



ASME CODE NEWS

by Thomas P. Pastor, Director, HSB Codes and Standards

QUESTIONS AND ANSWERS

Q My company fabricates small stainless steel (SS) vessels in accordance with Section VIII, Division 1 for the food and pharmaceutical industries. For the service connections, my customers often request the use of a quick-disconnect-type attachment. Several SS-clamp-type assemblies are available from different manufacturers, many of which state that their products meet ASME-BPE-97.

If the ferrule portion of the clamp assembly is welded directly to the tank as a nozzle neck, can I use the pressure/temperature rating from the supplier's catalog if it meets ASME-BPE-97?

A The use of standard pressure parts is covered in UG-11 of Section VIII, Division 1. Standard pressure parts can be purchased to a dimensional standard such as ASME B16.5 or B16.11, or to a Manufacturer's standard. Footnote 6 of UG-11 defines a Manufacturer's standard as:

These are pressure parts which comply with a parts Manufacturer's standard which defines the pressure-temperature rating marked on the part and described in the parts Manufacturer's literature. The Manufacturer of the completed vessel shall satisfy himself that the part is suitable for the design conditions of the completed vessel in accordance with the rules of this Division.

The key element of the definition is that the Manufacturer's literature shall define the pressure-temperature rating marked on the part. Although not explicitly stated, it is assumed that the pressure-temperature rating for Section VIII-1 applications shall be based on Section VIII-1 rules. For example, if a part rating is established from a proof test, then the testing should emulate UG-101 requirements. If this is

not stated in the catalog, then the vessel Manufacturer will be responsible to demonstrate that the part is *suitable for the design conditions*. This includes materials and fabrication requirements.

As far as ASME-BPE-97, this is a Bio-Pharmaceutical standard related to sanitary applications. It is not referenced by Section VIII-1, and thus has no relevance with respect to pressure vessel construction.

In summary, to use a ferrule from a clamp assembly as a nozzle in a Section VIII-1 vessel, the ferrule would need to satisfy all the relevant Code requirements such as design

(UG-45), materials (UG-4,UG-11), and fabrication. Below is a recently published Code interpretation on the subject, discussing the need to satisfy Code Case 2148 when a ferrule is fabricated from rod and bar.

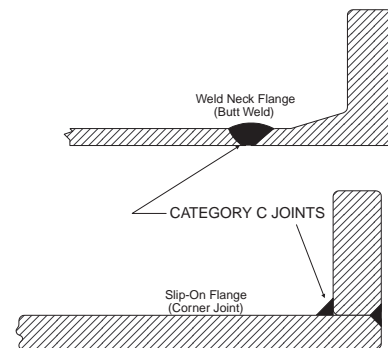
Question: Is it acceptable to use 'ferrules', which are flanged tubes used in clamp connections, as nozzle necks if machined from bar stock (does not comply with Code Case 2148), and purchased as a Manufacturer's standard pressure part under the requirements of UG-11(a)(1) in Section VIII, Division 1?

Reply: No.

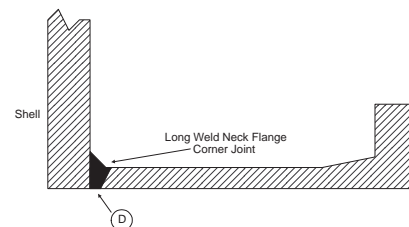
Q a) In Section VIII, Division 1, when a weld neck flange is butt welded to a nozzle neck, is the circumferential joint a Category B or C joint?

b) If a long weld neck flange is welded directly to a shell, is the attachment joint a Category C or D joint?

A a) According to UW-3(a)(3), all welded joints attaching flanges are Category C. As you can see in the sketch, whether a flange is attached via a weld neck (butt weld) or corner joint (slip-on) the joint category remains Category C.



b) In the case of a long weld neck flange welded directly to a main shell, the neck of the flange becomes a nozzle neck, and the attachment joint is classified as a Category D joint.



FINAL WORD

Section VIII, Division 1 Joint Efficiency Rules and 'RT' Marking (Part 1 of 4)

by Tom Pastor, Director, Engineering Technology Division

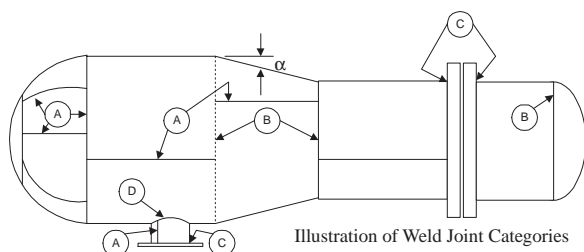
In Section VIII, Division 1 construction, the thickness calculation for welded components is affected by the degree of examination of the welded joints. The *joint efficiency* rules of UW-11 and UW-12 provide an elegant yet often misapplied solution to a difficult problem. For the next four newsletters, we will try to present the rules from a practical aspect, using the 'RT' marking requirements of UG-116 as a guide. This first installment focuses on 'RT-1' vessels.

RT-1 Vessels

To apply the joint efficiency requirements of UW-11 and UW-12 correctly, it is necessary to understand a few definitions. Section VIII-1 uses joint category and type to concisely describe the six joint types defined in Table UW-12 and their locations in a pressure vessel. Use of category and type provides a simple method for prescribing the required joint configuration and level of examination for different service conditions and material thicknesses.

Categories

Per UW-3, a joint category describes the location of a weld joint in a vessel. Four categories (A, B, C, D) are used to describe the most common joints in a pressure vessel. (Note: Not every weld joint is assigned a category; for example, welds attaching jacket closure bars are not assigned a category.)



Category A: Longitudinal welded joints within main shells, heads, cones, flat plates, nozzles, and the attachment weld of a hemispherical head to a shell.

Category B: Circumferential welded joints within the main shell, cone, nozzles, and the attachment joint between formed heads (ellipsoidal and torispherical) and shell.

Category C: Welded joints connecting flanges, tubesheets, flat heads to main shell, to formed heads, to transitions in diameter, to nozzles, or any welded joint connecting one side plate to another side plate of a flat-sided vessel.

Category D: Welded joints connecting nozzles to main shells, spheres, formed heads, flat heads, flat-sided vessels.

Butt Joint - UW-3(b). A butt joint is any joint in which the angle α is 30° or less.

Types

There are six types of welded joints described in Table UW-12.

Type 1: Double-sided butt joint (or single-sided) with no backing strip left in place. When welded from one side only, it must be demonstrated that the quality of the deposited weld metal on both sides of the joint meet the requirements of UW-35.

Type 2: Single-sided butt joint with backing strip left in place.

Type 3: Single-sided butt joint with no examination.

Type 4: Double full fillet lap joint.

Type 5: Single full fillet lap joint with plug weld.

Type 6: Single full fillet lap joint.

(See Fig. UW-13.1 for sketches of joint types)

Note: A corner joint ($\alpha > 30^\circ$) is not covered by the rules of UW-11, UW-12, and Table UW-12.

RT-1 - Fully Radiographed Vessel

Per UG-116(e)(1), a vessel is marked "RT-1" when all pressure-retaining butt welds, other than Category B and C butt welds associated with nozzles and communicating chambers that neither exceed NPS 10 nor 1 1/8 in. wall thickness, have been radiographically examined for their full length per UW-51.

RT-1 Examples

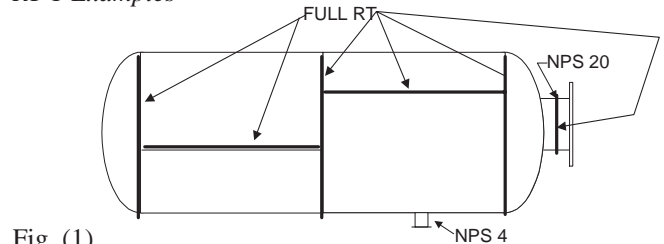


Fig. (1)

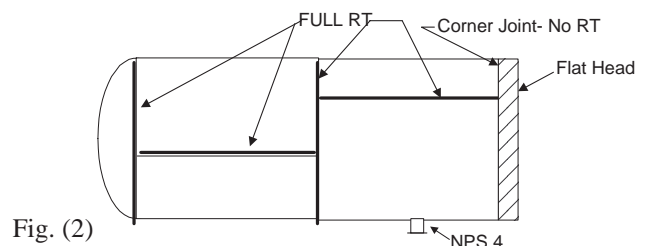


Fig. (2)

It was stated above that the joint efficiency rules only apply to butt joints in which $\alpha \leq 30^\circ$; thus the corner joint attaching the flat head to the shell in Fig. (2) is not required to be examined by RT. The value of 30° is arbitrary; it represents the angle above which it becomes increasingly difficult to interpret radiographs of the joints. Section VIII-1 compensates for the lack of NDE of corner joints by building in a *joint efficiency* factor when sizing the welds.

ANSI/AWS Standard Welding Procedure Specification

by Antonio (Nino) Olivares, Senior Code Consultant, HSB Codes and Standards

Section IX Welding and Brazing Qualification of the ASME Boiler and Pressure Vessel Code has recently passed an action to permit the use of the American Welding Society (AWS) Standard Welding Procedure Specification (SWPS) in the Boiler and Pressure Code. The proposed adoption of SWPS was through item # W98-18/BC99-501, which was approved by the Main Committee at the December 1999 meeting. Barring any major public comment, the Code revision adopting the SWPS should be published in the 2000 Addenda of the ASME Code.

The scope of the SWPS is limited to the following variables:

- Base Metal - P-No. 1 Group 1 & 2 and P-No. 8, Group 1
- Thickness - Up to 1.5 inches
- Welding Process - SMAW, GTAW, GMAW and FCAW
- Postweld Heat Treatment - As welded and stress relieved
- Notch Toughness - None

Before using an SWPS for Code construction, the Manufacturer shall weld and test one groove weld test coupon following the SWPS. The purpose of this demonstration test is to document the Manufacturer's ability to control and use the SWPS.

History of SWPS

In 1982, a cooperative effort between the Welding Research Council (WRC) and the American Welding Society (AWS)

B2 Committee started the development of SWPS for the welding industry. The WRC Committee was given the responsibility for generating data for the procedure qualification records to support each of the proposed SWPS. All Procedure Qualification Records (PQRs) were generated by actually welding, testing, and evaluating weld coupons and specimens. The WRC Committee provided the direct supervision of the procedure qualification tests and evaluation. Financial support for the procedure qualification was provided by the industry and the National Training Fund of the sheet metal industry.

The supporting data for an SWPS is derived from PQRs generated by the Welding Procedures Committee of the WRC and PQRs received from the industry and government agencies. To be referenced as a supporting document for a SWPS, PQRs must meet the rules of AWS B2.1 and, in addition, must have been qualified and documented in accordance with rules of a major code such as Section IX of the ASME Boiler and Pressure Vessel Code, AWS Structural Welding Codes (D1.1, D1.2, D1.3, etc.) and AWS Sheet Metal Welding Code (D9.1). The Welding Procedures Committee of the WRC reviews and validates all PQRs before summarizing the essential information, applying a new identification, and entering the information into the data bank.

It is the policy of the AWS B2 Committee that the range of conditions and variables listed for an SWPS be more restrictive than permitted by application of the full range of conditions and variables allowed by the B2.1 document or by other American National Standards such as AWS D1.1 or Section IX of the ASME Boiler and Pressure Vessel Code. The purpose of this policy is to increase the probability of successful application by all users. In judging the extent of such restriction, the Committee is guided by the number and scope of supporting PQRs, including the specific material, thickness and value for each welding variable used for the development of the PQR and by known fabrication experience. The minimum number of supporting PQRs required by the Committee to support an SWPS is two, but on the average more than two are prepared. It is the intent of the AWS B2 Committee to have SWPSs only for commonly welded materials using manual and semiautomatic welding processes.

Application of SWPS

Currently, SWPSs have been recognized and accepted by the National Board Inspection Code for repair and alteration and the AWS D9.1, Sheet Metal Welding Code for use in sheet metal welding. Other AWS construction equipment specifications are in a process of evaluating the use of the SWPS.

For any questions and additional information, please contact me at (860) 722-5661, or via e-mail: nino_olivares@hsb.com.

KEEPING YOU CURRENT WITH THE PRESSURE EQUIPMENT DIRECTIVE

Are you considering exporting pressure vessels to the European Union? Hartford Steam Boiler would like to help guide you through the information you need to know.

To keep you up-to-date with the Pressure Equipment Directive, we will include inserts in coming editions of *Pressure Points*. In this issue, we provide you with some useful Web sites and publication sources to get you started.

To obtain a binder in which to store these reference guides, and a practical glossary of terms, call Jill Smolnik at 800-472-1866, extension 5294, or send an e-mail to jill_smolnik@hsb.com.

HRSG WORKSHOP JULY 25, 2000

In this era of electric deregulation, heat recovery steam generators (HRSG) have been one of the bright spots in terms of placing new generation capacity into use. But along with their popularity, some growing pains have been experienced in the form of fitness-for-service issues cropping up early in their life cycle. In response to requests from HRSG manufacturers and owners, ASME has arranged an **HRSG Workshop** to be held in conjunction with the upcoming Pressure Vessel and Piping Conference this July in Seattle, WA. We strongly encourage all HRSG manufacturers to attend this important event. Below is an official announcement of the workshop, including contact information.

ANNOUNCEMENT

HRSG WORKSHOP on ASME Codes & Standards AND Research Needs

For HRSG manufacturers and users, industrial plant insurers, power plant engineers, consultants, codes and standards specialists, and utility experts.

To be held concurrent with PVP 2000
Pressure Vessel Piping Conference
{NO conference fee if ONLY attending HRSG Workshop}
The Weston Hotel
1900 Fifth Avenue, Seattle, WA
(206) 728-1000 • (800) 228-3000

Tuesday, July 25, 2000
8:30 AM – 3:30 PM

HRSG units are increasingly being used in severe cyclic service for which they were not designed. Improved usage of appropriate ASME boiler and pressure vessel Codes & Standards (C & S) will be addressed. HRSG industry research needs and proposed projects will be discussed.

AGENDA

- Discussion on the use of ASME BPV Codes & Standards in specifying and manufacturing HRSG units, and the needs for improved C & S relating to cyclic operations.
- Are procurement specifications or guidelines needed?
- Discussion of proposed industry research to address HRSG endurance, especially during cyclic operation.
- General discussion of HRSG industry needs and industry participation on an active ASME research committee addressing HRSG usage.

For further information, contact:

Roger S. De Cesare
ASME Center for Research & Technology Development
1828 L Street, N.W.
Washington, DC 20036-5104
202-785-3756

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P R E S S U R E P O I N T S

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