

Interpretations No. 2 to ANSI/ASME B31.3

(This supplement is not part of ANSI/ASME B31.3 or its Addenda and is included for information only.)

It has been agreed to publish Interpretations issued by the B31 Committee concerning B31.3 as part of the subscription service. This supplement includes Interpretations concerning B31.3 issued between January 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 Subsequent revisions to the Code may have superseded the reply.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.

Interpretation: 2-1

Subject: 323.1.1, Listed or Published Specifications

Date Issued: January 27, 1983

File: 1624

Question (1): Does 323.1.1 permit the use of seamless pipe manufactured to ASTM A 537 for ANSI/ASME B31.3 applications using the allowable stresses as given in Appendix A, Table 1?

Reply (1): No. ASTM A 537 is a plate specification, not a pipe specification.

Question (2): Why is ASTM A 537 Class 2 not listed in Table 1 of Appendix A?

Reply (2): Materials are listed only after it has been shown that there is sufficient general use of the material in piping. The Committee does not believe that there is sufficient need for this material to merit its inclusion in Appendix A. Provision is made in the Code for the qualification of unlisted materials in 323.1.1.

Interpretation: 2-2

Subject: P-No. 1 Materials

Date Issued: January 27, 1983

File: 1625

Question (1): Please refer to 329.3(a) and 330.2 of ANSI/ASME B31.3. Is postbend heat treatment required for P-No. 1 materials?

Reply (1): No. Postheat treatment is not required for any thickness of P-No. 1 materials after hot bending or hot forming.

Question (2): Does ANSI/ASME B31.3 require hardness tests and have hardness limitations for P-No. 1 after the heat treatment of bends and welds?

Reply (2): No, provided the weld metal analysis A-Number is 1.

Interpretation: 2-3**Subject:** Selection of Design Conditions**Date Issued:** January 27, 1983**File:** 1626

Question: What are the ANSI/ASME B31.3 design conditions for a piping system in which the required pipe wall thickness is determined by one set of coincident pressure-temperature conditions, and the required component rating, for components with established ratings in accordance with component standards listed in Table 326.1, is determined by another set of coincident pressure-temperature conditions?

Reply: The design condition for any component in a piping system is the most severe condition of coincident pressure and temperature which results in the greatest required thickness and the highest required rating. It is possible, under some circumstances such as in the example in the inquiry, to have more than one set of design conditions which apply to the same piping system.

Interpretation: 2-4**Subject:** Radiographic Examination of Welds**Date Issued:** January 27, 1983**File:** 1627

Question: If the engineering design specifies radiographic examination of welds in API 5L Grade B and API 5LX Grade X52 pipe, does ANSI/ASME B31.3 require such examination to be performed before or after completion of any heat treatment?

Reply: ANSI/ASME B31.3 has no requirements as to whether the radiographic examination of welds in API 5L Grade B or API 5LX Grade X52 pipe is performed before or after the completion of any heat treatment.

Interpretation: 2-5**Subject:** Use of Washers**Date Issued:** January 27, 1983**File:** 1628

Question: Does ANSI/ASME B31.3 require the use of washers when bolting metallic flanges?

Reply: No.

Interpretation: 2-6

Subject: 337.3, Test Preparation

Date Issued: January 27, 1983

File: 1631

Question: Paragraph 337.3 of ANSI/ASME B31.3 states, "All joints, including welds, are to be left uninsulated and exposed for examination during the test . . ." May the joints be primed and painted prior to hydrotest?

Reply: Yes.

Interpretation: 2-7

Subject: Stress Intensification Factors

Date Issued: January 27, 1983

File: 1632

Question: When determining stress intensification factors for branch connections in piping systems constructed in accordance with ANSI/ASME B31.3, may the thickness and diameter of the branch be used in the equations in Appendix D for determining the stress intensification factor for the branch?

Reply: No. Stress intensification factors are a function of the header (run) thickness, and the thickness of the reinforcing, if any. Any change in wall thickness of the run pipe or change in reinforcing pad or saddle thickness will result in a change in the computed flexibility characteristic h as shown in Table 319.3.6. A change in h will cause a change in the intensification factor.

The inquirer is referred to Eqs. 19 and 20 in 319.4.4(c). The values for i_o and i_i would be the same for both the branch and the header (run). The resulting bending stress will be a function of the remaining variables.

Interpretation: 2-8**Subject:** Table 327.4.1A**Date Issued:** May 11, 1983**File:** 1663 (B31 83-016)

Question (1): Table 327.4.1A of ANSI/ASME B31.3 limits undercutting for girth and miter joint butt welds to the lesser of $\frac{1}{16}$ in. (0.8 mm) or $T_w/4$. When components with different thicknesses are joined by welding, what thickness is used for T_w ?

Reply (1): T_w is the nominal wall thickness of the thinner component (see Appendix J, Nomenclature).

Question (2): Does the Code describe evaluation of undercutting, revealed on a radiograph, by use of the film density differential?

Reply (2): No.

Interpretation: 2-9**Subject:** Charpy Impact Absorbed Energy Data**Date Issued:** May 19, 1983**File:** 1633

Question: Under the rules of ANSI/ASME B31.3, may Charpy impact absorbed energy data be substituted for the lateral expansion criteria of 0.015 in.?

Reply: No.

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2-10, 2-11, 2-12

Interpretation: 2-10

Subject: 327.4.4, Welded Branch Connections

Date Issued: May 25, 1983

File: 1639

Question: Figure 127.4.8(F) of ANSI/ASME B31.1 shows a "Typical Partial Penetration Weld Branch Connection for 2 in. NPS and Smaller Fitting," and 127.4.8(C) allows its use by taking exception to the requirement for full penetration groove welds. Paragraph 327.4.4(c) of ANSI/ASME B 31.3 does not contain this exception. However, 327.4.4(a) states, "No attempt has been made to show all acceptable types of construction . . ." Does 327.4.4(a) allow partial penetration types of branch construction?

Reply: No. Only full penetration groove weld types of branch construction are allowed. The Committee will consider Fig. 127.4.8(F) of ANSI/ASME B31.1 for inclusion in ANSI/ASME B31.3.

Interpretation: 2-11

Subject: 304.1.2, Straight Pipe Under Internal Pressure

Date Issued: May 31, 1983

File: 1640

Question: For the pressure design of straight pipe under internal pressure, in accordance with 304.1.2 of ANSI/ASME B31.3, what equations apply when t is less than $D/6$ and when t is equal to or greater than $D/6$?

Reply: When t is less than $D/6$, the minimum wall thickness for pressure design shall be based on Eq. 3a, 3b, or 3c.

When t is equal to or greater than $D/6$, the Code does not require that a specific equation be used in design. If Eq. 3a is used for design, the correct value for Y is $d/(d + D)$. As stated in 304.1.2(b), the design of high pressure heavy wall pipe requires special considerations, and the final design is the responsibility of the designer.

Interpretation: 2-12

Subject: Random Radiography

Date Issued: June 8, 1983

File: 1650 (B31 83-003)

Question: What is the recommended or preferred practice for administration of random radiography as required by 336.4.5, 336.5, and 336.5.1(b) of ANSI/ASME B31.3?

Reply: The Code does not set forth administrative practices.

Interpretation: 2-13

Subject: Limitations on Tubing Size in Category M Fluid Service

Date Issued: June 8, 1983

File: 1652 (B31 83-005)

Question: Does ANSI/ASME B31.3 prohibit the use of tubing $\frac{3}{4}$ in. through 2 in. O.D. with proprietary fittings from use in Category M fluid service?

Reply: No; however, there are limitations on tubing size for instrument piping in M322.3. Also, proprietary fittings must meet the requirements of M326.

Interpretation: 2-14

Subject: 302.3.5(d), Allowable Displacement Stress Range

Date Issued: June 8, 1983

File: 1658 (B31 83-011)

Question: Is it a correct interpretation of ANSI/ASME B31.3 to apply the allowances for occasional pressure and temperature variations contained in 302.2.4 to the allowable displacement stress range S_A of 302.3.5(d)?

Reply: No.

Interpretation: 2-15

Subject: 302.3.5(c), Longitudinal Stresses

Date Issued: June 8, 1983

File: 1659 (B31 83-012)

Question: In accordance with 302.3.5(c), the longitudinal stresses due to pressure and weight are computed, assuming the pipe to be in the corroded condition. Is it a correct interpretation of ANSI/ASME B31.3 to also calculate stresses from occasional loads, such as wind and earthquake, assuming the pipe to be in the corroded condition?

Reply: Yes.

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2-16, 2-17

Interpretation: 2-16

Subject: 302.3.6, Limits of Calculated Stresses Due to Occasional Loads

Date Issued: June 8, 1983

File: 1660 (B31 83-013)

Question: Paragraph 302.3.6(a) concerning stresses due to occasional loads states, "Where the allowable stress value exceeds $2/3$ of yield strength at temperature, the allowable stress value must be reduced as specified in Note (3) in 302.3.2." Is it a correct interpretation of ANSI/ASME B31.3 to assume that the above sentence is only concerned with potential leakage rather than reduction of the life of the piping system due to creep?

Reply: No.

Interpretation: 2-17

Subject: Seismic Loads

Date Issued: June 8, 1983

File: 1661 (B31 83-014)

Question: How shall stresses in a piping system due to restraint deflections from seismic motions, and those due to seismic inertial loadings, be applied in accordance with ANSI/ASME B31.3?

Reply: It is the intent of 302.3.6 that the inertial loads from earthquake be included in the calculations of stresses due to occasional loads. The effects of displacement of restraints due to earthquake may be treated as an externally imposed displacement in accordance with 319.2.1(c).

Interpretation: 2-18**Subject:** Weld Repair Requirements**Date Issued:** June 21, 1983**File:** 1651 (B31 83-004)

Question (1): In lieu of repairs to weld defects which exceed Code limitations, does ANSI/ASME B31.3 permit the application of analysis methods, such as fracture mechanics, in the evaluation of said defects with a "fitness for purpose" concept?

Reply (1): No.

Question (2): Will the Committee take under consideration the principles set forth in such documents as BSI PD6493 as possible alternative rules to existing Code rules?

Reply (2): Yes. The Committee continually considers relevant information and is currently in receipt of the documents referenced by the inquirer.

Question (3): Will the Committee consider any further relaxation of weld defect limitations in view of current research publications, such as WRC or BSI, on this subject?

Reply (3): Yes. The Committee continually considers relevant information and is currently in receipt of the documents referenced by the inquirer.

Interpretation: 2-19**Subject:** Table 323.2.2**Date Issued:** June 23, 1983**File:** 1638

Question: When welding ASTM B 241 Grade 6061-T6 seamless aluminum pipe for service temperature of -320°F using a filler wire designated 5356 or 4043, does the filler metal being "outside the range of composition for the base metal" require testing in accordance with Column B, box 5, Table 323.2.2 of ANSI/ASME B31.3?

Reply: No, since filler wire designated 5356 or 4043 is in the range of composition for welding ASTM B 241 Grade 6061-T6.

Interpretation: 2-20**Subject:** Factor *E* in Appendix A.**Date Issued:** August 2, 1983**File:** 1670 (B31 83-023)

Question (1): Does ANSI/ASME B31.3 permit the use of an *E* value of 1.0 for A 234 fittings, Grades WPB and WPC, for both seamless and welded construction?

Reply (1): Yes.

Question (2): A 312 pipe is listed as having *E* values of 0.8 and 0.85. Is it correct to assume that these values are taken from Table 302.3.4 and depend on whether the pipe has a single butt weld (3a) or a double butt weld (3b)?

Reply (2): Yes.

Question (3): Fittings to A 403 are listed as having *E* values of 1.0, 0.85, and 0.80. Is it correct to assume the following, and that reference to Note (14) is irrelevant?

<u>Factor</u>	<u>Description of Fitting</u>
1.0	Class WP-WX
0.85	Class WP-W manufactured from A 312 pipe, double butt weld
0.80	Class WP-W manufactured from A 312 pipe, single butt weld

Reply (3): Yes.

Interpretation: 2-21**Subject:** Pressure Relief Devices**Date Issued:** August 2, 1983**File:** 1671 (B31 83-024)

Question: Does ANSI/ASME B31.3 have wording similar to UG-126(a) and UG-125(h) of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, which defines a pressure relieving device more precisely, or which defines the types of devices or systems that do not meet the requirements of the Code?

Reply: No.

Interpretation: 2-22

Subject: Notch Sensitive Materials

Date Issued: August 3, 1983

File: 1641

Question (1): Will the Committee identify which materials are notch sensitive for proper application of 314.2.1?

Reply (1): No.

Question (2): What is the meaning of the term "notch sensitive" as used in 314.2.1?

Reply (2): The definition of "notch sensitive" is given in 300.2.

Interpretation: 2-23

Subject: Minimum Hydrostatic Test Pressure

Date Issued: September 7, 1983

File: 1676 (B31 83-029)

Question: When the minimum hydrostatic test pressure of internally pressured metallic piping, as calculated in accordance with Eq. 24 of ANSI/ASME B31.3-1980, exceeds the hydrostatic test pressures listed in Table 3 of ANSI B16.5-1981, may the minimum hydrostatic test pressure be reduced to those listed in ANSI B16.5?

Reply: No, except as allowed by 337.4.1(c).

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Interpretation: 2-24

2-24

Subject: Flexibility Characteristics and Stress Intensification Factors

Date Issued: September 7, 1983

File: 1677 (B31 83-030)

Question (1): What is the correct equation in Appendix D of ANSI/ASME B31.3 for flexibility characteristic h for a welding tee in accordance with ANSI B16.9 and the following geometry characteristics: $T_r \geq 1.5\bar{T}$ and $r_s < \frac{1}{8}D_b$?

Reply (1): The Code does not give a specific flexibility characteristic for a welding tee with the geometry described. The inquirer is directed to 319.3.6 which addresses piping components not covered in Appendix D.

Question (2): Should the same stress intensification factors, calculated from the appropriate equations in Appendix D for the header (legs 1 and 2 in Fig. 319.4.4B), be applied to the branch (leg 3) in Equation 20?

Reply (2): Yes. Equation 21 for effective section modulus of the branch accounts for the geometric differences.

Question (3): What is the correct value of wall thickness \bar{T} to be used in calculating the flexibility characteristic h for bends or tees in Appendix D: the nominal wall thickness of the fitting or the matching pipe?

Reply (3): In accordance with Note (2), Appendix D of ANSI/ASME B31.3, the correct value of the wall thickness \bar{T} is the nominal wall thickness of the fitting for elbows and miter bends or the nominal wall thickness of the matching pipe for tees.

Question (4): A fitting is provided with a short length of pipe with nominal wall thickness equal to that of the fitting on each end to be joined to the header, attached to the fitting by welding or integral with the fitting. May the nominal wall thickness of the short length of matching pipe be used in the determination of flexibility characteristic h for tees in Appendix D?

Reply (4): Yes. The determination of sufficient length is the responsibility of the designer.

Question (5): In accordance with 302.3.5, what is the correct allowable stress to be compared with the longitudinal stresses resulting from the restraint of the soil on the thermal movement of buried pipe?

Reply (5): The stresses resulting from the restraint of the soil on thermal movement of buried pipe are displacement stresses rather than sustained longitudinal stresses. Accordingly, the correct allowable stress is S_A , the allowable displacement stress range, in 302.3.5(d).

Interpretation: 2-25**Subject:** Radiographic Examination**Date Issued:** September 8, 1983**File:** 1667 (B31 83-020)

Question (1): A certain piping system has 100 welds made by the same welder and welding procedure. Ten percent radiography was required. Ten welds were radiographed, of which one was defective. The subsequent second and third progression groups also had defective welds. Does 336.5 of ANSI/ASME B31.3 require radiographic examination, repair, and radiographic reexamination of all the welds other than the 9 found acceptable or of the 10 welds represented by the one original defective weld?

Reply (1): The first alternative is correct if the lot size has been established as 100 and the selection is truly random. The second is correct if the lot size has been established as 10 and each is represented by 1 of the 10 welds radiographed at random.

Question (2): What is intended by "all comparable items" as used in 336.5?

Reply (2): Comparable items contained in a designated lot.

Interpretation: 2-26**Subject:** Synfuel Plant Piping**Date Issued:** October 26, 1983**File:** 1541R

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 and/or industrial steam 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, 100.1 and Fig. 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 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: 2-27

Subject: Area of Reinforcement for Contoured Integrally Reinforced Branch Connections

Date Issued: October 26, 1983

File: 1681 (B31 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.

Interpretation: 2-28**Subject:** 336.4.2, Visual Examination**Date Issued:** December 2, 1983**File:** 1682 (B31 83-035)

Question (1): 336.5.1(a) of ANSI/ASME B31.3-1980 Edition requires visual examination in accordance with 336.4.2. Is it intended that 336.4.2(c), In-Process Examination, be included as part of this visual examination?

Reply (1): No. This was clarified in ANSI/ASME B31.3b-1982 by changing 336.4.2(c) to 336.4.7.

Question (2): M336.5.1(a)(1) of ANSI/ASME B31.3-1980 Edition requires that all fabrication, including the welds, be visually examined.

(a) Is this visual examination required for welds which are radiographed as required by M336.5.1(b)?

(b) Is this visual examination required if in-process examination as allowed by M336.5.1(c) is substituted for required radiography?

Reply (2): (a) Yes. (b) Yes. The visual examination is included in the in-process examination.

Question (3): Does ANSI/ASME B31.3-1980 Edition require written procedures for visual examination?

Reply (3): Yes. Refer to 336.4.1(c).

Question (4): Does ANSI/ASME B31.3-1980 Edition require a record of the visual examination results by individual weld?

Reply (4): No.

Question (5): Does ANSI/ASME B31.3-1980 Edition allow production workmen to perform the visual examination?

Reply (5): Refer to T-940(b), Article 9, Section V of the ASME Boiler and Pressure Vessel Code, which states, "Where impractical to use specialized visual examination personnel, knowledgeable production workmen may be used to perform the examination and to sign the report forms."

Interpretation: 2-29

Subject: 301.2.1, Required Pressure Containment or Relief

Date Issued: December 20, 1983

File: 1687 (B31 83-040)

Question: Does any device or system, such as pressure reducing valves or similar mechanical or electrical interlocks and/or control instruments, satisfy the requirements of ANSI/ASME B31.3, 301.2.1, to safely relieve any excess pressures?

Reply: The Code requires that provision be made to contain or safely relieve excessive pressure, but does not address acceptable types of pressure relieving devices.

Interpretation: 2-30

Subject: Use of Term "Owner"

Date Issued: December 20, 1983

File: 1688 (B31 83-041)

Question (1): Is the final owner always the "owner" referred to in ANSI/ASME B31.3?

Reply (1): Yes.

Question (2): Is the engineering construction contractor the "owner" until the piping is erected, mechanically complete, tested, and subsequently "sold" to the final owner?

Reply (2): No.

Question (3): Who is responsible for determining pressure test methods and media on jobs where the engineering and construction are performed by different contractors?

Reply (3): The owner is responsible.

Interpretation: 2-31**Subject:** 337, Pressure Tests**Date Issued:** December 20, 1983**File:** 1691 (B31 83-044)

Question: Since ANSI/ASME B31.3b-1982 does not exclude piping systems designed for internal gage pressures at or above 0 psi if the fluid handled is flammable, toxic, or damaging to human tissue, nor does it exclude any fluid outside the design temperature range of from -20°F through 366°F , must the following piping systems be pressure tested in accordance with 337?

(a) Discharge piping for pressure-relieving safety devices designed for steam at a design temperature of 375°F and a design pressure of 0 psi, discharging directly to atmosphere.

(b) Drain piping handling a toxic fluid at a design temperature of 80°F and a design pressure of 0 psi discharging directly to atmosphere (e.g., an atmospheric pressure holding tank).

Reply: The minimum hydrostatic test gage pressure is as calculated by Eq. 24, which for 0 psi, design pressure is 0. Note that a pressure differential is required for fluid flow.

Interpretation: 2-32**Subject:** Random Examination Requirements**Date Issued:** December 20, 1983**File:** 1693 (B31 83-046)

Question (1): Are "same kind" groups of items which are represented by an acceptable randomly selected and examined item (or which are represented by the acceptable completion of the progression of examinations as a result of an unacceptable randomly selected and examined item) considered acceptable by ANSI/ASME B31.3?

Reply (1): Yes.

Question (2): Is the selection and examination of additional items from "same kind" groups previously accepted by random examination (in compliance with the Code and engineering design) considered as being beyond ANSI/ASME B31.3 requirements for random examinations?

Reply (2): Yes, provided the minimum quantities of examination have been performed and found acceptable.