ASTM A312/A312M-08 Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

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Description

This specification covers standard specification for seamless, straight-seam welded, and cold worked welded austenitic stainless steel pipe intended for high-temperature and general corrosive service.

Several grades of steel shall conform to the required chemical composition for carbon, manganese, phosphorus, sulfur, silicon, chromium, nickel, molybdenum, titanium, columbium, tantalum, nitrogen, vanadium, copper, cerium, boron, aluminum, and others. All pipes shall be furnished in the heat-treated condition in accordance with the required heat treating temperature and cooling/testing requirements. Tensile properties of the material shall conform to the prescribed tensile strength and yield strength.

The steel pipe shall undergo mechanical tests such as transverse or longitudinal tension test and flattening test. Grain size determination and weld decay tests shall be performed. Each pipe shall also be subjected to the nondestructive electric test or the hydrostatic test.

Scope

This specification covers seamless, straight-seam welded, and heavily cold worked welded austenitic stainless steel pipe intended for high-temperature and general corrosive service.

Note 1—When the impact test criterion for a low-temperature service would be 15 ft·lbf [20 J] energy absorption or 15 mils [0.38 mm] lateral expansion, some of the austenitic stainless steel grades covered by this specification are accepted by certain pressure vessel or piping codes without the necessity of making the actual test.

For example, Grades TP304, TP304L, and TP347 are accepted by the ASME Pressure Vessel Code, Section VIII Division 1, and by the Chemical Plant and Refinery Piping Code, ANSI B31.3, for service at temperatures as low as –425 °F [–250 °C] without qualification by impact tests. Other AISI stainless steel grades are usually accepted for service temperatures as low as –325 °F [–200 °C] without impact testing.

Impact testing may, under certain circumstances, be required. For example, materials with chromium or nickel content outside the AISI ranges, and for material with carbon content exceeding 0.10 %, are required to be impact tested under the rules of ASME Section VIII Division 1 when service temperatures are lower than –50 °F [–45 °C].

Grades TP304H, TP309H, TP309HCb, TP310H, TP310HCb, TP316H, TP321H, TP347H, and TP348H are modifications of Grades TP304, TP309Cb, TP309S, TP310Cb, TP310S, TP316, TP321, TP347, and TP348, and are intended for service at temperatures where creep and stress rupture properties are important.

Optional supplementary requirements are provided for pipe where a greater degree of testing is desired. These supplementary requirements call for additional tests to be made and, when desired, it is permitted to specify in the order one or more of these supplementary requirements.

Table X1.1 lists the standardized dimensions of welded and seamless stainless steel pipe as shown in ANSI B36.19. These dimensions are also applicable to heavily cold worked pipe. Pipe having other dimensions is permitted to be ordered and furnished provided such pipe complies with all other requirements of this specification.

Grades TP321 and TP321H have lower strength requirements for pipe manufactured by the seamless process in nominal wall thicknesses greater than 3/8 in. [9.5 mm].

The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification. The inch-pound units shall apply unless the “M” designation of this specification is specified in the order.

Note 2—The dimensionless designator NPS (nominal pipe size) has been substituted in this standard for such traditional terms as “nominal diameter,” “size,” and “nominal size.”

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