

API 510 - Pressure Vessel Inspection Code

Last update: June 28, 2007

Standard	Edition	Section	Inquiry #	Question	Reply
510	8th Edition, June 1997	General	510-I-06/97	What inspection code should be used for maintenance inspection, rating, repair and alteration of a pressure vessel currently used to store fluids at ambient temperature and atmospheric pressure where the pressure vessel was originally built in accordance with an applicable pressure vessel construction code to be operated under pressure?	API 510, should be used for maintenance inspection, rating, repair and alteration of a pressure vessel originally constructed and certified in accordance with a recognized pressure vessel code of construction. API 653, <i>Tank Inspection, Repair, Alteration, and Reconstruction</i> , should not be used for maintenance inspection, rating, repair and alteration of a pressure vessel originally built in accordance with an applicable pressure vessel construction code, regardless of current service and/or operating conditions.
510	8th Edition, June 1997	1.1	510-I-01/01	<p>Background: API 510, Section 1.1, states that the code applies to various types of pressure vessels, which includes the term nonstandard. We know that there are many vessels operating in the petroleum and chemical process industries that have not been constructed and stamped/certified to a recognized code/standard or which have lost their stamping/certification.</p> <p>Can a nonstandard vessel as referred to in API 510, Section 1.1 be defined as the following? 1. An ASME vessel which as lost its nameplate; 2. An API/ASME vessel which has lost its nameplate; 3. A vessel constructed to a foreign code/standard which has lost its nameplate; 4. A vessel constructed to an internal specification and meeting no recognized code/standard.</p>	Yes, all of these examples are considered nonstandard vessels, as long as they are not in conflict with prevailing regulatory requirements.
510	8th Edition, June 1997	3.2	510-I-02/03	<p>Background: Sections 3.2 and 4.3(k) appear to reference (or require) that non-destructive examinations be carried out to the original construction code (i.e., ASME Section VIII). The code requires that ultrasonic procedures conform to ASME Section V, Article 5. This article has recently been substantially revised (in 2002) to simply reference SE-797 for UT thickness requirements “unless amended otherwise in this Article”.</p> <p>Question 1: Is it the intent of the noted sections that UT thickness written procedures conforming to SE-797 should be utilized when conducting in-service thickness examinations for corrosion monitoring purposes?</p> <p>Question 2: If the answer to Question 1 is “no”, is it the intent of the noted sections that UT thickness written procedures conforming to Table T-522 of ASME Section V, Article 5 in the 2002 Addenda, should be utilized when conducting in-service thickness examinations for corrosion monitoring purposes?</p> <p>Question 3: If the answer to Question 1 is “no”, what procedural requirements should be followed to meet the intent of the code?</p>	<p>Reply 1: No.</p> <p>Reply 2: No.</p> <p>Reply 3: Procedural requirements for ultrasonic thickness measurements are not addressed in API 510.</p>
510	8th Edition, June 1997	5.2.9	510-I-02/01	May post repair and alteration pressure testing of flange-to-nozzle welds and nozzle neck weld extensions in accordance with 5.2.9 be done without pressure testing the whole vessel using a device that seals the part under test from the rest of the unfired pressure vessel or boiler?	Yes, subject to the approval of the jurisdiction and the authorized pressure vessel inspector.

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510	8th Edition, June 1997	5.3	510-I-05/04	<p>Question 1: Is it the intent that all of Section 5, and specifically the corrosion rate determinations as outline in 5.3a, b, and c, apply only to new vessels, or for a vessel for which service conditions are being changed as delineated in the first paragraph of 5.3?</p> <p>Question 2: If the answer to Question 1 is "yes", is it the intent to utilize 6.3 and 6.4 for corrosion rate determinations for all other types of vessels?</p> <p>Question 3: Is it the intent that all of Section 8, and specifically the corrosion rate determinations as similarly outline in 5.3, apply only to exploration and production pressure vessels?</p>	<p>Reply 1: Yes.</p> <p>Reply 2: Yes.</p> <p>Reply 3: Yes.</p>
510	8th Edition, June 1997	5.4	510-I-04/04	<p>Background: Section 5.4 of API 510 states that the maximum allowable working pressure for the continued use of a pressure vessel shall be based on computations that are determined using the latest edition of the ASME Code or the construction code to which the vessel was built. The resulting maximum allowable working pressure from these computations shall not be greater than the original maximum allowable pressure unless a rerating is performed in accordance with 7.3.</p> <p>Question: When API 510 states that a vessel maybe evaluated using the latest edition of the ASME Code, does this include the use of the actual allowable stress values of the materials or the original stress values should be used?</p>	<p>Yes, provided the allowable stress values listed in the latest edition of the ASME Code are not higher than the allowable stress values used for the original design.</p>
510	8th Edition, June 1997	5.7	510-I-01/06	<p>What is the definition of $t_{required}$ as used in API 510, Section 5.7b, in conjunction with the criteria for widely scattered pits?</p>	<p>$t_{required}$ is the minimum thickness without corrosion allowance for each element of a pressure vessel based on the appropriate design code calculations and code allowable stress that consider pressure, mechanical and structural loadings.</p>
510	8th Edition, June 1997	6.2	510-I-01/99	<p>Referencing Section 6, if a complete Acoustic Emission Test (AET) is completed on a pressure vessel, and a thorough external and on-stream inspection is conducted (with ultrasonic thickness measurements) and no concerns are noted, can an internal inspection of the vessel be waived, if acceptable to the API 510 Inspector responsible for the vessel?</p>	<p>There are no provisions in API 510 for waiving an internal inspection. Sections 6.2 and 6.4 list the requirements necessary where the authorized inspector can substitute the internal inspection with an on-stream inspection. Section 6.4 also states that "when an on-stream inspection is conducted in lieu of an internal inspection, a thorough examination shall be performed using ultrasonic thickness measurements, or radiography, or other appropriate means of NDE to measure metal thickness and /or assess the integrity of the metal and welds." The owner/user and authorized pressure vessel inspector would need to assess if the proposed NDE methods are satisfactory for the anticipated degradation methods.</p>
510	8th Edition, June 1997	6.4	510-I-03/98	<p>If an internal inspection is performed on a vessel on May 10, 1998, and is put on a 10-year inspection interval, is it the intent of API 510, Section 6.4 to require the next inspection to be on or before May 10, 2008?</p>	<p>Yes.</p>

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510	9th Edition, June 2006	6.5.1	510-I-03/06	I have a vessel that has been in service since 1987. We haven't done any type of inspections other than a yearly visual. There is access to the inside of the vessel. Do I have to do an internal inspection before I proceed to the on-stream inspection?	Yes, unless an extension of the maximum 10-year interval is justified by a RBI assessment as described in 6.3, or where an on-stream inspection can be substituted for an internal inspection as described in 6.5.2.1 and 6.5.3.
510	8th Edition, June 1997	7	510-I-02/98	<p>Question 1: We have an ASME code stamped vessel that is registered with the National Board. If we perform repairs to this vessel according to API 510, will the ASME code stamp remain valid?</p> <p>Question 2: Will the vessel described in Question 1 retain its registration with the National Board after repairs are conducted according to API 510?</p>	<p>Reply 1: Yes, unless otherwise regulated by the jurisdiction.</p> <p>Reply 2: Yes.</p>
510	8th Edition, June 1997	7.1	510-I-01/00	<p>Background: We are replacing the shell and shell cover only for a TEMA type AJS shell-and-tube heat exchanger. The owner has decided to change metallurgy from the existing shells to provide increased corrosion resistance. The new components (shell and shell cover) will be code stamped as "Parts" with U-2 forms provided. There will be no welding to the existing equipment.</p> <p>Question 1: Is the work described above considered a repair or an alteration per API 510?</p> <p>Question 2: Should a nameplate be affixed per API 510, and what should be included on the nameplate?</p>	<p>Reply 1: The work described above is classified as an alteration because the material of construction is being changed.</p> <p>Reply 2: API 510 does not require a nameplate for repairs and alterations. However, the work should be documented on a form such as shown in API 510, Appendix D. The API form plus the U-2 data reports will constitute the documentation for the alteration.</p>
510	8th Edition, June 1997	7.1	510-I-03/03	<p>Background: We are replacing in kind a flanged ellipsoidal head only for an ASME code stamped heat exchanger. The replacement head will be the same material and dimensions as the original.</p> <p>Question: Is the replacement head required to be "U" stamped per the ASME code to comply with API 510?</p>	Reply: No, if the owner/user organization determines that stamping is not applicable and it is not required by the local jurisdiction.
510	8th Edition, June 1997	7.1	510-I-05/05	<p>Background: A longitudinal crack in fillet weld made to fit an appurtenance to shell was found by pressure testing during an internal inspection. In order to stop it, a ¼ in. hole is drilled at the end of the crack.</p> <p>Question: Does API 510 address use of the technique of drilling a hole at the end of a longitudinal crack in a weldment to arrest the crack as a temporary repair before making a weld reparation?</p>	No. To evaluate crack-like flaws, a fitness-for-service assessment should be performed in accordance with API 579, Section 9.
510	8th Edition, June 1997	7.1.3	510-I-01/05	Referencing Section 7.1.3, corroded areas, as defined in 5.7, may be restored with weld metal deposited in accordance with 7.2. Surface irregularities and contamination shall be removed before welding. Does this mean that weld repairs can be performed on the external surface of the pressure vessel?	Yes.

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510	8th Edition, June 1997	7.2.5	510-I-02/05	<p>Background: Per API 510, 7.2.5 note: Before local PWHT is used, a metallurgical review must be conducted to determine if the vessel was postweld heat treated due to the characteristics of the fluid contained in it.</p> <p>Question 1: Please clarify what does it mean by a metallurgical review to determine if the vessel was postweld heat treated due to the characteristics of the fluid contained in it?</p> <p>Question 2: If a vessel was previously stress relieved for the fluid characteristics, does it mean that local postweld heat treatment is not advisable for such a vessel after the local repair work?</p>	<p>Reply 1: A metallurgical review assesses whether interaction between the contained fluid and vessel components might be the reason why a postweld heat treatment was originally required.</p> <p>Reply 2: A local postweld heat treatment may or may not be acceptable depending on the result of the metallurgical review.</p>
510	8th Edition, June 1997	7.2.7	510-I-02/02	<p>Referring to 7.2.7;</p> <p>Question 1: Is it acceptable in to have a lap patch near or at a structural discontinuity such as a support saddle?</p> <p>Question 2: Is it acceptable to have a lap patch cross over a weld seam? If not, what is the minimum distance permitted?</p> <p>Question 3: Is it acceptable to have a lap patch cross over another lap patch? If not, what is the minimum distance permitted?</p>	<p>Reply 1: No.</p> <p>Reply 2: No.</p> <p>Reply 3: No.</p>
510	8th Edition, June 1997	7.2.10	510-I-01/03	<p>Can a load bearing pad on already hydrotested vessel head be fillet welded with an acceptable NDT in lieu of hydro test as per Section 7.2.10 of API 510?</p>	<p>Yes, but only after approval by the pressure vessel engineer and the authorized pressure vessel inspector.</p>
510	8th Edition, June 1997	7.2.11	510-I-01/03	<p>Is it required to have this pad thicknesses restricted to maximum of 50% of head thicknesses as per Section 7.2.11 a of API 510?</p>	<p>This issue is not addressed in the code.</p>
510	8th Edition, June 1997	7.3	510-I-04/97	<p>Which individual or entity is considered to have performed an API 510 rerate?</p>	<p>The owner/user is ultimately responsible for the pressure vessel and its rerate; therefore, the owner/user's name should appear on the rerate nameplate in the space titled "Rerated By:". If the owner/user employs a contract pressure vessel inspector and/or a contract engineering design firm and/or a contract repair shop, the owner/user should specify in appropriate contractual language if the owner/user expects an entity other than the owner/user to appear on the rerate nameplate.</p>