API Standards 620, 650, and 653 Interpretations— Tank Construction and In-Service Inspection

Answers to Technical Inquiries

API PUBLICATION 850
FIRST EDITION, NOVEMBER 1997

American Petroleum Institute

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- To commit to reduce overall emissions and waste generation.
- To work with others to resolve problems created by handling and disposal of hazardous substances from our operations.
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API Standards 620, 650, and 653 Interpretations— Tank Construction and In-Service Inspection

Answers to Technical Inquiries

Manufacturing, Distribution and Marketing Department

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Inquiries sent to the American Petroleum Institute should either request an interpretation of an API standard or ask that a revision to an API standard be considered on the basis of new data or technology. The following guidelines are recommended for submitting inquiries:

1. Format: Include your name and mailing address on all correspondence. Your letter should be typewritten (although legible handwritten letters will be considered), and mailed to:

American Petroleum Institute
MDM Department
1220 L Street, Northwest
Washington, D.C. 20005

2. Scope: Limit your inquiry to a single subject or closely related subjects. An inquiry letter concerning unrelated subjects will be returned.
3. Background: State the purpose of your inquiry and your understanding of the standard's requirements. Provide all information needed for a complete understanding of your inquiry. Refer to the applicable edition, revision, paragraphs, figures, and tables. Include sketches, if needed.
4. Inquiry: State your inquiry in a condensed, precise question format, omitting any superfluous background information. The question itself should be technically and editorially correct. Try to compose your question in such a way that "yes" or "no," with provisos if needed, would be a suitable reply. For example, you could ask whether or not your understanding of a standard's requirements is correct.
5. Suggestion for a Revision: When proposing a revision to an API standard, you should include supportive technical reasons and data, along with proposed new wording. Comments made concerning the technical basis for a requirement of an API standard should include relevant notes and suggestions. These suggestions and comments will be forwarded to the appropriate API subcommittee for the next review of that standard.

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API Standards 620, 650, and 653 Interpretations—Tank Construction and In-Service Inspection

INTRODUCTION

This publication is a compendium of responses to technical inquiries on API Standards 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks, API 650, Welded Steel Tanks for Oil Storage, and API 653, Tank Inspection, Repair, Alteration, and Reconstruction. Its purpose is to further the understanding of tank designers, fabricators, owners, and operators on technical issues related to these standards and their application. API Publication 850 includes technical inquiry responses issued from 1987 through 1997.

These inquiries can often lead to revisions or additions to the requirements in the standards. In cases where a change in the standard is warranted, the committee responsible for maintaining the document will ballot the proposed changes according to the procedures of the American National Standards Institute (ANSI) for comment and approval by API committee members and other interested parties.

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STANDARD 620

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STANDARD 620, SEVENTH EDITION, SEPTEMBER 1982; REVISION 1, APRIL 1985

Standard 620, Seventh Edition, Revision 1—General

Issue Date: September 2, 1987

Publication: API Standard 620, *Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Seventh Edition, September 1982; Revision 1, April 1985

Question: Is it permissible to use umbrella-shaped dome roofs for low-pressure storage tanks per Standard 620?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Seventh Edition, Revision 1—Section 3.5

Issue Date: March 8, 1988

Publication: API Standard 620, *Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Seventh Edition, September 1982; Revision 1, April 1985

Question: If T and T_2 are calculated using Equations (6) and (7), can paragraphs 3.5.3.2 and 3.5.3.3 be used to calculate the allowable compressive stress by taking $R = R_2$?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Seventh Edition, Revision 1—Section 3.10

Issue Date: March 8, 1988

Publication: API Standard 620, *Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Seventh Edition, September 1982; Revision 1, April 1985

Question: Can Standard 620 be used as a basis for design of conical heads under external loads of snow, insulation, etc., and zero internal pressure?

Reply: Yes.

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Standard 620, Seventh Edition, Revision 1—Section 3.11

Issue Date: September 2, 1987

Publication: API Standard 620, *Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Seventh Edition, September 1982; Revision 1, April 1985

Question: Does Standard 620 contain rules for tanks with cylindrical sidewalls and flat bottoms to design for uplift?

Reply: Yes; see applicable provisions of paragraph 3.11.2.

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Standard 620, Seventh Edition, Revision 1—Section 4.15

Issue Date: October 27, 1988

Publication: API Standard 620, *Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Seventh Edition, September 1982; Revision 1, April 1985

Question 1: Does 4.15 of Standard 620 require both plates to be greater than $^1/_2$ inch in thickness before a taper is required?

Reply 1: No.

Question 2: Does a 1 inch rim angle in Figure 3.4 (g) have to be tapered per 4.15 if butt welded to a $^3/_8$ inch roof plate?

Reply 2: Yes, but all requirements of 3.12 must be met.

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Standard 620, Seventh Edition, Revision 1—Appendix Q

Issue Date: July 5, 1988

Publication: API Standard 620, *Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Seventh Edition, September 1982; Revision 1, April 1985

Question: Does the concept to have an open top inner tank with suspended insulation deck comply with Standard 620, Appendix Q?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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STANDARD 620, EIGHTH EDITION, JUNE 1990

Standard 620, Eighth Edition—General

Issue Date: August 1, 1991

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: Does API Standard 620 have dimensional tolerances for flatness on flat bottom tanks?

Reply: No. The committee will take under consideration establishing tolerances for flat bottom tanks.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Eighth Edition—General

Issue Date: April 30, 1993

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question 1: Does API Standard 620 provide rules for the design of frangible roof joints?

Reply 1: No.

Question 2: Does API Standard 620 provide rules and procedures for operating tanks?

Reply 2: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Eighth Edition—Section 3.5

Issue Date: September 17, 1992

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: May Equations 18 and 19 on pages 3 to 5 of API Standard 620 be used to calculate the thickness of a conical roof under external pressure?

Reply: No. See paragraphs 3.5.4.1 and 3.10.5.1.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Eighth Edition—Section 3.5

Issue Date: December 30, 1991

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question 1: Can Figure 3-1 in API Standard 620 be used for steels with yield strengths below 30,000 psi and above 38,000 psi?

Reply 1: No.

Question 2: Does API Standard 620 provide a method for determining the combined tension and compression for steels with yield points below 30,000 psi and above 38,000 psi?

Reply 2: No.

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Standard 620, Eighth Edition—Section 3.19

Issue Date: December 30, 1991

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: Is the thickness in paragraph 3.19.2.2 of Standard 620 the nominal wall thickness of standard weight pipe as listed in B36.10 less $12^1/_2$ percent mill tolerance?

Reply: No. However, the committee will review this requirement to see if a change should be made.

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Standard 620, Eighth Edition—Section 5.17

Issue Date: August 1, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: Does API 620 permit the use of gamma radiation, as well as X radiography?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Eighth Edition—Appendix F

Issue Date: March 17, 1995

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: Is the note at the end of Example 3 in F.1.3 of API Standard 620 correct?

Reply: No. In using the alternative approach by the application of Figure F-1, a check shall be made that the compressive stress does not exceed the compressive stress value bounded by the line OABC in Figure 3-1. In your case, it is 12,230 pounds per square inch. This correction will be included in the next edition of the standard.

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Standard 620, Eighth Edition—Appendix Q

Issue Date: April 30, 1993

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: Is it the intent in Q.6.3.3 of API Standard 620 to require Charpy impact testing of HAZ specimens for austenitic stainless steel welds for service temperatures below –200°F?

Reply: No.

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Standard 620, Eighth Edition—Appendix Q

Issue Date: April 9, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: Does API 620, Appendix Q, regarding secondary components (e.g., the outer wall of an LPG tank), permit the material to be selected from Table 2-1 using (a) the design metal temperature of the inner tank, or (b) the design metal temperature based on the lower of the minimum atmospheric temperature conditions and the vaporized liquefied gas temperature if the components are in contact with the vapor?

Reply: Refer to paragraph Q.3.2 for the definition of "design metal temperature" for secondary components. Then refer to paragraph Q.2.3.1, which permits the use of Table 2-1, selecting based on item (b) above, but only for temperatures down to –35°F.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Eighth Edition—Appendix R

Issue Date: December 30, 1991

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question 1: Is it the intent of Section R.6.3.3 of API 620, Eighth Edition, to require more than one set of test plates when one test plate thickness cannot be selected to qualify all thicknesses in the shell?

Reply 1: Yes.

Question 2: Is $^5/_8$ inch the minimum value of $t/2$ in the second sentence of R.6.3.3?

Reply 2: Yes.

Question 3: In the third sentence of R.6.3.3, if the t - to - $2t$ range does not cover the range of shell thicknesses less than $^5/_8$ inch, is more than one test required?

Reply 3: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Eighth Edition—Appendix R

Issue Date: April 15, 1994

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question: Does API Standard 620 allow the use of material less than $^{3}/_{16}$-inch thick for suspended decks in double wall tanks?

Reply: No. Refer to Tables R-2 and R-5.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Eighth Edition—Appendix R

Issue Date: April 9, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Eighth Edition, June 1990

Question 1: Does API 620, Appendix R, allow the use of ASTM A20,*Charpy V-Notch Test Acceptance Criteria for Various Sub-Size Specimens* (Table A1.16), to be applied to the WPS qualification Charpy Impact test coupons for shell plate welding or nozzle-to-shell welding?

Reply 1: Paragraph R.6.1.5 refers to Table R-2 for the required impact levels to be met for the weld material and HAZ for the WPS. Table R-2 covers the impact requirements for primary component plate, HAZ, and weld deposit. Footnote a of Table R-2 refers to R.2.1.2. R.2.1.2.3 refers to ASTM A20 for subsize specimen acceptance criteria.

Question 2: Does API 620, Appendix R, require the PQR Charpy Impact test coupons for the welding of nozzles to the shell and nozzle pipe butt welding to be performed at least 30° lower than the design metal temperature of the tank?

Reply 2: No; refer to R.6.1.4. The 30° rule applies only to pipe, bolting, and forging testing by the mill.

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STANDARD 620, NINTH EDITION, FEBRUARY 1996

Standard 620, Ninth Edition—General

Issue Date: August 1, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: Is a draw-off sump permitted in an API 620 tank?

Reply: API 620 does not include rules for sumps but does not prohibit them.

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Standard 620, Ninth Edition—Section 2.2

Issue Date: August 1, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: For a tank design to basic API 620 requiring impact testing of plate material per paragraph 2.2.5:

(a) Should the long dimension of impact test specimen be parallel to direction of maximum stress (biaxial stresses are not equal) and the minimum absorbed energy value per Table R-5? or

(b) Should the impact test specimen be taken transverse to the final plate rolling and the absorbed energy value per Table R-2?

Reply: As stated in API 620, paragraph 2.2.5, the direction of the axis of the impact test specimen is dependent upon the direction of plate rolling by the mill. The direction of maximum stress when installed in the tank is not a factor. The impact test energy criteria applicable to either type of specimen is per Table R-2, or per Table R-5 where applicable.

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Standard 620, Ninth Edition—Section 3.3

Issue Date: August 1, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: Are paragraphs 3.3.1.2, 5.18.3.2, 5.18.5.1, and 5.18.10 erroneously referring to incorrect paragraph numbers?

Reply: Yes. These will be corrected in the addendum to API 620 as follows:

Paragraph:	Erroneous Reference:	Should Be:
3.3.1.2	5.23.4	5.18.4
5.18.3.2	5.23.2	5.18.2
5.18.5.1	5.23.4	5.18.4
5.18.10	5.23.3 and 5.23.4	5.18.3 and 5.18.4

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Standard 620, Ninth Edition—Section 3.3

Issue Date: February 18, 1997

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: Are there hydrostatic test guidelines for stresses allowed in API 620?

Reply: No. Refer to paragraph 3.3.3.

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Standard 620, Ninth Edition—Sections 3.5 and 3.6

Issue Date: February 18, 1997

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question 1: Is there a conflict between paragraph 3.5.6 and paragraph 3.6.5?

Reply 1: No. Paragraph 3.5.6 is in Section 3.5 and applies to walls. Tank wall is identified in Appendix A, paragraph A.3.

Question 2: Does paragraph 3.6.5 allow an increase of 25 percent for seismic loading of roof structural members?

Reply 2: No, this paragraph addresses the external structural members subject to stresses produced by combination of wind and other applicable loads. API Standard 620 does not address seismic design of roof framing members, nor does it address allowable stresses for seismic loading of roof framing.

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Standard 620, Ninth Edition—Section 3.10

Issue Date: February 18, 1997

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: Does "*t*" as determined by calculation method detailed in paragraph 3.10 apply to roofs and bottoms as well as sidewalls with respect to calculating nozzle reinforcement as defined in paragraph 3.16.5?

Reply: Yes.

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Standard 620, Ninth Edition—Section 3.26

Issue Date: September 26, 1997

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question 1: Does API 620 require full radiography of a butt-welded tank wall when the wall thickness is designed using a joint efficiency of 1.0, for a) the case of the wall thickness, t, greater than $1^1/_4$ inch and $S_t > 0.1\ T_s$, b) the case of t less than or equal to $1^1/_4$ inch and $S_t > 0.1\ T_s$, and c) the case of $t > 1^1/_4$ inch and $S_t < 0.1\ T_s$?

Reply 1: a) Yes, full radiography is required, because a joint efficiency of 1.0 is being used and, per paragraph 3.26.2, both the thickness and stress level requirements are met. b) Radiography is required because the joint efficiency of 1.0 is being used, per Table 3-2. Otherwise, spot radiography could be used, per Table 3-2 and paragraph 3.26.2. c) Full radiography is required because of the joint efficiency of 1.0 is being used, per Table 3-2. Otherwise, spot radiography could be used, per Table 3-2 and paragraph 3.26.2.

Question 2: In the Ninth Edition of API Standard 620, Table 3-2, Note 4, should "5.15" be "5.17" instead?

Reply 2: No. The reference to paragraph 5.15 is correct. Paragraph 5.17 should also be utilized however.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Ninth Edition—Section 5.18

Issue Date: August 1, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: Are paragraphs 3.3.1.2, 5.18.3.2, 5.18.5.1, and 5.18.10 erroneously referring to incorrect paragraph numbers?

Reply: Yes. These will be corrected in the addendum to API 620 as follows:

Paragraph:	Erroneous Reference:	Should Be:
3.3.1.2	5.23.4	5.18.4
5.18.3.2	5.23.2	5.18.2
5.18.5.1	5.23.4	5.18.4
5.18.10	5.23.3 and 5.23.4	5.18.3 and 5.18.4

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Standard 620, Ninth Edition—Section 5.18

Issue Date: August 1, 1996

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: Is a tank designed and fabricated in accordance with API 620 Appendix R required to be tested per paragraph 5.18.25 of API 620, 9th Edition?

Reply: Yes.

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Standard 620, Ninth Edition—Appendix Q

Issue Date: February 18, 1997

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question: What are the maximum allowable tensile stresses in API 620 for stainless steel materials used for shell plate, nozzles, piping, flanges, etc.?

Reply: API 620 permits the use of materials specifically identified in the document. Except for Appendix Q, stainless steel is currently not acceptable for an API 620 tank. (Note that API 650 recently added Appendix S to permit the use of stainless steels for tanks covered by API 650.)

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 620, Ninth Edition—Appendix R

Issue Date: September 26, 1997

Publication: API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

Edition/Date: Ninth Edition, February 1996

Question 1: Referring to API 620, paragraph R.7.3.1, 9th Edition, is stress relieving of a nozzle assembly prior to installation required only if the nozzle assembly is fitted with a thickened insert plate?

Reply 1: No. Paragraph R.7.3.1 requires all nozzle assemblies in primary components to be stress relieved, with specific exceptions. The use of a thickened insert plate is not a factor.

Question 2: Is local stress relieving acceptable if the above nozzle is welded directly to the shell with a reinforcing pad?

Reply 2: No. The rules in Appendix R take precedence over those in the basic document. See paragraph R.7.3.1.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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STANDARD 650

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STANDARD 650, SEVENTH EDITION, NOVEMBER 1980; REVISION 1, FEBRUARY 1984

Standard 650, Seventh Edition, Revision 1—Foreword

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Foreword: With the end user's consent, is it permissible to design, fabricate, erect, and test new oil storage tanks using an outdated edition of Standard 650?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—General

Issue Date: March 23, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Why was the minimum top angle size changed from 2 inches × 2 inches × $^{3}/_{16}$ inch in the Sixth Edition to $2^{1}/_{2}$ inch × $2^{1}/_{2}$ inch × $^{1}/_{4}$ inch in the Sixth Edition, Revision 3?

Reply: Please be advised that the American Petroleum Institute issues interpretations in response to questions concerning the meaning of its standards and is always ready to consider suggestions for revisions to its standards. API does not normally respond to questions seeking the rationale for requirements in its standards. These requirements are based upon consideration of technical data, and the judgment and skill of experienced engineering and technical personnel representing both users and manufacturers who serve on the standards committees. However, in Revision 1 to the Seventh Edition, February 1984, top angles of 2 inches × 2 inches × $^{3}/_{16}$ inch are permitted for tanks 35 feet and smaller in diameter (paragraph 3.1.5.8.5).

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—General

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: Can you cut an opening in a horizontal or vertical seam?

Reply 1: According to Standard 650, Seventh Edition, you cannot cut an opening in a vertical or horizontal seam. However, the API Pressure Vessels and Tanks Subcommittee is reviewing these options.

Question 2: Can a repad cover a horizontal or vertical seam?

Reply 2: See reply for question 1.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—General

Issue Date: October 27, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Is the required area of reinforcing the product of the vertical hole dimension times the *actual shell thickness used* or the required shell thickness?

Reply: Standard 650, Seventh Edition, 1980, Revision 1, 1984, states that the required minimum area of reinforcing is the product of the vertical opening and the actual plate thickness used. The Eighth Edition, when published, should be consulted.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 2

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Can a material that is produced to a specification not listed in Section 2 be employed in the construction of an API Standard 650 tank if it is certified to meet all the requirements of a material specification listed in Section 2?

Reply: Yes; see paragraph 2.1.1.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 2

Issue Date: March 23, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: Can the states of Alaska and Hawaii be included in Figure 2-1?

Reply 1: This has been referred to the proper API committee for consideration.

Question 2: What are the minimum design metal temperatures for plates used in tank shells without impact testing (reference: Figure 2-2) required for plates between 0.25 and 0.5 in Groups II and III?

Reply 2: Group II continues with Group V, and Group III continues with Group IIIA.

Question 3: To what components do the toughness requirements apply in paragraph 2.2.9?

Reply 3: The toughness requirements are for the components listed in paragraphs 2.2.9.1 through 2.2.9.4.

Question 4: Can 80 ksi electrodes be used to weld materials less than 80 ksi minimum tensile?

Reply 4: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 2.2

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: Is the intent of Table 2-1 of Standard 650, Seventh Edition, 1980, the same as Table 2-1 of Standard 650, Seventh Edition, Revision 1, 1984?

Reply 1: Yes. The maximum nitrogen content remains 0.015 percent, as required per footnote 4 of Table 2-1.

Question 2: Should the product analysis be added to Table 2-1?

Reply 2: This item has been referred to the appropriate subcommittee.

Question 3: What specification is referred to in footnote 2 of Table 2-1 of Standard 650?

Reply 3: The applicable specification to which the material is manufactured.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 2.2

Issue Date: October 13, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: In Standard 650 (paragraphs 2.2.9 and 2.2.10), are the Canadian standards G40.21-38T and G40.21-44T the same as the new standards G40.21-38WT and G40.21-44WT?

Reply 1: Yes.

Question 2: Why are G40.21-38T and G40.21-40T in a different group? Would it be because the higher yield strength the more brittle the material?

Reply 2: They have been assigned to the respective groups based on expected toughness levels as indicated by the Figure 2-2 exemption curves.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 2.5

Issue Date: January 5, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: Should paragraph 2.5.5 in right column of page 2-8 be 2.5.5.5?

Reply 1: Yes.

Question 2: Does paragraph 2.5.5.5 mean that materials per 2.5.1, 2.5.2, and 2.5.4 need not be impact tested when design metal temperature is 0°F or higher?

Reply 2: No. The impact requirements of 2.5.5.1, 2.5.5.2, and 2.5.5.3 still apply.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.1

Issue Date: March 8, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Can a shell to bottom plate weld be less than required by paragraph 3.1.5.6.1?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.1

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Are there any alternative details for Figure 3-3B for lap welding bottom plates under the tank shell?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.1

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Can a proposed alternate detail to Figure 3-3B be used?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.5

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Paragraph 3.5.1: When butt welded annular plants are required with Charpy impact tested shell, does the annular plate material have to meet any notch toughness requirements?

Reply: Yes; see paragraph 2.2.9.1.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.6

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Is there an inconsistency in the use of the term "nominal" as defined in 3.6.1.1, note 2, where "nominal" includes corrosion allowance, and 3.4.1 where "nominal" thickness is exclusive of corrosion allowance?

Reply: Yes, an agenda item will be requested to clarify this question.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.6

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: For calculating the thickness of an upper ring by the variable point method, do you use the thickness of the lower ring including corrosion allowance?

Reply: No. Use the thickness of the lower ring excluding corrosion allowance as per 3.6.4.2.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.6

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: If the specific gravity of test water is greater than 1.00, should there be a correction factor applied to the formulae in 3.6.3.2, 3.6.4.4, and 3.6.4.7 for hydrostatic shell thickness in Standard 650, Seventh Edition, Revision 1?

Reply: No.

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Standard 650, Seventh Edition, Revision 1—Section 3.7

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: Paragraph 3.7.2.1: Should "plate thickness used" be replaced with "required minimum thickness of shell plate (per paragraph 3.6.3.2 or 3.6.4.4 with CA equals 0)"?

Reply 1: This suggestion will be considered during the next review of Standard 650?

Question 2: Can the requirements of Standard 650, paragraph 3.7.7 be extrapolated to larger opening sizes?

Reply 2: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.7

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Can the requirements of Standard 650, paragraph 3.7.7 be extrapolated to larger opening sizes?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.7

Issue Date: March 8, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Does paragraph 3.7.4.3 allow a local stress relief of a nozzle after it is welded into the shell course?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.7

Issue Date: March 8, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Is it required to machine out the notch in Figure 3-10 by a milling machine?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.8

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: As an alternative to paragraph 3.8.3.2, is it possible to leave the manhole bolting flange as it is, but to counterbalance the weight of the mixer and torque produced by an independent supporting structure?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.10

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: Paragraph 3.10.2.2: For supported cone roofs with $^{3}/_{16}$ inch plates, is the live load limited to 25 psf?

Reply 1: No.

Question 2: Paragraph 3.10.2.2: If the roof dead plus live load exceeds 32.65 psf, should the roof plate thickness be

$$0.1875 \times \frac{D + L}{32.65}^{\frac{1}{2}}$$

Reply 2: The American Petroleum Institute does not approve, recommend, or endorse any proprietary or specific design or limit the method of design or form of construction that might be used to conform to an API standard.

Question 3: Paragraph 3.10.2.4: If corrosion allowance is required for structural members, should the corrosion allowance be added to 0.17 minimum nominal, or should it only be added to designed thickness?

Reply 3: The method of providing a corrosion allowance, if any, for the structural members should be a matter of agreement between the purchaser and the manufacturer.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 3.10

Question 4: Paragraph 3.10.5.2 and 3.10.6.2: Should the required area calculated in these paragraphs be limited to dead plus live load not exceeding 45 psf?

Reply 4: Yes.

Question 5: Paragraph 3.10.5.2 and 3.10.6.2: If dead plus live load exceeds 45 psf, should the required area be increased in proportion to $(D + L)/45$?

Reply 5: Yes.

Question 6: Paragraph 3.10.5.2 and 3.10.6.2: In the cases of self-supporting dome or cone roof tanks, with internal pressure, should the participating area of roof and shell be in accordance with F.3 or paragraphs 3.10.5.2 and 3.10.6.2?

Reply 6: All Standard 650 requirements shall be satisfied.

Question 7: Paragraph 3.10.5.2 and 3.10.6.2: To be consistent with other standards and paragraph F.3, should the participating area of roof and shell for self-supporting cone and/or dome roofs be in accordance with paragraph F.3 and shouldn't paragraphs 3.10.5.2 and 3.10.6.2 be revised accordingly?

Reply 7: This suggestion will be considered during the next review of Standard 650.

Question 8: Paragraph 3.10.2.2: For supported cone roofs with $^{3}/_{16}$ inch plates, is the live load limited to 25 psf?

Reply 8: No.

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Standard 650, Seventh Edition, Revision 1—Section 3.10

Issue Date: October 27, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Is it possible to define maximum weld size for roof plate to top angle juncture for supporting cone, dome, or umbrella roof tanks so that the juncture can be classified as "frangible" (assuming all other conditions of frangibility are met)?

Reply: No. See paragraph 3.10.2.5.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 5.2

Issue Date: October 13, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: When welding a tank fabricated from 316 LM, $^{3}/_{16}$ inch thick material, do the requirements of Standard 650, paragraph 5.2.1.2 apply?

Reply: Standard 650 covers only tanks that are fabricated from the materials listed in Section 2. As can be seen, 316 stainless steel is not within the scope of Standard 650; and therefore, the welding requirements of Standard 650 might not apply. Refer to Standard 620, Appendix Q for stainless steel tanks.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 5.5

Issue Date: January 5, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984.

Question 1: Are the tolerances per Section 5.5 regarding peaking and banding limited to the vertical and horizontal joints.

Reply: No.

Question 2: May they be applied to all local departures of shell plates?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 5.5

Issue Date: March 23, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984.

Question 1: Do the tolerances in 5.5.5 (1b) apply to the foundation other than the periphery under the tank shell?

Reply1: No.

Question 2: Do the tolerances in 5.5.5 (2b) apply to the foundation other than the periphery under the tank shell?

Reply 2: No.

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Standard 650, Seventh Edition, Revision 1—Section 5.5

Issue Date: July 5, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Does Standard 650 have requirements for roundness other than that covered in paragraph 5.5.2?

Reply: No.

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Standard 650, Seventh Edition, Revision 1—Section 6.1

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: In complying with the requirements of paragraph 6.1.2.4, does radiography of only one of two identical tanks satisfy the requirements?

Reply: No; this is only for determining the aggregate footage when applying the requirements of other paragraphs.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Section 6.1

Issue Date: March 8, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question 1: Do unacceptable sections of welds determined by radiograph require re-radiograph after repair?

Reply 1: Yes.

Question 2: Is it required to make additional radiographs in the weld adjacent to unacceptable sections of welds in accordance with requirements in 6.1.6?

Reply 2: Yes.

Question 3: Is it required to make additional radiographs in the weld adjacent to acceptable "imperfections" found in original radiographs?

Reply 3: No.

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Standard 650, Seventh Edition, Revision 1—Appendix B

Issue Date: March 23, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Is a bottom slope other than 1 inch in 10 feet acceptable?

Reply: Yes. Appendix B is a recommended practice, and a slope of 1 inch in 10 feet is suggested as a minimum.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Appendix F

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: In the Appendix F maximum design pressure calculation procedure, can the weight of the bottom be included when calculating the term W (total weight)?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Appendix F

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Paragraph F.7.1: For an anchored tank, is it permissible to design the shell per paragraph 3.6.3 or 3.6.4, and can the shell thickness exceed 0.5 inch?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Appendix F

Issue Date: October 27, 1988

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: May a flush-type clean out fitting per 3.7.7 be used in an Appendix F tank?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Seventh Edition, Revision 1—Appendix H

Issue Date: August 17, 1987

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Seventh Edition, November 1980; Revision 1, February 1984

Question: Is it permissible to satisfy the requirements of paragraph H.5.1.2 with a design factor of 1.4 instead of 2 for small tanks ($D \leq 5$ meters)?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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STANDARD 650, EIGHTH EDITION, NOVEMBER 1988

Standard 650, Eighth Edition—General

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does API 650 have rules for designing tanks for external pressures?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Are openings in the cover plate of flush-type cleanout larger than 2 inch pipe size permitted by API 650 if reinforced?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Does API 650 assume inelastic response to earthquakes?

Reply 1: Yes.

Question 2: Explain the difference in results between API 650 and Housner.

Reply 2: Please be advised that the American Petroleum Institute issues interpretations in response to questions concerning the meaning of its standards and is always ready to consider suggestions for revisions to its standards. API does not respond to questions on engineering issues outside the scope of the standard.

Question 3: Explain the difference in results between Wozniak/Mitchell and Housner.

Reply 3: API does not evaluate designs or calculations.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: June 20, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Does API approve of pipe sizes greater than 6 inches in diameter for drawoff sumps?

Reply 1: No.

Question 2: Can 6 inch pipes from drawoff sumps be connected to 18 inch or 24 inch headers?

Reply 2: We have received your inquiry relative to the approval of your specific design. The American Petroleum Institute does not approve, recommend, or endorse any proprietary or specific design or limit the method of design or form of construction that might be used to conform to the API standard. Therefore, we cannot act on your inquiry.

Question 3: May flush type shell connections be used instead of drawoff sumps?

Reply 3: We have received your inquiry relative to the approval of your specific design. The American Petroleum Institute does not approve, recommend, or endorse any proprietary or specific design or limit the method of design or form of construction that might be used to conform to the API standard. Therefore, we cannot act on your inquiry.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: October 17, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: We have received your inquiry of June 28, 1990, relative to the approval of your specific design.

Reply: The American Petroleum Institute does not approve, recommend, or endorse any proprietary or specific design or limit the method of design or form of construction that might be used to conform to API Standard 650, *Welded Steel Tanks for Oil Storage*. Therefore, we cannot act on your inquiry.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does API Standard 650 permit the use of G40.21-M81, Grade 300W semi-kiled, for "non-critical" components such as tank roofs, main bottoms (not sketch plates welded to the shell), floating roofs, column base plates, etc.?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does API Standard 650 state minimum distances between vertical shell welds and welds in butt welded annular plates?

Reply: No. An agenda item will be taken out to study this matter.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: April 30, 1993

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does API Standard 650 provide rules for spacing with riveted tank apparatus?

Reply: No. API Standard 650 is titled, *Welded Steel Tanks for Oil Storage*.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: April 30, 1993

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does API Standard 650 require only spot radiography for a joint efficiency of 1.0?

Reply: API Standard 650 in the basic document does not use the concept of joint efficiency in the thickness formulas. In Appendix A, the designer has a choice of radiography requirements (spot or none) and is required to apply an associated joint efficiency (0.85 or 0.70).

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—General

Issue Date: April 30, 1993

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Are there any circumstances which would allow the use of API Standard 650 within the industry for the re-erection of a tank?

Reply: No. API Standard 650 covers only construction. API Standard 653 covers re-erection of carbon and low-alloy aboveground steel storage tanks which are nonrefrigerated and designed for atmospheric pressure.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Figure 2-1

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: When reading the API 650, Figure 2-1 chart "Minimum Permissible Design Metal Temperature for Plates Used in Tank Shells Without Impact Testing," does the Group II line coincide with the Group V line to include thicknesses less than 0.5 inch?

Reply 1: Yes.

Question 2: When reading the same chart, does the Group II line coincide with the Group IIIA line to include thicknesses less than 0.5 inch?

Reply 2: Yes.

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Standard 650, Eighth Edition—Figure 2-1

Issue Date: March 25, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: In Figure 2-1 of API Standard 650, can Group III or IIIA materials be used for design metal temperatures below –40°F without impact testing?

Reply: No. Figure 2-1 does not allow any material to be used below –40°F without impact testing.

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Standard 650, Eighth Edition—Section 2.2

Issue Date: July 2, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Is the intent of API Standard 650, Eighth Edition, Table 2-2 to limit the nitrogen content of 0.015 percent when added as a supplement to vanadium?

Reply: This item has been referred to the appropriate subcommittee for further consideration.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 2.2

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: API 650, Eighth Edition, paragraph 2.2.9.4 requires one to use the same material for a reinforcing plate as the shell plate to which it is attached. Does this contradict the requirements of paragraph 2.2.9.1?

Reply: No. Your suggestion for a change to API 650, paragraph 2.2.9.4 will be considered for the next edition of the standard.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 2.2

Issue Date: November 14, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Will API 650, Table 2-3 allow the use of A36 in Group II for thicknesses up to 0.75 inch with no limits on manganese content?

Reply: The basis for allowing A36 at the lower Group II temperatures without impact testing (per Figure 2-1) is the manganese addition.

The fact that A36 is not readily available with the required chemistry is not relevant. Group II applies to all thicknesses up to 1.5 inches.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 2.5

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Can ASTM A105 flanges be used on tanks where the minimum design metal temperature is +5°F?

Reply 1: No, if classified as a Group I material per paragraph 2.5.5.2, and yes, if classified as a Group II material (up to 0.75 inch maximum nominal thickness) per paragraph 2.5.5.2 (normalized).

Question 2: If ASTM A350-LF1 flanges are used for +5°F minimum design metal temperature tanks, is there any size or thickness limitation?

Reply 2: No.

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Standard 650, Eighth Edition—Section 2.7

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: What NDE requirements apply to the long seam in the manway and nozzle necks from plate material?

Reply 1: Unless the pipe is fabricated from A-671, there are no NDE requirements.

Question 2: Are lay type joint flanges, meeting requirements of ANSI B16.5, permitted on API 650 tanks?

Reply 2: No.

Question 3: Should the bolting materials referred to in Section 2.7 be A307 and A193 instead of A36 and A193?

Reply 3: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.1

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Is the purpose of 3.1.5.3.b of API 650, Eighth Edition, to strictly prohibit the commonly accepted industry practice of aligning the inside diameter of the shell courses, including courses of differing thicknesses, and, therefore, offsetting the vertical centerlines?

Reply: The paragraph does not "strictly prohibit" the practice, but it does require this procedure to be specified by the purchaser.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.5

Issue Date: March 25, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Does the annular ring have to be of the same material group as the shell when it is being provided to meet minimum requirements of paragraph 3.5 (i.e., not designed for stress)?

Reply 1: No. Refer to paragraph 2.2.9.1 and Figure 2-1 for rules to use to determine thickness (of bottom plates welded to shell) as a function of group number. The requirements in paragraph 3.5 and Table 3-1 must also be satisfied.

Question 2: Does the annular ring have to be of the same material group as the shell when it is being designed to carry loading such as earthquake uplift?

Reply 2: No. Refer to Appendix E for additional rules applicable to earthquake loads and their application to annular rings (see E.4). The requirements in paragraph 2.2.9.1, Figure 2-1, paragraph 3.5, and Table 3-1 also apply.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.7

Issue Date: June 29, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does 3.7.5.1 permit the distance between the toes of welds to be less than 3 inches on 30 inch manways in violation of rules in 3.7.3?

Reply: No. Figure 3-4A notes under centerline dimensions for manholes (increase as necessary for clearance). Both sections are being balloted for revision for clarity.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.7

Issue Date: June 29, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: In API Standard 650, paragraph 3.7.8.11, does the butt weld between the weld neck flange and the nozzle neck of flush-type shell connections have to be radiographed?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.7

Issue Date: April 30, 1993

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: In API Standard 650, do the rules of 3.7.3 take precedence over Figure 3-4A for weld spacing?

Reply: Yes. Figure 3-4A is being revised to eliminate any confusion.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.9

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: What is "t," "$t_{uniform}$," and "t_{actual}" in 3.9.7?

Reply: "t" is the thickness, as furnished of the top shell course, in inches. "$t_{uniform}$," is the thickness, as furnished of the top shell course, in inches. "t_{actual}" is the thickness of the shell course for which the transposed width is being calculated in inches.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.9

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Is "*t*," in 3.9.7.1 the furnished or corroded thickness?

Reply 1: Furnished.

Question 2: Can the note in 3.9.7.1 be restored?

Reply 2: The next edition of API 650 will contain an explanatory note that "*t*" is as furnished.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.9

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Is *t* in 3.9.7 the uncorroded shell thickness?

Reply: Yes. The next revision of API Standard 650 will show this *t* as the *ordered thickness*.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 3.10

Issue Date: March 25, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: For Canadian applications, may the allowable stresses and design rules in paragraph 3.10.3 of API Standard 650 be waived if 300W steel and the "limit states" design method are used?

Reply: No.

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Standard 650, Eighth Edition—Section 5.2

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Is it the intent of paragraph 5.2.3.3 that the reverse side of double-welded butt joints be gouged in a manner that leaves the exposed surface smooth and in a sound metal condition prior to the application of the first bead to the second side?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 5.2

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Is it the intent of API 650, Eighth Edition, paragraph 5.2.3.6 to require visual and magnetic particle, or at the option of the purchaser, liquid penetrant, examination of the designated welds in the usual and far more frequent case where no stress relief is required?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 5.2

Issue Date: April 30, 1993

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Concerning the use of low-hydrogen electrodes in API Standard 650, does 5.2.1.10 override 2.8.1?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 5.3

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Referring to API Standard 650, paragraph 5.3.7, are roofs that are equipped with open free-flowing vents (for example, mushroom vents) or with nominal pressure vents (for example, breater vents) exempt from air testing or vacuum testing of welds?

Reply: No. The exemptions for air testing the roof or vacuum testing the welds are permitted only if peripheral circulation vents are provided or if the purchaser specifies that a gas-tight roof is not required.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 5.5

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does paragraph 5.5.4 on "peaking" apply to the flatness requirements of the tank bottom?

Reply: No. Peaking in 5.5.4 applies to vertical cylindrical surfaces as measured with a horizontal sweep board.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Section 6.1

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: All other requirements of paragraph 6.1.2.2.a being met, can a horizontal and vertical joint junction radiograph be used to satisfy the requirement of the last sentence of paragraph 6.1.2.2.a, without any other radiographs being taken in the respective vertical weld?

Reply: Yes.

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Standard 650, Eighth Edition—Appendix A

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Is the intent of API 650, A.1.1 to limit the size of flush type cleanout doors used on Appendix A tanks to 8 inch × 16 inch and 24 inch × 24 inch with a maximum 34 foot product height?

Reply 1: Yes.

Question 2: Does the $^{5}/_{8}$ inch limit of A.8.2 contradict the intent of A.1.1? If the answer is no, is it the intent that A.8.2 override A.1.1 (under the terms of paragraph A.1.4)?

Reply 2: No; no.

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Standard 650, Eighth Edition—Appendix A

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Is it the intent of API 650 to require MT of fitting and attachment welds for Appendix A tanks under any circumstances?

Reply: Yes. See paragraph 5.2.3.6.

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Standard 650, Eighth Edition—Appendix A

Issue Date: June 29, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Are anchored tanks subject to pressures between P_{max} and $2^1/_2$ psig subject to Appendix A and Formula A.3.1?

Reply: Yes.

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Standard 650, Eighth Edition—Appendix C

Issue Date: October 22, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Is the intent of API 650, paragraph C.3.6 to require that floating roof compartments only be internally pressure tested when gas/tight compartments are specified by the purchaser?

Reply: No.

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Standard 650, Eighth Edition—Appendix E

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Should Appendix E be revised per 1988 UBC?

Reply: This suggested revision to API 650 has been forwarded to the committee responsible for this document and are under consideration for inclusion in the next revision.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix E

Issue Date: June 8, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does API 650, Appendix E require checking the stability of the shell against ovalization?

Reply: No. (Note in E.1 that the purchaser may specify additional requirements to be checked by the manufacturer.)

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix E

Issue Date: August 21, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Is it necessary to check the resistance to overturning per Section E.4 and the shell compression for unanchored tanks per Section E.5.1 whatever the value found for M?

Reply 1: Yes.

Question 2: Can these above sections be ignored when the uplift force is counterbalanced by only the weight of the steel shell assuming that the above-mentioned uplift force due to M has the opposite sign of the compression force $1.273\ M/D^2$ given in Section E.5.2 for unanchored tanks?

Reply 2: No.

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Standard 650, Eighth Edition—Appendix E

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Does API Standard 650 equate *Z*, zone coefficient in E.3.1, to Richter Scale Factor 6?

Reply 1: No.

Question 2: Can you give us the *Z* factor for the Esphahan Province of Iran?

Reply 2: No. It is recommended that you consult an engineering or geotechnical firm experienced in seismic design in your location.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix F

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: Should corrections be made to Figure F-1?

Reply 1: This suggested revision to API 650 has been forwarded to the committee responsible for this document and are under consideration for inclusion in the next revision.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix F

Issue Date: May 23, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: In Figure F-1, is R_2 the length of the line normal to the roof and measured from the roof to shell junction to its intersection with the centerline of the tank?

Reply: Yes.

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Standard 650, Eighth Edition—Appendix F

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: In designing tanks with internal pressures requiring anchors per API Standard 650, Appendix F, paragraph F.7, is the weight of framing and insulation considered?

Reply 1: No. Only the weight of framing supported by the shell may be considered.

Question 2: In F.7, can the shell thickness be designed in accordance with 3.6.3.2?

Reply 2: No. Paragraph A.4.1 must be used.

Question 3: Does API Standard 650, Appendix F, allow design pressures greater than 2.5 psi?

Reply 3: No.

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Standard 650, Eighth Edition—Appendix F

Issue Date: June 29, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: In paragraph F.1.2 of Standard 650, is the nominal weight of the shell less corrosion allowance?

Reply 1: No.

Question 2: In paragraph F.2.1, should "of $2^1/_2$ psig" be between P_{max} and $2^1/_2$ psig?

Reply 2: Yes. This change will be made in subsequent editions.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix F

Issue Date: June 29, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: May roof manholes for Appendix F tanks be designed per Figure 3.4A and Tables 3.3 to 3.7 for the minimum equivalent pressure instead of the API Standard 620 design as required by F.7.3?

Reply: If the weight of the shell and roof exceed the uplift due to internal pressure, Section F.7 is not mandatory and the roof manholes shall be designed by API Standard 650, paragraph 3.8.5 and Figure 3-12. If the uplift due to internal pressure exceeds the weight of the shell and roof, then Section F.7 applies, including design and welding of roof manways. An agenda item has been taken out to see if paragraph F.7.3 needs clarification or revision.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix F

Issue Date: April 30, 1993

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: In F.1.2 of API Standard 650, is the *nominal* weight of the metal that counterbalances the internal pressure calculated in the uncorroded condition?

Reply: Yes, unless otherwise specified by the purchaser.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix G

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: In the proposed API Standard 650 Appendix G, paragraph G.8.3 reads in part, "Emergency venting, if required, shall meet API 2000 requirements." When is emergency venting required?

Reply: API Standard 2000 gives a method for determining venting requirements including emergency venting. If the tank has adequate venting to accommodate the emergency venting capacity, no additional emergency vent is required. Or, if the product in the tank is nonflammable and nontoxic, the owner may wish to waive emergency venting requirements.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix H

Issue Date: January 3, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question: Does API Standard 650, H.7.2, require for all types of internal floating roofs, physical testing of deck seams and other joints that are required to be liquid- or vapor-tight?

Reply: Yes.

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Standard 650, Eighth Edition—Appendix H

Issue Date: June 29, 1992

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: CLAUSE H.4.2.2—This clause referring to all roofs is not appropriate to some sandwich decks. We do not believe that this should be a universal requirement.

Reply 1: No reply.

Question 2: CLAUSE H.4.3.4—Our preceding comments apply equally to this clause.

Reply 2: We have very strong safety concerns with joints that are in contact with vapor or liquid that are not sealed vapor tight. It is the opinion of our Subcommittee on Pressure Vessels and Tanks that all joints exposed to product (either liquid or vapor) should be vapor tight.

Question 3: CLAUSE H.4.5.1—We frequently carry out a tank survey prior to undertaking an internal roof installation and tailor our roofs to suit the particular tank. In so doing, we have found that the tolerance requirement of ±4 inches is somewhat excessive and leads to unnecessarily wide rim gaps. We consider that the tolerance should be related to tank diameter, increasing with increase in tank size.

Reply 3: Various tolerances for rim spacing are possible for different size tanks and will be considered by the subcommittee for inclusion in the next edition of API Standard 650.

Question 4: CLAUSE H.5.3.2—Aluminum sandwich roofs of the type we supply have a very low installed weight. The buoyancy requirement that the roof should be designed to support twice its dead weight is in our opinion inappropriate. Bouyancy should be sufficient to support the roof dead weight plus the weight of two men standing on top (see clause H.4.2.5).

Reply 4: Your proposal would leave a very small factor of safety.

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Standard 650, Eighth Edition—Appendix H

Issue Date: June 29, 1992

Question 5: CLAUSE H.5.3.4—The requirement for all edges of the panels to be sealed is in our experience completely unnecessary. Panels in the roofs we supply are not sealed in any way around the edges. This is due to their inherent buoyancy and have not given any problems in nearly 20 years of operational service.

The basis for our view is the result of tests conducted by a major oil company in the U.K. for a period of 15 years. Samples of panel materials in test roofs were removed, inspected, and analyzed biannually. This indicated that for the first four to five years product was absorbed by the core material (closed call polyurethane) at its outer edges and where it contacted the top and bottom aluminum skins. After this period, the uptake stabilized and there was no further significant increase. The concentration of product absorbed was 6.35 percent maximum vol/vol, whereas a concentration of 62 percent vol/vol is required to sink the roof. Besides buoyancy there was no measurable effect on material compressive properties, foam cell structures, or adhesives.

It is our conclusion that panel edges sealing is unnecessary if the roof constructional materials and adhesives are chosen correctly and assessed to establish their acceptability beforehand.

Reply 5: Tanks in the petroleum industry are subject to many different environments that could attack an unsealed edge.

Question 6: CLAUSE H.6.1.1—The need to provide a ladder, although not mandatory, is an unusual practice for internal roofs. This requirement is usually applied to external floating roofs.

Reply 6: It is *usual* for larger tanks to have internal ladders. Standard 650 allows the purchaser the option to omit the ladder.

Question 7: CLAUSE H.6.4—While we agree that an anti-rotation device is essential, we consider that the provision of a self-centering device for the internal roof should be optional. As indicated previously very few tanks are either round, perpendicular or free of flat plates. In these circumstances, it is better for the roof to be allowed to take up a natural position which may not necessarily be "on center." The peripheral seal will to some extent automatically self center the roof in the tank.

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Standard 650, Eighth Edition—Appendix H

Issue Date: June 29, 1992

Reply 7: We disagree. The liquid filling action can cause the floating roof to migrate, thus overcompressing the seal on one side and leaving gaps on the other.

Question 8: CLAUSE H.6.5.2—While we can see the need to specify a minimum diameter for an entry manhole for large tanks, this may not be ideal for very small tanks for structural/stress reasons. It should be sufficient to specify that a manhole be provided which is large enough to permit unobstructed access.

Reply 8: If you are going to eliminate the ladder, a 24-inch manway is essential to pass hoses, electrical cables, and a ladder and still allow a man easy and safe access through the manhole.

Question 9: OMISSIONS—From our experience, we feel that guidance on the following should be provided in the requirements:

(a) The need for a diffuser on the fuel entry pipe in order to disperse the inlet stream and eliminate damage to the roof undersurface when it is on its legs or in a low position.
(b) Procedures to follow when entering tanks equipped with internal roofs for inspection, repair, or modification purposes.
(c) Procedures to follow before carrying out "hot work" in a tank fitted with an internal roof. Should the roof be removed or just those components, i.e., seals, pontoons which contain absorbent materials and which make complete degassing impossible.
(d) Procedures for carrying out routine inspections of internal roofs. Is it acceptable to walk on a roof to inspect seals, etc., while it is floating on product? We think not.

Reply 9: While these items are important, the scope of API Standard 650 is limited to new tank construction. A copy of API's publication catalogue is enclosed for your use in ordering publications addressing these issues.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Eighth Edition—Appendix P

Issue Date: June 8, 1990

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Eighth Edition, November 1988

Question 1: On page P-13 of API 650, should the units of K_r be pounds per inch instead of pound-feet?

Reply 1: Yes.

Question 2: On page P-13 of API 650, should the units of K_1 be in inch-pound per radian instead of foot-pounds per radian?

Reply 2: Yes.

Question 3: On page P-14 of API 650, should the units of K_c be in inch-pounds per radian instead of foot-pounds per radian?

Reply 3: Yes.

Question 4: On page P-3 (Figure P-1, Radial Load F_r), should the sign of θ be positive if the nozzle is turned down in accordance with the formula for θ in P.5.2?

Reply 4: Yes, but change the sign of the formula for θ.

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STANDARD 650, NINTH EDITION, JULY 1993

Standard 650, Ninth Edition—General

Issue Date: April 9, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650 include the applicable requirements for tanks that are stated in pertinent *Code of Federal Regulations*?

Reply: API 650 makes no attempt to address CFR requirements, nor those of any other jurisdiction. Compliance with the various jurisdictions is a contractual matter between the tank manufacturer and the purchaser.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—General

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650 have rules covering the process of certifying NFPA-30 requirements for storage of combustible products?

Reply: No.

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Standard 650, Ninth Edition—General

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Is a repad allowed to go to the tank bottom and intersect the bottom at 90 degrees to the bottom?

Reply: Yes.

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Standard 650, Ninth Edition—Section 2.2

Issue Date: April 9, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650, Ninth Edition, prohibit the use of ASTM A240 material?

Answer: Yes, see paragraph 2.2.2, where acceptable plate material specifications are identified. ASTM A240 is not included on that list, and therefore construction with that material would not meet API 650 Ninth Edition compliance.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 3.5

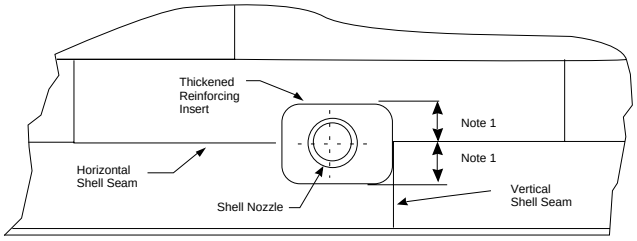
Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

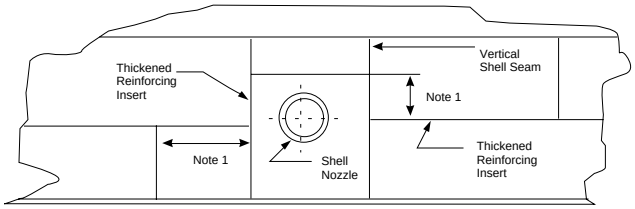
Question: Does API require an annular plate to be used if (a)bottom plates ($^1/_2$ inch nominal thickness) are butt welded and 100 percent radiographed, and (b) the bottom shell course material falls under Group IV or V, and (c) the materials are not Charpy tested?

Reply: The requirement to provide an annular plate depends upon the material group and stress levels in the bottom shell course. Refer to paragraph 3.5.1. The question cannot be answered without more information being provided. Bottom plate thickness, the NDE applied, and the material toughness are not factors in the decision.



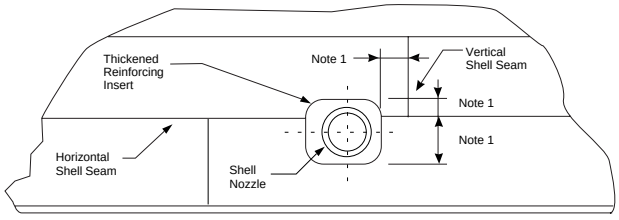
Note 1: Dimensions Comply with API 650. 3.7.3

Figure A



Note 1: Dimensions Comply with API 650. 3.7.3

Figure B



Note 1: Dimensions Comply with API 650. 3.7.3

Figure C

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 3.6

Issue Date: June 13, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Referring to API 650, paragraph 3.6.3.2, is it required to add the depth of undercut (vertical seam $^{1}/_{64}$ inch, or horizontal seam $^{1}/_{32}$ inch) to the calculated thickness?

Reply 1: No, as long as the undercut does not exceed the limits of paragraph 5.2.1.4.

Question 2: Does API 650 permit having both a shell plate underrun of 0.01 inch and the above weld undercuts on the same tank?

Reply 2: Yes. These allowances are independent of each other on API 650.

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Standard 650, Ninth Edition—Section 3.6

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Is the joint efficiency in equations of paragraph 3.6 assumed to be 1.0? Why?

Reply: Yes. API does not provide a rationale for material presented in the standards.

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Standard 650, Ninth Edition—Section 3.6

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Does API specify the maximum height to which a tank may be filled?

Reply 1: Yes. See definition of *H* in paragraphs 3.6.3 and 5.3.6.a.

Question 2: Does API 650 permit a tank to be filled to the top of the shell including the top angle?

Reply 2: Yes, in some cases. See definition of *H* in paragraphs 3.6.3 and 5.3.6.a.

Question 3: Does API 650 allow for overflows?

Reply 3: Overflows limiting *H* as defined in paragraph 3.6.3 are permitted.

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Standard 650, Ninth Edition—Section 3.6

Issue Date: August 7, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Is the formula in 3.6.4.4 for the variable point calculation for hydrostatic test conditions correct?

Reply: The formula is correct in Addendum 2 to the Ninth Edition of API Standard 650.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 3.6

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: If the calculated shell thickness is $^1/_8$ inch and the specified corrosion allowance is $^1/_8$ inch, must the shell thickness be obtained by adding the $^1/_8$ inch to the minimum thicknesses required by paragraph 3.6.1.1, which would be $^1/_8$ plus $^3/_{16}$ inch, or can it be determined by adding the corrosion allowance to the computed required minimum thickness, in this case, $^1/_8$ inch plus $^1/_8$ inch?

Reply: The minimum thickness requirements of paragraph 3.6.1.1 are primarily for fabricability. The corrosion allowance may be added to the computed shell minimum thickness, in this case, $^1/_4$ inch total.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: November 8, 1994

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Does the weld space requirements in 3.7.2.3 of API Standard 650 apply if the reinforcing pads are on the inside of the wall?

Reply 1: Yes.

Question 2: Does API Standard 650 specify a minimum space between annular ring butt joints and shell vertical butt joints?

Reply 2: No.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: November 9, 1994

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Does the insert plate in Figure A (of attachment) meet the weld spacing requirements of Section 3.7.3 of API Standard 650?

Reply 1: Yes.

Question 2: Does the insert plate in Figure B (of attachment) meet the weld spacing requirements of Section 3.7.3 of API Standard 650?

Reply 2: Yes.

Question 3: Does the insert plate in Figure C (of attachment) meet the weld spacing requirements of Section 3.7.3 of API Standard 650?

Reply 3: Yes.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: September 26, 1997

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650 allow for nozzles to be installed in circumferential seams?

Reply: Yes, if the conditions specified in paragraph 3.7.3.4 are met, including purchaser and manufacturer agreement, nozzle spacing, and radiography requirements.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: June 12, 1995

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Do the requirements in API 650, paragraph 3.7.8.11 apply to all nozzles?

Reply: No, they apply only for flush-type shell connections.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: April 9, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650, paragraph 3.7.4.4, require for the stated materials that the weld attaching a nozzle reinforcing plate to a shell plate be stress relieved?

Reply: Yes, in addition, the nozzle-to-shell weld is to be stress relieved also.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: April 9, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Is the thickness, *T*, in Table 3-4 the same as t_{shell} for the thickness of the opening reinforcement?

Reply 1: Yes.

Question 2: Is the thickness t_n in Table 3-4 equal to *T* plus *t*?

Reply 2: No. In column 1, *T* and *t* are not considered to be a sum.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Are the shell nozzle heights governed by the weld spacing specified in column 9 of Table 3-8 or by footnote c?

Reply: A spacing that is the greater of column 9 or footnote c applies. An agenda item is currently under consideration to review weld spacing requirements.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650 specify a minimum number and location for manholes and inspection openings in tanks?

Reply: No.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Regarding reinforcement for shell openings, is the total area of provided reinforcing equal to the sum of the reinforcing areas above and below the opening?

Reply 1: Yes, the areas are measured vertically, along the diameter of the opening, and must be within a distance above or below the horizontal centerline equal to the vertical dimension of the hole.

Question 2: Is the total area of required reinforcing equal to the product of the vertical diameter of the hole and the nominal plate thickness?

Reply 2: Yes, however, when calculations are made for the required thickness considering all design and hydrostatic test load conditions, the required thickness may be used in lieu of the nominal thickness.

Question 3: May shell opening reinforcement be determined either in accordance with Section 3.7.2.1 or, alternately, in accordance with Tables 3-8 and 3-9?

Reply 3: No, Section 3.7.1.2 requires that Tables 3-8 and 3-9 be used. However, alternate details satisfying the reinforcement requirements of Section 3.7.2.1 are allowed if the purchaser agrees to their use.

Question 4: In Figure 3-5 is the thickness (T) of the reinforcing plate equal to the shell thickness (t)?

Reply 4: Yes.

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Standard 650, Ninth Edition—Section 3.7

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Where conditions occur, such as the floor of the tank or another nozzle, is it permissible to use a recognized method such as Area Replacement Rules to determine the required area and/or width of a repad, rather than just applying the width of the repad listed in Table 3-8 of API 650 (without calculation)? The calculation would be certified by a Professional Engineer.

Reply: Yes. Refer to 3.7.2 and 3.7.1.2 of API 650. Purchaser agreement is required.

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Standard 650, Ninth Edition—Section 3.8

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650 require intermediate landings for spiral stairways?

Reply: No.

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Standard 650, Ninth Edition—Section 3.8

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Referring to API 650, paragraph 3.8.7.2, is the "as-ordered thickness" equal to the "new condition" or the "corroded condition"?

Reply: The "new condition."

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Standard 650, Ninth Edition—Section 3.9

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Is there a typographical error in footnote 13 of paragraph 3.9.7.1?

Reply: Yes, the exponent of (100/V) should be “2” instead of “a.”

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Standard 650, Ninth Edition—Section 3.9

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Must corrosion allowance be subtracted from *t* in the formula of 3.9.7.1 and 3.9.7.2?

Reply 1: No.

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Standard 650, Ninth Edition—Section 3.10

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: If the corrosion allowance plus the calculated thickness is less than $^{3}/_{16}$ inch thick, must the corrosion allowance be added to the $^{3}/_{16}$ inch minimum nominal roof thickness?

Reply: No.

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Standard 650, Ninth Edition—Section 3.10

Issue Date: August 1, 1996

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does the current edition of API 650, paragraph 3.10.3 allow the use of AISC or the equivalent for allowable stresses?

Reply: No, however, an agenda item is being handled that will allow use of AISC.

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Standard 650, Ninth Edition—Section 3.10

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does a 2 percent slope for a supported cone roof tank meet the requirements of API 650?

Reply: No.

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Standard 650, Ninth Edition—Section 3.10

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: In section 3.10.5 for self-supporting roofs, may the corrosion allowance be added to the minimum calculated thickness given by $t_{min} = D/400\sin\theta$ to arrive at a total minimum required thickness of $^{3}/_{16}$ inch or greater?

Reply: No.

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Standard 650, Ninth Edition—Section 3.10

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: When designing a cone roof based on the formulas in API 650, are factors of safety included in the rules of API 650 or must they be considered separately by the tank designer?

Reply: The necessary and appropriate factors of safety are included inherently in the design rules of API 650.

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Standard 650, Ninth Edition—Section 3.11

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: For tanks with anchorage required by API 650, Section 3.11 (overturning stability), is the shell thickness limited to $^1/_2$ inch?

Reply: No, the requirements of Section 3.11 are independent of those in Section F.7.

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Standard 650, Ninth Edition—Section 3.11

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Does the term *W* in Equation 3.11.2 include the weight of the roof?

Reply 1: Yes, but only that portion of the roof directly supported by the shell.

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Standard 650, Ninth Edition—Section 5

Issue Date: November 9, 1994

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Is it permissible to install stiffening rings on cone roof tanks to maintain the roundness, peaking, and banding requirements set forth in Section 5?

Reply: No.

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Standard 650, Ninth Edition—Section 5

Issue Date: November 20, 1995

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Does API Standard 650 require a hydrostatic test before the tanks has been painted or primed (externally)?

Reply 1: No.

Question 2: If the tank is permitted to be primed externally before the hydrostatic test, is it mandatory to unprime the main welded joints on tank shells?

Reply 2: No.

Question 3: Is it mandatory to complete the entire tank erection, i.e., with floating roof, roof rolling ladder, roof seal, before the water test?

Reply 3: Yes. Refer to API Standard 650, 5.3.6.

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Standard 650, Ninth Edition—Section 5.2

Issue Date: June 23, 1995

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Referring to API Standard 650, 5.2.3.6, is MT or PT required on any weld attaching: (a) nozzles, manholes, and cleanout openings that are not in the stress relief assembly; (b) attaching nozzles, manholes, and cleanout openings to a tank that stress relief is not a requirement; or (c) attaching permanent and temporary attachments to a shell that are not classified in materials Group IV, V, or VI?

Reply: (a) Yes.
(b) Yes.
(c) No (see 5.2.3.5).

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Standard 650, Ninth Edition—Section 5.2

Issue Date: November 20, 1995

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Are there any tolerances applicable to the flatness of tank bottoms and roof decks?

Reply: No. Refer to API Standard 650, paragraph 5.2.2.1.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.2

Issue Date: June 12, 1995

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API Standard 650, paragraph 5.2.3.5 require magnetic particle examination for permanent and temporary attachments only if Groups IV through VI are being welded?

Reply: Yes, although the dye penetrant is an option.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.2

Issue Date: June 23, 1995

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Referring to API Standard 650, paragraph 5.2.3.6, is MT or PT required on any weld attaching: (a) nozzles, manholes, and cleanout openings that are not in the stress relief assembly; (b) attaching nozzles, manholes, and cleanout openings to a tank that stress relief is not a requirement; (or c) attaching permanent and temporary attachments to a shell that are not classified in materials Group IV, V, or VI?

Reply:
(a) Yes.
(b) Yes.
(c) No (see 5.2.3.5).

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.2

Issue Date: April 9, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: In API 650, paragraph 5.2.3.5, is the specified NDE (e.g., visual and magnetic particle examination) applicable only to attachments to shells containing Groups IV, IVA, V, and VI material?

Reply: Yes. NDE for attachments to shells containing material other than Groups IV, IVA, V, and VI is covered in paragraph 5.3.2, which requires visual examination of fillet welds.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.3

Issue Date: November 20, 1995

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Referring to 5.3.6 of API Standard 650, does the phrase "completion of the entire tank" allow the interpretation that the interior/exterior of the shell may be lined and/or coated prior to the water test?

Reply: The document does not specify when linings and/or coatings are to be applied in relation to testing.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.3

Issue Date: November 20, 1995

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Does 650 require a hydrostatic test before the tanks have been painted or primed (externally)?

Reply 1: No.

Question 2: If the tank is permitted to be primed externally before the hydrostatic test, is it mandatory to unprime the main welded joints or tank shells?

Reply 2: No.

Question 3: Is it mandatory to complete the entire tank erection (i.e., with floating roof, roof rolling ladder, roof seal) before the water test?

Reply 3: Yes. Refer to API Standard 650, paragraph 5.3.6.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.3

Issue Date: November 20, 1995

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Referring to paragraph 5.3.6 of API Standard 650, does the phrase "completion of the entire tank' allow the interpretation that the interior/exterior of the shell may be lined and/or coated prior to the water test?

Reply: The document does not specify when linings and/or coatings are to be applied in relation to testing.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.5

Issue Date: September 15, 1995

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Is the horizontal sweep board the same instrument as the vertical sweep board?

Reply 1: No.

Question 2: Is the horizontal sweep board a straight-edged instrument?

Reply 2: No.

Question 3: Is the vertical sweep board a straight-edged instrument?

Reply 3: Yes.

Question 4: Is it permissible to apply the horizontal (convex) or the vertical sweep boards to the inside diameter surface of the tank for dimensional evaluation of peaking or banding?

Reply 4: Yes.

Question 5: Is it permissible to apply the horizontal (concave) or the vertical sweep boards to the outside diameter surface of the tank for dimensional evaluation of peaking or banding?

Reply 5: Yes.

Question 6: Is the purpose of the sweep board to make contact with the tank in:

(a) one place - (weld bead)?
(b) two places - (weld bead and shell plate)?
(c) two places - (shell plate on opposite sides of the weld jointly)?

Reply 6: (a) and (c) would satisfy the intent, but (b) would not; (c) is more accurate than (a).

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 5.5

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Please advise if API 650 permits accepting shell plate inward deformations of 2.3 inch magnitude, assuming the locations are away from vertical seams.

Reply: Local deviations are acceptable as long as they meet the requirements of paragraph 5.5.4.c.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 6.1

Issue Date: May 15, 1995

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Regarding API 650, paragraph 6.1.6, if a radiograph shows a detectable defect anywhere on the film, is it required to take two additional radiographs?

Reply 1: Yes, if the defect is within 3 inches of the two edges of the film.

Question 2: In the same paragraph, does the sentence beginning "However, if the original radiograph . . ." apply to the part of the previous sentence reading, " . . .or the limits of deficient welding are not defined by the radiograph"?

Reply 2: No, the sentence is an exception to all of the previous sentence.

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Standard 650, Ninth Edition—Section 6.1

Issue Date: August 1, 1996

Publication: API Standard 650, Welded Steel Tanks for Oil Storage

Edition/Date: Ninth Edition, July 1993

Question: Is it the intent of API 650, paragraph 6.1.5, to require the interpretation of "spot radiographs" required by this section, to be done in accordance with paragraph UW-51(b), "Full Radiography" of ASME Section VIII, Division 1, after the revision to add paragraph UW-52 "Spot Examination of Welded Joints"?

Reply: Yes.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Section 6.2

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: In API 650, what is the definition of a crack?

Reply: Refer to the acceptance standards for magnetic particle examination defined in paragraph 6.2.4. Also, paragraph 6.5.1 prohibits cracks, including surface cracks. Otherwise, there is no definition of a crack in API 650.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix A

Issue Date: August 1, 1996

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: What is the definition of small tank in Appendix A?

Reply: Small tanks are not defined in Appendix A. The scope of design that may be applied to relatively small tanks if opted is specified in paragraphs A.1.1 through A.1.5.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix C

Issue Date: September 26, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Does API 650 contain rules applicable to the design of the legs on floating roofs for the rainfall condition while the roof is supported on its legs?

Reply: Yes, see paragraph C.3.10.2 which specifies at least a 25 psf load. Actual site conditions more severe than that are outside the scope of API 650 and thus become a contractual matter between the purchaser and manufacturer.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix E

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: In the equation $T = kD^{0.5}$, what is the meaning of 0.5 in the equation?

Reply: This is an exponential equation. The value D is raised to the 0.5 power, which is the same as taking the square root of D, so that the equation may be written $T = k\sqrt{D}$.

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Standard 650, Ninth Edition—Appendix F

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Is API 650 paragraph F.7 applicable to tanks with shell plates in excess of $^1/_2$ inch nominal thickness?

Reply: No.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix F

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: For tanks whose internal pressure will exceed the weight of the shell, roof, and framing but not exceed $2^1/_2$ psig (API 650, Appendix F, Section F. 1.3), is the shell thickness limited to $^1/_2$ inch including any corrosion allowance (F.7.1)?

Reply: Yes, revisions to this requirement are under consideration by API.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix F

Issue Date: February 18, 1997

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Was the wind moment, *M*, ever excluded from earlier editions of the code in Equation F.4.2, and when was it introduced?

Reply: The wind moment did not appear in the Eighth Edition or previous editions. It was introduced in the Ninth Edition. There is an agenda item that makes inclusion of the wind overturning moment in this equation optional and by agreement between purchaser and manufacturer.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix G

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question: Should the coefficient in paragraph G.4.2.4 be revised to 0.60 to be consistent with the change in Appendix E?

Reply: Yes. The change was made in the Second Addendum to the Ninth Edition of API 650.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix I

Issue Date: August 1, 1996

Publication: API Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: Is the "shell support ring" in Figure I-5 an annular ring?

Reply 1: No. The ring of annular plates is defined in paragraph 3.5. The "shell support ring" in Figure I-5 is a continuous support under the tank shell whose dimensions, but not material, are specified by the figure. Alternative details or methods may be used if agreed upon by the tank owner and manufacturer.

Question 2: Since annular rings have a 2-inch projection that causes the anchor bolts to extend at least 2 inches beyond the shell, are the stresses produced by the moment caused by the distance between the shell and the anchor bolts detrimental and is the detailed sketch shown acceptable?

Reply 2: The designer should consider all anticipated loads and design the anchorage system so that the combination of anticipated loads produces stresses within those allowable stresses specified in the standard. API does not endorse, approve, or review detailed designs or drawings.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 650, Ninth Edition—Appendix P

Issue Date: November 20, 1995

Publication: Standard 650, *Welded Steel Tanks for Oil Storage*

Edition/Date: Ninth Edition, July 1993

Question 1: For the nomenclature P.3 in Appendix P, what is the correct interpretation of "*t*," the corroded thickness of shell at the opening or the installation thickness? If circular reinforcing plates were used at the opening, what will be the correct value of "*t*"?

Reply 1: API Standard 650 does not specify which thickness should be used. For the question on reinforced openings, the shell thickness should be used.

Question 2: Since Appendix P is recommended for use with low-type nozzles, i.e., for L/2a - 1.0, why are Figures P-2D through P-2F and Figures P-2J and P-2L included in the appendix?

Reply 2: Refer to Paragraphs P.1 and 3.7.1.5, which do not preclude the application of Appendix P to nozzles located at L/2a only.

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STANDARD 653

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STANDARD 653, FIRST EDITION, JANUARY 1991

Standard 653, First Edition—General

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: Where are fillet welded patches permitted by API Standard 653?

Reply: On the roof, bottom plate 12 inches away from the shell or annular plate, and on floating roofs.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—General

Issue Date: July 19, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: If a TK311 stainless steel tank which was constructed, installed, and used in one state is later cut apart, moved to another state and re-erected in the second state, which API standards within the industry apply to the cutting and subsequent re-erection in the second state?

Reply: None. There is presently no standard for the re-erection of a stainless steel tank.

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Standard 653, First Edition—Section 2.3

Issue Date: January 14, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question 1: Referring to 2.3.2.1 of API Standard 653, First Edition, is L required to be placed somewhere on t_2, even if a lower t_1 can be found above or below t_2, or even if t_2 is not in the vertical plane containing the critical length, L?

Reply 1: No.

Question 2: Referring to 2.3.2.2 of API Standard 653, is the *minimum acceptable tank shell thickness* equal to the thickness defined as t_{min} in 2.3.3?

Reply 2: Yes.

Question 3: What should be done to analyze an area of corrosion that extends over a weld and/or over two tank courses of different thicknesses?

Reply 3: API Standard 653 does not specifically address this question, which will be referred to the appropriate subcommittee for study. Paragraph 2.3.3.5 permits design by analysis, which could be applied to this situation.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Section 2.3

Issue Date: March 17, 1995

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question 1: Does API Standard 653 require that seismic loads be incorporated in tank shell evaluations?

Reply 1: Yes, see 2.3.3.4.

Question 2: For tanks constructed prior to the publication of API Standard 650, Appendix E, does API Standard 653 require that a seismic evaluation be conducted in accordance with API Standard 650, Appendix E?

Reply 2: No, the seismic evaluation referenced in API Standard 653, 2.3.3.4, does not have to be performed in accordance with API Standard 650, Appendix E, if the tank was constructed prior to the publication of Appendix E.

Question 3: What are the original construction standards for oil storage tanks constructed prior to 1965?

Reply 3: API Standard 653, Appendix A provides a list of documents that preceded the current edition of API Standard 650.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Section 7.1

Issue Date: July 19, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: When installing an annual ring to API Standard 653, whether an annual ring is required by API Standard 650 or not, do the x-ray requirements per 6.1.2.10 of API Standard 650 apply?

Reply: Paragraph 7.1.1 of API Standard 653 requires radiographic examination per 6.1.2.10 of API Standard 650 for the annular plate welds when the annular plates are required by 3.5.1 of API Standard 650.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Section 7.2

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: Is the minimum weld spacing between the edge of the shell-to-bottom weld and edge of the weld of the lower edge of the door sheet to be not less than 6 inches for tanks less than or equal to $^1/_2$ inch thick?

Reply: No. The bottom edge of the door sheet may be fillet welded to bottom plate. Section 7.2.3.3 deals solely with the spacing of butt welds. Section 10.3.2.3.a deals solely with hydrotests.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Section 7.8

Issue Date: November 20, 1995

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: Referring to API Standard 653, when shell penetrations are altered in accordance with 7.8.2.3 and all minimum weld spacing requirements are met, are the new welds re-joining the relocated plate (i.e. the plate removed with the penetration) to the shell plate required to be fully radiographed?

Reply: No. API Standard 653 does not currently address NDE on the welds covered in 7.8.2.3.

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Standard 653, First Edition—Section 7.9

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: Does API Standard 653 address the installation of a second bottom other than 7.9.2?

Reply: No, but Appendix I of API Standard 650 does.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Section 7.9

Issue Date: April 30, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question 1: Does API Standard 653 require partial removal of lining (>0.05 inch thick and installed in accordance with API Recommended Practice 652) on a tank bottom as part of a complete internal inspection to measure the bottom plate thickness if continuous effective cathodic protection has been provided and a complete visual inspection and spark test of the lining reveal no problems?

Reply 1: API Standard 653 requires that bottom plate thickness measurements be taken. The need to remove a reinforced lining to measure bottom plate thickness is not covered by API Standard 653.

Question 2: May thickness credit be taken for an adhesive-applied steel patch on a tank bottom plate which has an applied tank bottom reinforced lining, >0.05 inch thick in accordance with API Recommended Practice 652 if it has been confirmed that the adhesive is compatible with the stored product?

Reply 2: No. Nonwelded patch plates are not acceptable details, so no thickness credit can be taken against the minimum required bottom plate thickness.

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Standard 653, First Edition—Section 7.10

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: When replacing an entire bottom per API Standard 653, are the weld spacings per 3.7.3 of API Standard 650 to be followed?

Reply: Yes.

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Standard 653, First Edition—Section 7.13

Issue Date: September 17, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: Does 7.13.3.1 of API Standard 653, quoted below, apply to the welds of reinforcing plates?

7.13.3.1 Minimum spacing in any direction (toe-to-toe of welds) between the hot tap and adjacent nozzles shall be equivalent to the square root of *RT*—where *R* is the tank shell radius, in inches, and *T* is the shall plate thickness, in inches.

Reply: Yes.

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Standard 653, First Edition—Section 9.1

Issue Date: September 17, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: The following questions refer to 9.1.1 of API Standard 653 for a tank with unknown or obsolete steel material:

1. May a weld repair be made using a weld procedure previously qualified on P1 to P1 material?
2. Must the weld procedure and welder be requalified using the actual plate from the tank?
3. Is the verification of weldability met by a successful bend test of a coupon from the actual plate to be welded, if the coupon was welded using the previously qualified P1 to P1 weld procedure and welder?

Reply:

1. The weld procedure must comply with the current rules of ASME Section IX.
2. No.
3. Yes.

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Standard 653, First Edition—Section 10.3

Issue Date: July 19, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: In API Standard 653, does Figure 10-1 override the restrictions of Table 10-1, or is the figure an additional requirement?

Reply: For a hydrotest exemption to be permitted, Figure 10-1 must be satisfied for tanks having materials of unknown toughness. Refer to Basic Condition 1 in Table 10-1.

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Standard 653, First Edition—Section 10.1

Issue Date: September 17, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question 1: Does API Standard 653 specify qualification requirements for the person performing diesel oil tests on shell-to-bottom welds per 10.1.6?

Reply 1: No.

Question 2: Does 10.1.6 of API Standard 653 require that a vacuum-box test and diesel oil test both be performed on the completed shell-to-bottom?

Reply 2: No. Either test is acceptable. The first pass must be tested with light diesel oil per 10.1.6.

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Standard 653, First Edition—Section 10.2

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: Does API 653, paragraph 10.2.1.5, require a radiograph in each vertical joint and in each horizontal joint for square or rectangular replacement plates?

Reply: No, only one horizontal joint and one vertical joint are required to be radiographed, in addition to the four corner joint radiographs required.

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Standard 653, First Edition—Section 10.2

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question 1: Does the phrase *repaired welds* in the last sentence of paragraph 10.2.1.5 of API Standard 653 mean 100 percent radiography of required defective welds?

Reply 1: Yes.

Question 2: Does this phrase mean 100 percent radiography of all new welds for a replaced shell insert or door sheet that had a defect indicated by the initial radiography?

Reply 2: No.

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Standard 653, First Edition—Section 10.2

Issue Date: July 20, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: Refer to 10.2.3.2 of API Standard 653. Should the term *work* be interpreted to mean *welds*?

Reply: Your question has been referred to the appropriate subcommittee for further study; and your recommendation for a revision of the standard is being pursued.

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Standard 653, First Edition—Section 10.2

Issue Date: September 17, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: In API Standard 653, is 6 inches the minimum diagnostic length of each radiograph?

Reply: Yes, in accordance with 10.2.1.6 of API Standard 653.

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Standard 653, First Edition—Section 10.3

Issue Date: January 2, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: Does Section 10.3.2 of Standard 653 require a full penetration weld and full radiograph of the shell to annular plate ring weld in order to be exempted from hydrostatic test after replacement of the complete tank bottom?

Reply: No. See paragraph 7.1.1 of Standard 653 and paragraph 3.1.5.7 of Standard 650.

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Standard 653, First Edition—Section 10.3

Issue Date: September 17, 1993

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991 (Incorporates Supplement 1, 1992)

Question: Does 10.3 of API Standard 653 require hydrotesting for the following:

1. A repair on an internal floating roof?
2. A complete replacement?
3. Adding a manway to the shell, designed per API Standard 650?
4. Shell plate removal and replacement to accomplish 1 or 2?

Reply:

1. No.
2. No, but H.7.3 of API Standard 650 requires a flotation test for this new internal roof.
3. Yes, assuming the manway is below the design liquid level. However, if the conditions for exemption of hydrostatic testing are met (per 10.3.2), hydrotesting is not required.
4. If the shell plate that was removed included more than 12 inches of vertical weld, then a hydrotest is required, unless the exemption permitted by 10.3.2 is exercised and all of the required conditions are met. If the shell plate that was removed does not include more than 12 inches of existing vertical weld (door sheet), a hydrotest is not required as long as all conditions in 10.3.2 are met (see 10.3.2.3).

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Standard 653, First Edition—Appendix B

Issue Date: March 13, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: In the equation in B.3.2 of API Standard 653, should the value of *S* be absolute?

Reply: Yes. An agenda item will be taken out to make this correction.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Appendix B

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question 1: Is the formula for edge settlement in B.3.3 of API Standard 653 conservative?

Reply 1: Yes. The committee will review this and would welcome any analysis to better define acceptable settlement.

Question 2: Is the yield stress in B.3.2 that of the shell?

Reply 2: Yes.

Question 3: May the arc length in B.3.2 be greater than 30 feet?

Reply 3: No. See B.1.3 and 10.5.1.2.

Question 4: Is the formula in B.3.2 too stringent?

Reply 4: No. Note that S is the out-of-plane distortion.

Question 5: Are maximum and minimum R values specified in B.3.2?

Reply 5: No. The committee will look into this.

Question 6: Is rippling considered in evaluating tank bottoms in API Standard 653?

Reply 6: No. The committee will look into this.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Appendix B

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: In the equation in B.3.2 of API Standard 653, should the value of *S* be absolute?

Reply: Yes. An agenda item will be taken out to make this correction.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, First Edition—Appendix B

Issue Date: June 30, 1992

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: First Edition, January 1991

Question: How do you determine the correct number of survey points to use for evaluating tank bottom settlement in Appendix B of API Standard 653?

Reply: See Section 10.5.1.2.

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STANDARD 653, SECOND EDITION, DECEMBER 1995

Standard 653, Second Edition—Section 2.3

Issue Date: April 9, 1996

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question 1: What information is required to determine the fill height according to API 653?

Reply 1: Refer to API 653, paragraphs 2.3.2 and 2.3.3.

Question 2: Do the calculations need to be performed by an API 653 Certified Inspector?

Reply 2: No.

Question 3: Will the evaluation of the calculations require an API 653 Certified Inspector?

Reply 3: No. Refer to the top of paragraph 2.3.1.2.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, Second Edition—Section 2.3

Issue Date: February 18, 1997

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question 1: How do you classify "corroded areas of considerable size" - paragraph 2.3.2.1? Is there a size limit for this corroded area? If so, what are these limits? If not, why not?

Reply 1: It is not specifically defined, but an area larger than that defined in 2.3.2.2 would be considered a corroded area of considerable size.

Question 2: Does the criteria to settle the minimum thickness (t_{min} - paragraph 2.3.3) calculation for welded tank shell apply only for local corroded area? If so, what are the limits for this local area? Can that criteria be applied when there is a uniform corroded area along all the tank course? In this particular case, would t_1 equal to t_2?

Reply 2: It is a general limit that applies either to a locally corroded area or to a uniformly corroded area.

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Standard 653, Second Edition—Section 2.4

Issue Date: August 1, 1996

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question: What are the applicable requirements in API 653 pertaining to tank bottom settlement limits?

Reply: See API 653, paragraph 2.4.1, which refers to Appendix B, where a general discussion of pertinent issues of concern can be found.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, Second Edition—Section 2.4

Issue Date: August 1, 1996

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question 1: Does API 653 permit the use of leak detection procedures to justify extending inspection intervals beyond that determined by corrosion rates?

Reply 1: No. API 653, paragraph 2.4.1, does require periodic assessment of tank bottom integrity that could use leak detection data to shorten the inspection data.

Question 2: Does API 653 specify the time frame between internal inspections for leak detection?

Reply 2: No.

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Standard 653, Second Edition—Section 4.3

Issue Date: August 1, 1996

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question 1: Does API 653, paragraph 4.3.3 require ultrasonic thickness readings on the tank shell?

Reply 1: No. UT examination is permitted but not required for the external inspection.

Question 2: If the internal inspection is used as a substitute for the external ultrasonic thickness measurements (per 4.3.3.3), are ultrasonic thickness readings required during the internal inspection?

Reply 2: No.

Question 3: If ultrasonic thickness measurements are not required, per question 2, how would the 1/4 corrosion rate of the shell be determined for the formal visual external inspection?

Reply 3: The alternate corrosion rate determination methods, such as mechanical measurement with calipers, or taking core samples, are not specified in API 653.

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Standard 653, Second Edition—Section 6.2

Issue Date: September 26, 1997

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995 (incorporates December 1996 Addendum 1)

Question: Referring to API 653, paragraph 6.2 and 6.3, when inserting a new shell course into an existing tank shell, is the weld joining the new course to the course above considered as a "new weld joint" or an existing weld joint?

Reply: The process of inserting a new course into an existing tank is an alteration, not a reconstruction, which makes Section 7 applicable, but not Section 6. Refer to paragraph 7.2.3.2, which indicates that the original code of construction may be followed for such work.

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Standard 653, Second Edition—Section 7.2

Issue Date: August 1, 1996

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question: Do the rules of API 653, Figure 7-1 apply to weld spacing if bottom plates only are being replaced?

Reply: No.

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Standard 653, Second Edition—Section 7.2

Issue Date: September 26, 1997

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995 (incorporates December 1996 Addendum 1)

Question 1: Does API 653 permit the above new weld joint to be a lap-welded design, assuming the existing tank welds are lap-welded?

Reply 1: Yes, per paragraph 7.2.3.2.

Question 2: If the above new weld must be butt-welded to the shell above, how can the joint be made where this weld joins the lap-welded vertical welds?

Reply 2: Butt-welding is not required, per 7.2.3.2.

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Standard 653, Second Edition—Section 7.9

Issue Date: August 1, 1996

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question 1: Are the requirements of paragraph 7.9.2 applicable only if the tank bottom has failed?

Reply 1: No. The requirements apply whenever a new tank bottom is being installed in a tank.

Question 2: Is the requirement for a projection of a new bottom beyond the shell specified by paragraph 7.9.2.1.2 dependent upon whether the bottom replacement is due to failure or due to some other reason?

Reply 2: No. This detail applies anytime a bottom is installed in a tank.

Question 3: Is there ever a condition when the new bottom would not extend beyond the shell plates?

Reply 3: No.

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Standard 653, Second Edition—Section 10.1

Issue Date: June 12, 1997

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question: Referring to API 653, paragraph 10.1.2.5, is it correct that "fully radiographed" means that 100 percent of the circumference of an installed circular plate must be radiographed?

Reply: Yes, if the insert plate contains a penetration. If there is no penetration, then paragraph 10.2.1.5 applies.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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Standard 653, Second Edition—Section 10.2

Issue Date: February 18, 1997

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question: When replacing several shell rings on an existing tank, is it acceptable, per API 653, to radiograph the joints between existing plates per paragraphs 10.2.1.1, 10.2.1.2, and 10.2.1.3 of API 653 and joints between new plates per API 650? Or, must all joints be radiographed per API 653?

Reply: When replacing shell rings on an existing tank, all joints must be radiographed per API 653.

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Standard 653, Second Edition—Section 10.3

Issue Date: September 26, 1997

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995 (incorporates December 1996 Addendum 1)

Question: Referring to API 653, paragraph 10.3.1.2e and Table 10-1(3), do these apply to the cleaning of the weld necessary prior to making a restoration of a corroded or otherwise deficient weld?

Reply: Cleaning a weld in itself does not constitute a repair or alteration. However, any weld metal removal or addition to the shell-to-bottom weld, for any reason, would fit the definition in paragraph 10.3.1.2 for a major repair or alteration.

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Standard 653, Second Edition—Section 10.5

Issue Date: August 1, 1996

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question: Is the formula $N = D/10$ in paragraph 10.5.1.2 correct?

Reply: It should be $N = D/30$. This will be changed in the next edition of API 653.

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Standard 653, Second Edition—Appendix B

Issue Date: May 15, 1995

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question: In API 653, Appendix B, Paragraph B.3.2, what is the value of Young's Modulus?

Reply: Young's Modulus is provided in many engineering textbooks and other technical references, such as ASME Section VIII, Division 1, Table UF-27.

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Standard 653, Second Edition—Appendix B

Issue Date: February 18, 1997

Publication: Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

Edition/Date: Second Edition, December 1995

Question: API 653, Appendix B seems too conservative for edge settlement. Please advise if this appendix is being revised?

Reply: Yes. A task group is working to make the criteria more accurate and consistent with other codes being successfully applied in this area.

This interpretation was issued as a result of a question on the above edition. It applies to all previous and subsequent editions in which the text remains substantially unchanged.

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