF	J	GRADE	MIN IMPACT TEST TEMP	
10 BY 10	13	18	10	14		F	C
10 BY 7.5	10	14	8	11	1	-50	-45
10 BY 6.67	9	12	7	9	3	-150	-100
10 BY 5	7	9	5	7	6	-50	-45
10 BY 3.33	5	7	3	4			
10 BY 2.5	4	5	3	4			

* This information is provided for quick references, always consult applicable ASME, ASTM and Manufacture's standards.

1.636.536.1775 amerpipe.com sales@amerpipe.com

Scan here for more info