Inquiry: For partial and full penetration corner joints made using LBW, what alternative testing may be used in lieu of the mechanical testing required in QW-215.2 when qualifying a WPS to ASME Section IX?

Reply: It is the opinion of the Committee that partial and full penetration corner joints may be welded following WPSs qualified in accordance with the following in lieu of the mechanical testing in QW-215.2:

a) The metals shall be limited to P-No. 7 grades: S44400, S43035 and S43932 and to those assigned to P-No. 8, P-No. 45, and P-No. 10H, including combinations of these metals.

b) For full-penetration corner joint welds, the base metal thickness shall not exceed 0.118 in. [3 mm].

c) The properties of the welds shall be demonstrated by a burst test in accordance with HG-500 in order to verify the mechanical strength of the corner joint under consideration. The test assembly and joint geometry shall duplicate that to be used in production. The test shall be acceptable when failure of the assembly occurs at or above the required bursting test pressure.

d) Four cross-sections from a test assembly identical to that which was burst tested shall be removed the corner joint in each test coupon with the joint geometry shall be sectioned, polished and etched with a suitable etchant (see QW-470) to reveal the weld and heat-affected zone with a suitable etchant (see QW-470). If production welds will contain a lap-over, the test coupon shall include a lap-over, and one of the cross-sections shall be taken from that location. The weld and heat-affected zones of each cross-section shall exhibit complete fusion and be free of cracks when visually examined at 10x magnification.

e) For partial penetration welds, the depth of penetration of each cross-section shall be measured to within 0.005 in. (0.13 mm) and the depth of penetration shall meet the specified production requirements.

f) The PQR shall be prepared showing the configuration of the parts, a photomicrograph of at least one weld cross-section, the dimensions of the members at the joint, the measured and required weld size, reference to the bursting test report and the essential variables.

g) This Case number shall be recorded on the WPS and on the Manufacturer’s Data Report.

Based on first consideration comments, the changes shown were made. Additions are in red deletions are in strikethrough.

NOTES TO REVIEWERS
NOT FOR PUBLICATION

UNS Numbers S44400, S43035 and S43932 are P-No. 7 materials, but some P-7 materials are hardenable and we do not want to include those. These are the grades that the manufacturer uses and are not hardenable per Dr. Kotecki.

Modified to clarify that the assembly that was burst tested would not be used for the section testing.