

# ASTM - A928/A928M

## Standard Specification for Ferritic/Austenitic (Duplex) Stainless Steel Pipe Electric Fusion Welded with Addition of Filler Metal

This specification covers electric-fusion-welded steel pipe suitable for corrosive service.

Five classes of pipe are covered as follows:

Class 1— Pipe shall be double welded by processes using filler metal in all passes and shall be radiographed completely.

Class 2— Pipe shall be double welded by processes using filler metal in all passes. No radiograph is required.

Class 3— Pipe shall be single welded by processes using filler metal in all passes and shall be radiographed completely.

Class 4— Same as Class 3, except that the weld pass exposed to the inside pipe surface is permitted to be made without the addition of filler metal.

Class 5— Pipe shall be double welded by processes using filler metal in all passes and shall be spot radiographed.

### ❖ Heat Treatment :-

1. Unless otherwise stated in the order, heat treatment shall be performed after welding and in accordance with the requirements of Table 1.
2. If the purchaser desires pipe without heat treatment subsequent to welding, the purchase order shall specify the following condition:
  - i. No final heat treatment of pipe fabricated of plate that has been heat treated as required by Table 2 for the particular grade. Each pipe supplied under this requirement shall be stenciled with the suffix “HT-O.”

**Table 1**

UNS Designation	Grade <sup>A</sup>	Temperature, °F [°C]	Quench
S31200	...	1920–2010[1050–1100]	rapid cooling in water
S31260	...	1870–2010[1020–1100]	rapid cooling in water
S31500	...	1800–1900[980–1040]	rapid cooling in air or water
S31803	...	1870–2010[1020–1100]	rapid cooling in air or water
S32003	...	1850–2010[1010–1100]	rapid cooling in air or water
S32202	...	1870–1975[1020–1080]	rapid cooling in air or water
S32205	2205	1870–2010[1020–1100]	rapid cooling in air or water
S32304	2304	1700–1920[925–1050]	rapid cooling in air or water
S32506	...	1870–2050[1020–1120]	rapid cooling in air or water
S32550	255	1900 [ 1040], min	rapid cooling in air or water
S32750	2507	1880–2060[1025–1125]	rapid cooling in air or water
S32900	329 <sup>B</sup>	1700–1750[925–955]	rapid cooling in air or water
S32950	...	1820–1880[990–1025]	rapid cooling in air or water
S32760	...	2010–2085[1100–1140]	rapid cooling in air or water
S32520	...	1975–2050[1080–1120]	rapid cooling in air or water
S81921	...	1760–2010[960–1100]	rapid cooling in air or water
S82121	...	1760–2010[960–1100]	rapid cooling in air or water

<sup>A</sup> Except as indicated, common name, not a trademark, widely used, not associated with any one producer.

<sup>B</sup> A grade designation originally assigned by the American Iron and Steel Institute (AISI).

### ❖ Chemical Composition :-

1. The chemical composition of the plate shall conform to the requirements of the applicable specification and grade listed in Table 2

❖ **Tensile Requirements :-**

1. The plate used in making the pipe shall conform to the requirements as to tensile properties of the applicable specifications listed in Table 2.

**Table 2**

UNS Designation	Grade	ASTM Plate Specification No. & Grade
S31200	...	A240 S31200
S31260	...	A240 S31260
S31500	...	A240 S31500
S31803	...	A240 S31803
S32003	...	A240 S32003
S32202		A240 S32202
S32205	2205	A240 S32205
S32304	2304	A240 S32304
S32506	...	A240 S32506
S32550	255	A240 S32550
S32750	2507	A240 S32750
S32900	329	A 240 type 329
S32950	...	A240 S32950
S32760	...	A240 S32760
S32520	...	A240 S32520
S81921	...	A240 S81921
S82121	...	A240 S82121

❖ **Mechanical Tests :-**

1. Transverse Tension Test.
2. Transverse Guided-Bend Test.
3. Non-destructive Test—Each length of pipe shall be subjected to a hydrostatic test or, with the approval of the purchaser, each length of pipe having a wall thickness up through 0.165 in. (4.2 mm) shall be subjected to a non-destructive electric test as defined follow:
  - i. Hydrostatic Test— Each length of pipe shall be subjected to a hydrostatic test in accordance with Specification A999/A999M.
  - ii. Non-destructive Electric Test—Each length of pipe shall be subjected to a non-destructive electric test in accordance with Practice E426.

❖ **Radiographic Examination :-**

1. For Classes 1, 3, and 4 pipe, all welded joints shall be examined completely by radiography.
2. For Class 5 pipe, the welded joints shall be spot radiographed to the extent of not less than 12 in. [300 mm] of radiograph per 50 ft [15 m] of weld.
3. For Classes 1, 3, and 4 pipe, radiographic examination shall be in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII, latest edition, Paragraph UW-51.
4. For Class 5 pipe, radiographic examination shall be in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, latest edition, Paragraph UW-52.

❖ **Supplementary Tests :-**

1. Tension and Bend Tests.
2. Penetration Oil and Powder Examination.

**Keyword**

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