

Summary of Changes in
ASME Section IX, 2005 Addenda

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Changes to ASME Section IX, 2005 Addenda

The following is a summary of the changes that appear in 2005 addenda of ASME Section IX. These changes and related discussion are reported by Walter J. Sperko, P.E., Vice-chairman of Subcommittee IX; Readers are advised that the opinions expressed in this article are those of Mr. Sperko and not the official opinion of Subcommittee IX.

Welding Procedure (QW-200) Changes

The rules for preparing side bend test coupons have been revised for thick test coupons. The previous rules only permitted bend test specimens that were greater than 1-1/2 inches (38 mm) thick to be split into multiple through-thickness specimens to make bending easier. This addendum permits the commonly used 1-1/2 inch thick qualification test coupon bend specimens to be split into narrower specimens rather than limiting the coupon width to the full 1-1/2 inch wide coupon. See QW-462.2. That means that instead of bending a specimen that is 1-1/2 inches wide by 3/8 inches thick, the specimen can now be cut into two specimens 3/4 inches wide by 3/8 inches thick. Although the number of specimens will double, bending them will be easier.

In addition, the top view of the side bend test specimen had become cluttered during the addition of metric units. These addenda revise the look of the figure, particularly relative to the radius that one is allowed to grind on bend test specimens. Similar changes were made in the face and root bend specimen sketches.

Some readers may have noticed that Table QW-451,1 had what seemed to be an error in the last line of the table. When the 2004 edition was issued, that line read "1/2 in (38 mm) and over." Since the previous versions of this table showed "1-1/2 in (38 mm) and over," and because the line directly above it showed "1-1/2 in (38 mm) and over" as it always has, most readers assumed that this was a typographical error – and it was. The line was corrected to "1-1/2 in (38 mm) and over" by errata. When something is corrected "by errata," that means that the previous version never officially existed.

Changes have been made in flash and resistance welding. In flash welding, most welding was is between circular pipe sections. There was a request to permit welding of noncircular cross-sections, and changes were made to allow them.

Resistance welding rules have been in Section IX for over 20 years, and the technology has changed significantly during that time; further, more meaningful test methods have been developed for resistance seam welding. Accordingly, the resistance welding rules have been revised to be more liberal and technically up-to-date. Those who do resistance welding should review the new rules to see if they can revise their WPSs to take advantage of them. For example, there are revised criteria for the width of the spot weld as a function of the thickness of the members being

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joined, and there is a new and more meaningful peel test for seam welds. In addition, preheating and postweld heating during the welding cycle have been consolidated under welding parameters, tolerance on sets of variables have been broadened and “synchronous or asynchronous welding” has been deleted.

For those who do corrosion-resistant weld metal overlay, the normal rules regarding postweld heat treatment found in QW-407.1 apply. However, for austenitic stainless steel weld overlay that meets A-8 or A-9 weld metal analysis limits, the total time at PWHT temperature may not exceed the time qualified by more than 25%; however, for A-8 analysis weld metal, the time-at-temperature rule does not come into effect until the PWHT time exceeds 20 hours.

A new precedent has been established in the definitions in QW-492: a sketch has been added. The new definition is:

Layer: A stratum of weld metal consisting of one or more beads.

The sketches for single and multi-bead welds are shown as QW-492.1 and QW-492.2.

Welder Qualification (QW-300) Changes

When a welder qualification test specimen is radiographed, the radiography is performed in accordance with ASME Section V, Article 2. Historically, if the radiograph exhibited proper density and one could see the essential hole in the penetrometer, no formal radiography procedure was required. QW-191.1 has not changed that philosophy, but since wire-type penetrometers are now permitted by Section V, the words have been changed to identify “penetrameters” as “image quality indicators (IQIs)” and wire-type IQIs are now permitted in addition to the traditional hole-type penetrometer.

For those who apply corrosion-resistant overlay, QW-381.3 has been added to allow welders who have been qualified using a groove weld tests to deposit corrosion-resistant weld metal overlay without further qualification—but only when chemical composition of the weld metal is not specified in the welding procedure. The rationale is that when the engineer does not specify the chemical analysis of the weld deposit, he has selected a filler metal that is adequately overalloyed that the resulting weld deposit has the corrosion-resistance he needs without the welder using any special welding techniques. Since no special welding techniques are required for this situation, it was the committee’s opinion that no special test for the welder should be required either.

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Base Metals and Filler Metals

Several new materials were added to QW/QB-422, and several editorial errors corrected. For those with internet access, the easiest place to find the P or S-number of a base metal is at www.pnumbers.com. This site is not an ASME-sanctioned site, but it contains a database of all the base metals listed in QW/QB-422 and also AWS D1.1. This table can be easily sorted by specification, grade, P-number, product form, etc. There is also a site for filler metals, www.fnnumbers.com.

Brazing (QB) Changes

The tension test specimens in QB-462 have been revised to allow, in addition to the traditional compression-clamped specimens, the use of specimens that are pinned across the end of the specimen behind the jaws of the testing machine. Pinned specimens have been recognized by AWS for years and provide more consistent results when the specimen ends are offset, such as in a single-lap joint.

Metrication

The 2004 Edition is the first edition of the Boiler Code that is published in both US Customary units and in SI units. The Foreword to each Section required that one set of units be used consistently for all phases of construction (e.g. materials, design, fabrication, and reports). Since values in the two systems are not exact equivalents, the Foreword required that each system be used independently of the other without mixing U.S. Customary units and SI units. A literal interpretation of those words implies that WPSs and all other welding documents would have to be in SI units if the design calculations were made in SI units, but a literal interpretation was not intended. Although not finalized as of this writing, The Foreword will be revised to require that all calculations be in one set of units, but that other documents such as WPSs, PQRs, welder qualifications, etc. may be in other units than those used for calculations provided dimensions are converted using the conversions given in the appendix "Guidance for the use of U.S. Customary and SI units in the ASME Boiler and Pressure Vessel Code" (Appendix G in Section IX). A Code Case will be issued to address this matter on an interim basis, and appropriate revisions to the Foreword should appear in the 2006 addenda.

Interpretations

There were several interpretations that were of special interest. Interpretations are illustrative of Code rules, not as rules on their own.

Interpretation IX-04-11 asked what the range of procedure qualification is for base metal where QW-451 applies and impact testing was not a consideration if the test

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coupon consists of dissimilar thickness plates, one 1-1/2 inches thick and the other 1 inch thick. There were two replies:

- 1) for test plates of the *same* P-number, the range qualified is 3/16 to 8 inches;
- 2) for test plates of *different* P-numbers, the range qualified is 3/16 to 8 inches for the P-number of the test plate that was 1-1/2 inches thick, and the range qualified is 3/16 to 2 inches for the P-number of the test plate that was 1 inch thick.

Interpretation IX-04-12 asked if it was required that HAZ impact test specimens be taken at the location that represented the location of highest heat input in the test coupon. The reply was “No” because the location of impact test specimens is dictated by the Construction Code Sections (i.e., Section III, Section VIII, B31.3, etc.).

Finally, Interpretation IX-04-15 asked if the qualified time at PWHT temperature specified by supplementary essential variable QW-407.2 was based on the ratio of heat treatment time to thickness, or was it to be based on the absolute time qualified. That is, if a test coupon 2 inches thick is heat treated for 2 hours, is the qualified heat treatment time 2 hours / 0.8 or 2.5 hours per inch of thickness or is it simply 2.5 hours. The latter is obviously an absolute limit whereas the former would allow heat treatment of an 8 inch thick weld for 10 hours. The reply was that the limit was the absolute time, 2.5 hours in the case of the example, not relative time.

Coming Attractions

Paragraph QW-213, which deals with P-11 materials and thermal cutting, is being moved into the essential variables tables for each process. The rules on temper bead welding are being revised to address overlap, use of half-bead technique and control of the distance from surface temper beads to the toe of the weld. There is discussion of converting materials that are assigned S-numbers to assign them P-numbers; this was defeated resoundingly when it was tried some 10 years ago, so readers should not get their hopes up.

Readers are advised that ASME Code Committee meetings are open to the public; the schedule is available on the writer's web site and at www.asme.org.

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