

		Agenda Item 653-2077
Subject:	Alternate to VBT examination for "Welded-on Patch" in Bottom plate	
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Purpose:		
Source:	RFI-10142 API 653 5 th Ed Add3 Errata 2	
Revision:	0 Rev 0 was completely re-written. 1 Rev1 in red 2 Rev2 in green – separated Agenda Item 653-2077 and 650-2077 3 Rev3 in blue – feedback from ballot comments and spring 2026 meeting. 4 negatives addressed. Justin & Frank – remove option to PT entire bottom tank welds, Larry – specify leak test methods or directly reference 650, Andrew – clarify leak test methods. All items have been addressed.	
Date:	Rev0 - 5/07/2025 Rev1 – 11/10/2025 Rev2 – 3/7/2026 Rev3 – 5/5/2026	
Impact:		
Background:	RFI-10142 posed the following scenario and question. Welded on Lap patches provided on bottom plates (due to soil side corrosion) will be subjected to examination and testing as mentioned in Clause 12.1.7 of API-653 API 653 is specified to refer API-650 Section 7.3.3 for the examination and testing requirements of Tank bottom. But practically, Welded-on patch in bottom plate is welded from all sides and while carrying out VBT, it will not show any leak indications since all sides are closed by welding/ tightly fixed on bottom plate. Moreover, all sides are closed by welding, VBT on lap patches will not show any leak indication (bubbles) due to the lack of air (from underside of the patch/bottom plate) In view of the above mentioned constraints found while carrying out VBT on Welded-on patch, API shall consider DPI/MPI examination for inspecting the welds of Welded-on patch in Bottom plates. After review of vacuum box testing requirements, it is recommended to add language to the vacuum box test requirements in 650 to resolve the vacuum box concern mentioned in the RFI. The wording in 653 can be updated at this time to remove references to 650 section numbers and add “bottom leak test” for clarification. 650 can also be updated to add PT as a “leak test” so it clear that it can be used in lieu of vacuum boxing if necessary. This agenda is associated with agenda item 650-2077	
Current wording:	API 653 5 th Ed Add3 Errata 2 12.1.7 Bottoms	

	12.1.7.1 Upon completion of welding on a tank bottom, the plates and the entire length of new welds for tank bottom plates shall be examined visually for any potential defects and leaks. Particular attention shall apply to areas such as sumps, dents, gouges, three-plate laps, bottom plate breakdowns, arc strikes, temporary attachment removal areas, and welding lead arc burns. Visual examination acceptance and repair criteria are specified in API 650, Section 8.5. In addition, all new welds, including the weld attaching a patch plate to the bottom, the areas of bottom plate restored by welding, and the restoration of welds found with defects during an internal inspection shall be examined by one of the methods specified in API 650, Section 7.3.3. Leaking areas shall be repaired by grinding and rewelding as required, and the repaired area shall be retested. 12.1.7.2 In addition to the requirements in 12.1.7.1, the root and final pass of a welded-on patch plate weld in the critical zone (see 3.10 for definition) shall be visually examined and examined by either magnetic particle or liquid penetrant method over its full length. 12.1.7.3 In addition to the requirements in 12.1.7.1, areas of bottom plate repaired by welding shall be examined by the magnetic particle method or the liquid penetrant method. In addition, the repaired area shall also be tested using a vacuum box and solution or a tracer gas and detector.
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Revised Proposal:	API 653 12.1.7 Bottoms ... 12.1.7.1 Upon completion of welding on a tank bottom, the plates and the entire length of new welds for tank bottom plates shall be examined visually for any potential defects and leaks. Particular attention shall apply to areas such as sumps, dents, gouges, three-plate laps, bottom plate breakdowns, arc strikes, temporary attachment removal areas, and welding lead arc burns. Visual examination acceptance and repair criteria are specified in API 650, Section 8.5. 12.1.7.2 In addition, all new bottom welds, including the weld attaching a patch plate to the bottom, the areas of bottom plate restored by welding, and the restoration of welds found with defects during an internal inspection shall be examined by one of the bottom leak test methods below specified in API 650, Section 7.3.3. Leaking areas shall be repaired by grinding and rewelding as required, and the repaired area shall be retested. a) A vacuum-box test b) A tracer gas test c) For small pads, patches or configurations in which vacuum-box testing is impractical, a no-indication liquid penetrant test 12.1.7.23 In addition to the requirements in 12.1.7.1 and 12.1.7.2, the root and final pass of a welded-on patch plate weld in the critical zone (see 3.10 for definition) shall be visually examined and examined by either magnetic particle or liquid penetrant method over its full length. 12.1.7.34 In addition to the requirements in 12.1.7.1, areas of bottom plate repaired by welding shall be examined by the magnetic particle method or the liquid penetrant method. In addition, the repaired area shall also be tested using a bottom leak test listed in 12.1.7.2 vacuum box and solution or a tracer gas and detector.
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Rationale:	Removes the direct section numbers of a different code but helps the reader identify where to find it by clearly stating “leak test” which can be used to help find it in 650.