B16 Case 2
ASME B16.34 Table 1 Unlisted Material ASME B16.34 Valves - Flanged, Threaded, and Welding End

Inquiry: Can Group (1), 2, and 3 forging, casting, plate, bar, seamless pipe, or tube materials or Group 4 bolting materials not listed in Table #1 of ASME B16.34 be used for construction of Standard Class, Special Class and Limited Class threaded, welded, and flanged end valves that in all respects conform to the construction requirements of ASME B16.34?

Reply: Yes, providing the following rules are met for the unlisted material:

(a) The material specification shall be listed in Part A, Ferrous Material Specifications or Part B, Nonferrous Specifications of ASME Section II. Boiler and Pressure Vessel Code. An ASTM material equal to the listed ASME SA or SB material can also be used.

(b) The following materials properties are listed in Part D, Mechanical Properties of ASME Section II, Boiler and Pressure Vessel Code for either Section I or Section VIII, Division 1 construction:
   1. Allowable Stress $S$ @ temperature
   2. Ultimate Tensile stress $S_u$ @ temperature
   3. Yield stress $S_y$ @ temperature

   When strength data is listed as size dependent (thickness, diameter, etc.) the lesser strength value shall be used for B16.34 pressure-temperature rating determination. Also data that indicates that allowable stress at temperature exceeds 2/3 yield strength at temperature of the material shall not be used for B16.34 pressure-temperature rating determination (see B-2.1 (e) of B16.34).

   Applicable maximum temperature limits and notes for the unlisted material as listed in Part D of Section II shall be included with the developed pressure-temperature ratings.

   (c) The data in (b) is available from an ASME Code Case or directly from the ASME Section II, Subcommittee on Materials if not listed in Part D of ASME Section II.

   (d) Allowable stress (S), tensile strength (Su) and yield strength (Sy) values listed in ASME Section II, Part D, and permitted for Section III, Class 2 or Class 3 valve construction may be used for a material not permitted for either Section I or Section VIII, Division 1 construction. Applicable maximum temperature limit and notes for the material as listed in Section II Part D shall be included with the valve’s developed pressure-temperature table.

   (e) The Standard Class rules of B-2, Appendix B of ASME B16.34 shall be used to determine the Selected Stress $S_1$ and pressure-temperature rating. Ceiling pressures shall be applied as part of this process.

   (f) The Special Class rules of B-3, Appendix B of ASME B16.34 shall be used to determine the Selected Stress $S_2$ and pressure-temperature rating. Flanged end valves shall not be Special Class. Ceiling pressures shall be applied as part of this process.

NOTES:
(1) ASME B16.34 Group numbered materials are identified as follows:
   (a) Group 1-Carbon, carbon alloy and low alloy ferrous steels including those identified with a UNS Designation Kxxxxx.
   (b) Group 2-Ferrous stainless steel materials including martensitic, ferritic, austenitic and duplex alloys including those identified with a UNS Designation Sxxxxx.
   (c) Group 3-Nonferrous nickel alloys including those identified with a UNS Designation Nxxxxx.
   (d) Group 4-Ferrous and nonferrous bolting alloys including those identified with a UNS Designation UNS Gxxxxx, Kxxxxx, Sxxxxx, or Nxxxxx.
(g) The Limited Class rules of Appendix V of B16.34 apply but the Special Class ratings as determined from (f) above shall be used to determine the Limited Class pressure-temperature ratings. Limited Class valves are limited to NPS 2.5 and smaller with threaded or welding ends. Flanged end valves shall not be Limited Class.

(h) For Standard, Special or Limited Intermediate Class Designation valves the rules of B-4, Appendix B of ASME B16.34 shall be used to determine the pressure-temperature ratings based on Standard, Special or Limited Class pressure-temperatures as determined from (e), (f) or (g) above.

(i) Unlisted bolting materials shall satisfy the valve joint rules of Section 6.4 of ASME B16.34 and support the full pressure-temperature rating of the valve. Unlisted bolting materials shall meet the general and specific notes of Table 1 of B16.34 as applicable to Group 4 materials.

(j) If the “unlisted material” has chemistry and/or mechanical properties similar to an existing Material Group of B16.34 and if the developed pressure-temperature rating equals or exceeds that of the existing Material Group at each temperature, the manufacturer shall make a recommendation as to the assignment of the unlisted material into that Material Group and the pressure-temperature rating of that Material Group shall apply after validation by B16 Subcommittee N. If no existing Material Group provides a match, a new material group shall be proposed to B16 Subcommittee N.

(k) Validation of B16.34 Table 1 unlisted material pressure-temperature rating, Material Group assignment, or new Material Group number shall be performed by the ASME B16 SC-N Valve Committee.

(l) The valve nameplate shall reference the B16 Case specific to the unlisted material pressure-temperature rating.

(m) All correspondence on this process shall be submitted to ASME as noted on page ix of B16.34-2013. As an alternate correspondence can be submitted by email to SecretaryB16@asme.org.