Interpretations No. 4 to ANSI/ASME B31.1

(This supplement is not part of ANSI/ASME B31.1 or its Addenda and is included for information only.)

It has been agreed to publish Interpretations issued by the B31 Committee concerning B31.1 as part of the subscription service. This supplement includes Interpretations concerning B31.1 issued between July 1, 1983 and December 31, 1983. They have been assigned Interpretation numbers in chronological order. Each Interpretation applies to the latest Edition or Addenda at the time of issuance of the Interpretation or the Edition or Addenda stated in the reply. Subsequent revisions to the Code may have superseded the reply.

These replies are taken verbatim from the original letters, except for a few typographical and editorial corrections made for the purpose of improved clarity. In some instances, a review of the Interpretation revealed a need for corrections of a technical nature. In these cases, a revised reply, bearing the original Interpretation Number with the suffix R, is presented.

ASME procedures provide for reconsideration of these Interpretations when or if additional information is available which the inquirer believes might affect the Interpretation. Further, persons aggrieved by an Interpretation may appeal to the cognizant ASME committee or subcommittee. As stated in the Statement of Policy in the Code documents, ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

B31.1

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[1]Asterisk indicates reply has been revised one or more times.

Interpretation: 1-45R

Subject: B31.1 and B31.3, Synfuel Plant Piping

Dated Issued: October 26, 1983

File: 1541R (83-034)

Question: What section of the ASME Code for Pressure Piping, B31, may be used for materials, design, fabrication, assembly, erection, examination, inspection, and test of piping within coal based synfuels plants for the production of electric power or industrial steam, or both, primarily for use within the plant?

Reply: ANSI/ASME B31.1 applies to piping associated with power boilers and subject to the ASME Boiler and Pressure Vessel Code, Section I inspection and stamping [see B31.1, Para. 100.1 and Figs. 100.1.2 (A) and (B)].

Either ANSI/ASME B31.1 or B31.3 is applicable to other piping associated with the production or distribution of industrial steam or the production of electric power primarily for use within the plant (see B31.3, Fig. 300.1.1).

ANSI/ASME B31.3 applies to all other piping primarily for use within the plant.

Interpretation: 2-10R

Subject: Appendix II Nonmandatory Rules for the Design of Safety Valve Installations

Date Issued: July 25, 1983

File: 1573R

Question: In Appendix II of ANSI/ASME B31.1, what gas parameters a and b are to be used for dry air and freon 114 in the following equation, taken from Para. 2.2.1(1):

$$P_1 = \frac{W_1}{A_1} \frac{(b - 1)}{b} \sqrt{\frac{2\,(h_o - a)J}{g_c\,(2b - 1)}}$$

Reply: The equation in question is based on an empirical formula relating to energy and steam properties near the saturation region at sonic velocity. It would not be appropriate to use for dry air or freon 114.

Interpretation: 4-1

Subject: Qualification of Welding Procedures

Date Issued: July 13, 1983

File: 1606 (83-018)

Question (1): Can ASTM A 356 Grades 8 and 9 materials not currently listed in Appendix A, Table A-2 of ANSI/ASME B31.1 be treated as P-No. 4 materials as permitted by Para. 127.5.1?

Reply (1): No. Paragraph 127.5.1 applies only to materials listed in Appendix A for which no P-Number has been assigned by the ASME Boiler and Pressure Vessel Code, Section IX.

Question (2): What is the installer's responsibility for installing/welding ASTM A 356 Grades 8 and 9?

Reply (2): The installer must qualify a WPS in accordance with the ASME Boiler and Pressure Vessel Code, Section IX. However, the ANSI/ASME B31.1 Code does not authorize the use of ASTM A 356 Grades 8 and 9 for piping within the scope of that Code.

Interpretation: 4-2

Subject: Double Valving

Date Issued: July 13, 1983

File: 1665 (83-018)

Question: Is double valving of a channel drain on a feedwater heater required by the ANSI/ASME B31.1 Power Piping Code?

Reply: No. A single drain valve satisfies Code requirements for this service.

Interpretation: 4-3

Subject: Allowable Stresses for Carbon Steels

Date Issued: July 14, 1983

File: 1599 (83-033)

Question (1): Why does ANSI/ASME B31.1 Appendix A, Table A-1 not list allowable stresses for carbon steels, such as ASME SA-106 Grade B, at temperatures above ~~188~~ 200°F?

Reply (1): The reason is given in Note (3) of Table A-1, which states, "upon prolonged exposure to temperature above 775°F, the carbide phase of carbon steel may be converted to graphite."

Question (2): Some other Codes, such as the ASME Boiler and Pressure Vessel Code, Section I, do list allowable stresses for carbon steels at temperatures above 800°F. Is it the intention of the Committee to include in Table A-1 of ANSI/ASME B31.1 allowable stresses for carbon steels at temperatures above 800°F?

Reply (2): The stress values given in Table PG-23.1 of the ASME Boiler and Pressure Vessel Code, Section I for carbon steels at temperatures above 800°F are shown with parentheses. Note (b) of Table PG-23.1 states, "stress values shown in parentheses are permissible but, except for tubular products 3 in. O.D. or less enclosed within the boiler setting, use of these materials at these temperatures is not current practice under Section I." It is not appropriate to add these stress values to Table A-1 of ANSI/ASME B31.1.

Question (3): Does the Committee consider it acceptable to exceed the 800°F temperature figure for operation of ASME SA-106 Grade B pipework for a limited time period (up to 5000 hr) or an extended time period (up to 50,000 hr)?

Reply (3): Such usage is not acceptable as it does not comply with the requirements of ANSI/ASME B31.1.

Interpretation: 4-4

Subject: Relief Valve Discharge Vent Stack Piping

Date Issued: August 17, 1983

File: 1585

Question (1): In ANSI/ASME B31.1-1980 Edition, does the 800°F maximum allowable temperature limitation of Table A-1 for carbon steel piping apply to relief valve discharge vent stack piping when steam temperatures in excess of 800°F are calculated to exist only during the short time duration of relief valve actuation?

Reply (1): Not necessarily. The limitation mentioned in the question derives from Para. 123.2.1, which states, "The materials listed in the allowable stress Tables A-1 through A-7, Appendix A, shall not be used at design temperatures above those for which stress values are given." Table A-1 of Appendix A does not give allowable stress values for carbon steel materials at temperatures above 800°F.

The condition described in the question is a self-limiting transient. Per Para. 101.3.2(A), the design temperature must be selected to equal or to exceed the maximum sustained condition. The selected design temperature need not exceed the maximum temperature attained during a transient. Conditions during a self-limiting transient must not exceed the limitations of Para. 102.2.4.

In order to show that the limitations of Para. 102.2.4 are met, the allowable stress value at the transient condition must be determined. For the condition described in the question, the allowable stress value during the transient must be obtained from Section I or Section VIII, Division 1, of the ASME Boiler and Pressure Vessel Code, as permitted by the rules of Para. 102.3.1(a).

Note (3) of Table A-1 warns the designer of possible graphitization due to prolonged exposure to temperatures above 775°F.

Question (2): Does the requirement of Para. 136.4.5 for radiography of piping welds with design temperatures in excess of 750°F apply to relief valve discharge vent stack piping?

Reply (2): Yes.

Interpretation: 4-5

Subject: Definition of "a few" in Appendix II

Date Issued: September 7, 1983

File: 1644

Question: What is the definition of the phrase "a few" in ANSI/ASME B31.1-1980 Edition, Appendix II, Para. 2.3.2?

Reply: There is no quantitative intent in the term "a few" as used in ANSI/ASME B31.1-1980 Edition, Appendix II, 2.3.2 other than to reinforce the short duration of the momentary unbalanced forces. The duration of the unbalanced forces is governed by the safety valve design, the system in which the safety valve is installed, and operating fluid characteristics.

Interpretation: 4-6

Subject: Postweld Heat Treatment

Date Issued: September 12, 1983

File: 1591 (83-007)

Question (1): Is postweld heat treatment of welds required by Table 131 of ANSI/ASME B31.1-1980 Edition under the following conditions for P-4 materials?

(a) a maximum thickness of ½ in.;

(b) a maximum nominal pipe size of 4;

(c) butt welded or socket welded fitting to ASTM A 234 WP11 of A 182 Grade F11 with an ASTM specification limit of 0.20% carbon, maximum. Fittings are procured with only a Certificate of Compliance to the ASTM specification (i.e., the actual percentage of carbon is not known). The fittings are used in conjunction with ASTM A 335 Grade P11 (maximum carbon of 0.15%) pipe.

(d) application of 300°F minimum preheat.

Reply (1): Postweld heat treatment is required under the conditions outlined above.

Question (2): Can the Design Engineer exempt postweld heat treatment of P-No. 4 materials when those materials are purchased to an ASTM specification, with a limitation on the carbon to 0.15%?

Reply (2): Postweld heat treatment of the ASME Boiler and Pressure Vessel Code, Section IX, P-No. 4 materials are exempted if all the requirements of Table 131 are met. The methods used to verify these exemptions are not addressed in the Code.

Interpretation: 4-7

Subject: Postweld Heat Treatment

Date Issued: September 12, 1983

File: 1654 (83-007)

Question: Are any alternative methods to heating a full circumferential band during PWHT acceptable to ANSI B31.1-1977 Edition, including the Summer 1978 Addenda?

Reply: No.

Interpretation: 4-8

Subject: Area of Reinforcement for Contoured Integrally Reinforced Fittings

Date Issued: October 26, 1983

File: 1681 (83-034)

Question: Do the rules for extruded outlets apply to contoured integrally reinforced fittings? If not, what are the correct equations indicated in ANSI/ASME B31.1, B31.2, B31.3, B31.4, and B31.8 to be used in determining the limits of area reinforcement for contoured integrally reinforced branch connecting fittings (e.g., weldolet) and extruded outlets?

Reply: The contoured integrally reinforced fitting is not an extruded outlet. The equations set forth in the B31 Codes for determining the reinforcing limits of an extruded outlet do not apply in determining the reinforcing limits of a contoured integrally reinforced fitting.

The equations set forth in the Code documents for fabricated intersection area reinforcement limits are the only equations available for contoured integrally reinforced branch connecting fittings.

Interpretation: 4-9

Subject: Para. 105.3, Nonmetallic Pipe

Date Issued: November 7, 1983

File: 1617-2 (83-017)

Question (1): May reinforced thermosetting resins made to such standards as ASTM C 582, D 2517, D 2996, or D 2997 be used in any water piping systems covered by ANSI/ASME B31.1?

Reply (1): ANSI/ASME B31.1. permits the use of nonmetallic piping materials. See Paras. 105.3(A) and 123.2.8.

Question (2): If these materials may be used under ANSI/ASME B31.1, what allowable stress values should be used for design and what are the allowable pressure and temperature ranges?

Reply (2): Design stress and temperature limits shall be within the manufacturer's recommendations.

Interpretation: 4-10

Subject: Nondestructive Examination

Date Issued: November 7, 1983

File: 1664 (83-028) (83-017)

Question: Does ANSI/ASME B31.1-1980 Edition require any nondestructive examinations in addition to those stated in Table 136.4?

Reply: No. See 136.1, second paragraph, for guidance on additional examinations.

Interpretation: 4-11

Subject: Materials for Boiler External Piping

Date Issued: November, 7, 1983

File: 1675 (83-028)

Question: Since the ANSI/ASME B31.1 Power Piping Code allows the substitution of API 5L pipe for ASTM A 53 pipe per 105.2.1(D), why does Note (1) of Appendix A, Table A-1, disallow the use of API 5L pipe for boiler external piping?

Reply: ANSI/ASME B31.1, 123.1 specifically limits boiler external piping materials to either ASME or ASTM specifications for ASME Code certification of the piping.

Interpretation: 4-12

Subject: Fire Protection Piping

Date Issued: November 8, 1983

File: 1642 (83-006)

Question: May ASTM A 120 pipe be used in a fire protection system covered by ANSI/ASME B31.1 with design conditions of 150 psig and 150°F?

Reply: The requirements of ANSI/ASME B31.1 do not apply to fire protection piping. See 100.1.3(D). When compliance with ANSI/ASME B31.1 is required by either NFPA Code/Standard reference or agreement between the parties concerned, then the pressure limitation of 125 psig for straight ASTM A 120 pipe (or 25 psig if bending is used) dictated by 105.2.1(B) of ANSI/ASME B31.1 must be met.

Interpretation: 4-13

Subject: Postweld Heat Treatment Requirements

Date Issued: December 12, 1983

File: 1653 (83-006)

Question: In repairing previously heat treated welds, is it permissible in accordance with ANSI B31.1-1973 Edition to determine the postweld heat treatment requirements based on a depth of the weld repair? If not, what parameters are to be used to determine the stress relieving requirements?

Reply: The thickness of the material being repaired shall determine the postweld heat treatment requirements.