Summary of Changes in

ASME Section IX, 2002 Addenda

Prepared by

Walter J. Sperko, P.E.
Sperko Engineering Services, Inc
4803 Archwood Drive
Greensboro, NC 27406 USA
Voice: 336-674-0600
FAX: 336-674-0600
e-mail:sperko@asme.org
www.sperkoengineering.com

Changes to ASME Section IX, 2002 Edition

The following is a summary of the changes that appear in 2002 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.

Introduction

Nobody ever reads the introduction to a Code, and yet the introduction to Section IX was written specifically to give the novice an introduction to Section IX. The Introduction provides critical insights into the historical development, the organization and structure of Section IX and some key terms. Those who have successfully used Section IX can vouch for the fact that understanding how it is organized and understanding its terminology are critical to using it properly. The only change in the Introduction in these addenda was updating the historical aspects to document the addition of Article V (Standard Welding Procedures) in the 2000 Addenda, Although this is only a small change, novices and experienced users are encouraged to read the Introduction.

Welding Procedure (QW-200) Rule Changes

Some adjustments were made to Plasma Arc Welding (PAW) gas variables. Previously, when using the keyhole or melt-in technique, the orifice gas and shielding gas flow rate was limited to no less than what was qualified. Since the presence or absence of a keyhole is self-evident, it made no sense to keep flow rates as essential variables, so they were made nonessential. This means that the Welding Engineer may specify the correct shielding gas and orifice gas flow rates as necessary for the parts being welded without having to requalify the procedure if he changed them from what he qualified. Shielding and orifice gas composition, however, may not be changed without requalification of the WPS.

Welder Qualification (QW-300) Changes

In the 2000 addenda, Subcommittee IX answered the question regarding continuing validity of WPSs and PQRs when one business is purchased by another business. At that time, QW-201.1 was added stating that WPSs and PQRs of the purchased business could be used by the new owner without requalification provided the new owner identified them with the new owner's name, took responsibility for them and maintained an historical record of their source. In the 2002 addenda, parallel provisions were added in paragraph QW-300.2 covering welders and welding operators and also brazing.

The simplest approach to satisfying these requirements is to enter the name of the new owner on the existing qualification record form, sign and date it and describe

these steps in the QA program. If your company is one of many that does not have a QA program but still follows Section IX, describe the process in company operating procedures or a memo to file that you keep with your qualification records. If the previous owner's data is transferred to a new form, be sure to identify the PQR as originating with the previous owner either on the PQR or on a separate list in the QA program.

QW-304.1, which deals with qualification of welders by radiography, was revised to clarify that welds made in the 5G and 6G positions had to be radiographed over their entire circumference, not just for a length of 6 inches. This was clarified because 5G and 6G are multi-position qualifications since they contain some overhead, some vertical, some flat and, for 6G, some horizontal welding; accordingly, more than 6 in. of weld length is required to get representative coverage the various positions welded. However, if a welder tests in the 2G position, only 6 inches of weld length needs to be radiographed. Parallel changes were also made for welding operators.

When a welder takes an immediate retest (i.e., without further training or practice), the rule of thumb was that he had to pass double the number of test coupons or double the radiographed weld length used for his original test. Although this philosophy was clear for mechanical testing, it was not clear for coupons that had been radiographed, particularly given the changes described in the previous paragraph. QW-321.3 was revised from specific dimensions of weld length to be radiographed for an immediate retest to simply requiring that twice the length or number of welds required for the original test be radiographed.

When considering using an immediate retest, one should always consider that giving the welder any type of additional training or requiring him to practice for a time before welding another test coupon allows the new coupon to be considered a "new" test – and doubling up is <u>not</u> required. Section IX does not define how much training or practice is required (See QW-321.4); that is left up to the qualifier's engineering judgement.

The table that addressed welder test coupons, QW-452.1, is now two tables. The new table QW-452.1(a) specifies the visual examination and testing requirements and QW-452.1(b) is used to determine the thickness of weld metal that the welder is qualified to deposit in production. The previous version of the table always required a little historical understanding of intent to use properly, but it became "user unfriendly" in the 2000 addenda when the thickness that a welder had to deposit to be qualified for "Max. to be welded" changed from 3/4 in to 1/2 in.

The only technical change in QW-452.1(a) is that it is again mandatory to use side bend specimens for test coupon thicknesses over 3/4 in rather than over 1/2 in. Although it appears that another technical change was made by the addition of a col-

umn for visual examination of the coupon, this was simply a change in format; visual examination of coupons that are mechanically tested has been a requirement since 1992. Visual examination of coupons that will be radiographed is not required -- but is a really smart thing to do.

The new table QW-452.1(b) only addresses the thickness for which a welder is qualified. It has one technical clarification from the previous table: a separate "t" has to be used not only for each welder and for each process that is used in the coupon, but also for each F-number filler metal. For example, if a welder uses E6010 (F-3) in a test coupon and also E7018 (F-4), the thickness that he deposited with each F-number type must be used separately to determine the thickness that he may deposit in production welding with that F-number type electrode.

It should be noted that the subject of "t" as used in this table is also addressed in QW-306 and in QW-350. QW-306 not only requires that a separate "t" be determined for each welder, process and F-number, but also anytime there is a change in an essential variable. This means that if a welder welds a root downhill and the fill passes uphill on his test coupon, "t" must be documented separately for the downhill and uphill portions of the test coupon. These separate values must then be applied to QW-452.1(b) to determine separately the maximum thickness that a welder is qualified to deposit downhill and and that he is qualified to weld uphill.

QW-350 specifies that the thickness of weld metal that may be used in QW-452 is exclusive of weld reinforcement. The technical basis for this limitation is that reinforcement is usually removed when testing the bend specimens. Since reinforcement may also be removed on production welds, it is the writer's opinion that reinforcement does not have to be considered as part of the weld thickness when evaluating a production weld. That is, if the welder is qualified to deposit1/2 in. weld thickness, he may make a production groove weld that is 1/2 in. thick, and any reinforcement that he adds to the production weld does not have to be considered.

According to Table QW-452.1(b), the minimum thickness that a welder has to deposit in his test coupon to be qualified for unlimited thickness is 1/2 in, and that thickness must contain at least three weld layers.. An inquirer asked if it was necessary to document that three layers or more had been used since space for documenting it is not on the Section IX form. The reply was "Yes." Since the forms are not mandatory, the onus is on the qualifier to document the test conditions properly -- including the use of at least three layers, if applicable. Nevertheless, Subcommittee IX has modified the form QW-484(a) to allow easy documentation of the number of weld layers for each process. The writer prefers the old form modified with an asterisk on the weld metal thickness line that refers to a note that indicates that at least three layers were used. A version of the old form with an appropriate note to this effect is available on the writer's web site.

Standard Welding Procedures (SWPS)

A small change was made in QW-520 regarding welding process limitations when adopting an new SWPS without performing a demonstration test for that specific SWPS. Previously, QW-520(a) permitted use of SWPSs that permitted more than one welding process when the demonstration had only been performed for one of the processes permitted by the new SWPS. Although this expanded the number of SPWSs that could be adopted based on a particular demonstration test, it was contradictory to the general philosophy that SWPSs have to used exactly as written. In addition, this provision was confusing to users. The new requirement is that all of the processes in an SWPS have to be demonstrated before that SWPS can be followed.

A small change was made to the SWPS form QW-485 in the row that addresses the weld position. Since the demonstration weld has to be on a test coupon, the test coupon positions (2G, 5G, etc.) should be recorded, not the welding positions (vertical, horizontal, etc.). The examples on the form were changed.

A copy of the form and some simple instructions for completing it are available on the writer's web site.

Brazing (QB) Changes

There has always been some confusion in brazing about when section tests were permitted in lieu of peel tests. QB-141.4 has been revised to make it clear that section tests may be substituted for peel tests when peel tests "are impractical to perform." That means that if the test coupon geometry is such that a peel test cannot be done, a section test may be substituted. It should be noted that this substitution is a one-for-one substitution for each required peel test specimen.

QB-402.3 was revised to refer to QB-452 for performance qualification. This was always intended but was either inadvertently dropped or simply overlooked for many years.

Figure QB-463.1(e) was revised to allow the same bend and section specimen removal for smaller pipe sizes as was changed for brazer coupons in the last addenda. This change was made for consistency between coupons used for procedure and performance qualification.

The brazing forms have been revised to bring them more up-to-date. It should be noted that the forms in Section IX are not required to be used.

Coming Attractions

Exciting things that are in the works by Subcommittee IX include reassignment of nickel alloys into a more consistent grouping system, the addition of nonessential variables for corrosion-resistant and hardfacing, revision to Note 1 of QW-451.1 and consolidation of QW-452.2 (longitudinal bends) into QW-452.1.

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

Mr. Sperko is President of Sperko Engineering, a company that provides consulting services in welding, metallurgy, corrosion and ASME Code issues located at www.sperkoengineering.com. He also teaches publicly offered seminars sponsored by ASME on how to efficiently and competently use Section IX. He can be reached at 336-674-0600, FAX at 336-674-0202 and by e-mail at: sperko@asme.org.