

Customary Fitting, Forging, Plate and Bar Materials used with Pipe

1. Introduction

- 1.1 This bulletin is provided as a guide in identifying the ASTM materials for pipe fittings, forgings, and plate commonly considered compatible with the type and grade of pipe being used. The table is organized by ASTM pipe material in ascending order. This bulletin covers only pipe materials. Tube has not been included. If more than one specification and grade is applicable, a "/" is used as a separation. The description provides the nominal chemical composition.
- 1.2 Compatibility is determined by chemical composition, primarily defined by the Unified Numbering System (UNS) number. The Unified Numbering System for metals and alloys is a uniform system of identifying the metals and alloys in use by industry today. In cases where there is no nominal grade defined by the specification, the specification number is followed by the UNS number.
- 1.3 All specifications and grades must be verified by referencing the most current addenda of the ASTM or ASME specification. Consult the material tables of the applicable code to determine if the listed specification is acceptable. This document must not be interpreted as approval to use combinations for particular applications. Review of applicable codes and standards as well as sound engineering judgment are necessary in determining the best material for a given application and generally the responsibility of the engineer of record.
- 1.4 This bulletin references many different specifications that are subject to revisions and additions, therefore all listings in this bulletin are based on references published on or before Sept. 15, 2003.

2. Forged Materials

- 2.1 Most codes caution that consideration should be given to the possibility of graphite formation under prolonged exposure of carbon steel to temperatures above 800 Deg F. (427 Deg C.).

- 2.2 There are some alloys that do not currently have a corresponding forged fitting specification. It is the designer's responsibility to consult applicable codes, specifications, and use sound engineering judgment to determine if the corresponding plate or bar specification may be used as a raw material to machine or form the required fittings for the application.

3. ASME verses ASTM

- 3.1 All materials have been defined by the American Society for Material Testing (ASTM) specification. ASTM material specifications prefix of "A" for ferrous materials and "B" for non ferrous materials. Many of the ASTM specifications have been adopted by the American Society of Mechanical Engineers (ASME) specifications. ASME material specifications have a prefix of "SA" for ferrous materials and "SB" for non ferrous materials. Consult ASME Boiler Vessel Code, Section 2, parts A and B to determine if there are any additional material specification requirements.

4. Trade Names

- 4.1 The trade names column lists most, but not all, of the available trade names for a given chemical composition. These names are considered the more commonly used within the piping industry.

5. References

- ASME 2003 Boiler & Pressure Vessel Code Section 2 Part A Ferrous Material Specifications
- ASME 2003 Boiler & Pressure Vessel Code Section 2 Part B Nonferrous Material Specifications
- ASME B31.1-2002 Power Piping
- ASME B31.3-2002 Process Piping
- ASTM Section I Volume 01.01- Steel Piping, Tubing, Fittings
- ASTM Section I Volume 01.05- Steel Bars, Forgings, Bearing, Chain, Spring
- ASTM Section II Volume 02.01- Copper and Copper Alloys
- ASTM Section II Volume 02.02- Aluminum and Magnesium Alloys
- ASTM Section II Volume 02.04- Metals: Nickel, Cobalt, Lead, Tin, Zinc, Cadmium, Precious, Refractive, Refractory Metals and Alloys
- ASME Section IV, Table QW/QB-422

The worksheets in TB-9 require Microsoft Excel version 2000 or later.