

ASTM B673 / ASME SB673

SPECIFICATION FOR UNS N08904, UNS N08925, AND N08926 WELDED PIPE

This specification covers UNS N08904, UNS N08925, and UNS N08926 welded pipe for general corrosion applications.

A. Classification :-

1. Class 1— Welded, cold worked, solution treated, and nondestructively tested in accordance with Point D.3.v.
2. Class 2— Welded, cold worked, solution treated, and nondestructively tested in accordance with Point D.3.vi.
3. Class 3— As welded, solution treated, and nondestructively tested in accordance with Point D.3.v.

B. Manufacture :-

1. Pipe shall be made from flat-rolled alloy by an automatic welding process with no addition of filler metal.
2. Subsequent to welding and prior to final solution treatment, Class 1 and Class 2 material shall be cold worked either in both weld and base metal or in weld metal only.

NOTE 1 — The recommended heat treatment shall consist of heating to a temperature of 1985 to 2100°F (1085 to 1150°C) for UNS N08904 or 2010 to 2100°F (1100 to 1150°C) for UNS N08925 and UNS N08926, followed by quenching in water or rapid cooling by other means.

C. Chemical Composition :-

The material shall conform to the requirements as to chemical composition prescribed in Table 1.

Table 1

Element	UNS N08904	UNS N08925	UNS N08926	Product (Check) Analysis Variations, under min or over max of the Specified Limit of Element, %	
				UNS N08904, UNS N08925	UNS N08926
Carbon, max	0.02	0.02	0.02	0.005	0.005
Manganese, max	2.0	1.0	2.0	0.04	0.04
Phosphorus, max	0.045	0.045	0.03	0.005	0.005
Sulfur, max	0.035	0.03	0.01	0.005	0.003
Silicon, max	1.0	0.5	0.5	0.05	0.03
Nickel	23.0-28.0	24.0-26.0	24.00-26.00	0.2	0.25
Chromium	19.0-23.0	19.0-21.0	19.00-21.00	0.2	0.25
Molybdenum	4.0-5.0	6.0-7.0	6.0-7.0	0.1	0.15
Copper	1.0-2.0	0.8-1.5	0.5-1.5	0.1	0.04
Nitrogen	...	0.1-0.2	0.15-0.25	...	0.01
Iron ^A	balance	balance	balance

^A Iron shall be determined arithmetically by difference.

D. Mechanical and Other Requirements :-

1. Mechanical Properties— The material shall conform to the mechanical properties prescribed in Table 2.

Table 2

Alloy	Temper	Tensile Strength, min, psi (Mpa)	Yield Strength, 0.2% offset, min, psi (MPa)	Elongation in 2 in. or 50 mm, (or 4D) , min, %
UNS N08904	solution annealed	71 (490)	31 (220)	35
UNS N08925	solution annealed	87 (600)	43 (300)	40
UNS N08926	solution annealed	94 (650)	43 (295)	35

2. Flattening Test—

- i. A section of pipe not less than 4 in. (102 mm) in length shall be capable of withstanding, without through wall cracking, flattening under a load applied gradually at room temperature until the distance between the platens is five times the wall thickness.

3. Nondestructive Tests:

i. Hydrostatic Test—

- a. Each piece shall be tested at a pressure calculated by the following equation, but such pressure shall not exceed 1000 psi (6.9 MPa):

$$P = 2St / D$$

or

$$S = PD/2t$$

where: P = hydrostatic test pressure, psi (or MPa),

S = allowable fiber stress for material in the condition furnished, as follows: Solution treated, 20000 psi (138 MPa),

t = specified wall thickness, in. (or mm), and

D = specified outside diameter, in. (or mm).

- b. The test pressure shall be held for a minimum of 5 s.

ii. Pneumatic (Air Underwater) Test—

- a. Each piece shall be tested at a pressure of 150 psi (1 .05 MPa).
- b. The test pressure shall be held for a minimum of 5 s.

iii. Electric Test —

- a. Each pipe shall be tested with an electric test in accordance with either Practice E 213, E 571 , or E 426.
- b. For eddy-current testing, the calibration pipe shall contain, at the option of the manufacturer, any one of the following discontinuities to establish a minimum sensitivity level for rejection.
 - I. Drilled Hole
 - II. Transverse Tangential Notch
 - III. Longitudinal Notch

iv. Ultrasonic Testing—

- a. For ultrasonic testing, the longitudinal calibration reference notches shall be at the option of the manufacturer, any one of the three common notch shapes in accordance with Practice E 213.

- v. Class 1 and Class 3 — Each piece in each lot shall be subjected to one of the following four tests: hydrostatic, pneumatic (air underwater), eddy-current, or ultrasonic.

- vi. Class 2 — Each piece in each lot shall be subjected to a leak test and an electric test as follows:

- a. Leak Test—Hydrostatic or pneumatic (air underwater).

- b. Electric Test — Eddy-current or ultrasonic.
- vii. The manufacturer shall have the option to test Class 1 or Class 2 and select the nondestructive test methods, if not specified by the purchaser.

E. Length :-

Variations from the specified length shall not exceed the amounts prescribed in Table 3.

Table 3 ^A

Outside Diameter, in. (mm)	Cut Length, in. (mm)	
	Over	Under
Under 2 (50.8)	1/8 (3.2)	0
2 (50.8) and over	3/16 (4.8)	0

^A These permissible variations in length apply to pipe before bending. They apply to cut lengths up to and including 24 ft (7.3 m). For lengths over 24 ft, an additional over-tolerance of 1/8 in. (3.2 mm) for each 10 ft (3.0 m) or fraction thereof shall be permissible up to a maximum additional over-tolerance of 1/2 in. (12.7 mm).

F. Test Methods :-

Determine the chemical composition, mechanical, and other properties of the material as enumerated in this specification, in case of disagreement, in accordance with the following methods:

<u>Test</u>	<u>ASTM Designation</u>
Chemical analysis	E 354
Tension	E 8
Rounding procedure	E 29

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