# PRESSURE POINTS

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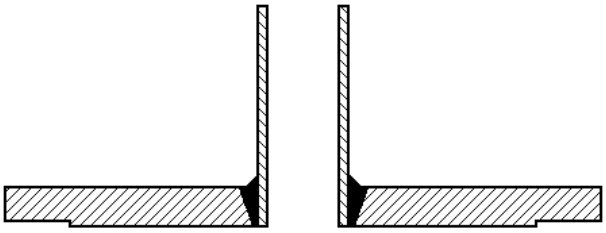
# ASME CODE NEWS

*by Thomas P. Pastor, Director, Engineering Technology Division*

## Questions and Answers

**Q** An NPS 2 1/2 nozzle stub end is to be full-penetration welded into the center of an ASME B16.5 Class 150 NPS 12 blind flange. Are reinforcement calculations required by Section VIII, Div. 1, and if so what do I use for the required thickness of the blind flange?

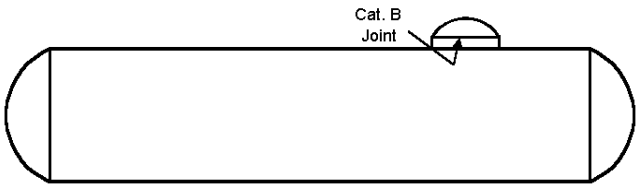
**A** Under most circumstances, once you modify an ASME B16.5 flange, the pressure/temperature ratings from the



standard are no longer valid, and the flange must be calculated per the Code. The one exception is reducing flanges fabricated from blind flanges. Table 7 of ASME B16.5 lists the smallest size of reducing outlet that requires the use of hubbed flanges. Flanges reducing to a size smaller than that listed in the table may be made from blind flanges. For this particular example, the smallest size of a reducing outlet requiring a hubbed flange for a NPS 12 flange is NPS 3 1/2. Since the actual nozzle is NPS 2 1/2, it may be installed in a blind flange. The pressure/temperature rating from B16.5 may still be used. Per UG-39(a) and UG-36(c)(3)(c) of Section VIII, Div. 1, the finished opening [2.09" I.D.] is exempt from reinforcement calculation.

**Q** My shop constructs Section VIII-1 vessels that require the manway [formed head] to be welded to the manway ring as shown below. To figure out what type of weld joint can be used and whether or not it must be RTed, I need to know what the joint category is.

**A** Per UW-3(a)(2) the weld attaching the formed head to the manway ring is a Category B joint. The manway ring to shell weld is a Category D joint.




## Final Word

Here are some recent ASME Boiler and Pressure Vessel Code items of interest:

**Section VIII, Division 1, Appendix 1-7(b) – Large Openings in Cylindrical Shells** – Rules for direct calculation of membrane and bending stresses at large openings were first published in the 1995 Addenda. Confusion with regard to the range of applicability led to publication of Code Case 2236. Final revisions to Appendix 1-7(b) were published in the 1998 Edition, thereby eliminating the need for Code Case 2236. These revisions corrected two problem areas:

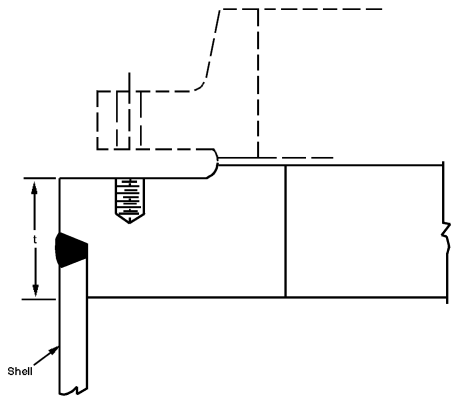
1. Range of applicability;
2. Excessive conservatism in bending stress calculations.

The rules of 1-7(b) now apply to:

- Openings for <u>radial</u> nozzles that exceed the limits in UG-36(b)(1) and also are within the range defined below:
  1. Vessel diameters greater than 60 in. I.D.
  2. Nozzle diameters that exceed 40 in. I.D. and also exceed $3.4\sqrt{Rt}$
  3. $R_n/R \leq 0.7$

With respect to the membrane and bending calculations, rules are now provided for nozzles with and without a flange as well as pad reinforced nozzles.

**Section VIII, Division 1, Appendix 2, Design of Reverse Flanges –** A common closure system employed on oil separators and filter vessels is the use of a reverse flange welded to the shell body, to which a blind flange is bolted. Currently Appendix 2 rules for loose flange attachment require the presence of an inside fillet weld to reduce bending-related stress concentrations. Designs without the inside fillet weld are acceptable per 2-1(e) with acceptance of the Authorized Inspector. An upcoming revision in the '99 Addenda will provide an option for attaching a reverse flange with a full-penetration weld [see Fig. UW-13.2 sketch (d)] without the inside fillet weld.

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**Update on New Allowable Stresses Based on 3.5 Design Margin –** As reported in a previous newsletter, Sections I, III, and VIII-1 have adopted a margin of 3.5 on ultimate tensile strength (UTS) for establishing allowable stresses, versus the current factor of 4.0. Implementing Code Cases 2278, 2284, and 2290 were approved last summer allowing the use of the higher allowable stresses for certain materials. The '99 Addenda to be published this July will contain completely revised stress allowable tables [Tables 1A & 1B] based in part on the 3.5 design margin on UTS. With publication of the revised allowable stresses into Section II, Part D, the before mentioned code cases will be annulled as of January 1, 2000.

**Changes to ASME's Materials Policy That May Impact Your Global Business**

*by Jay Cameron, Mechanical & Materials Engineering Division*

The American Society of Mechanical Engineers has become more proactive in recent years in promoting the use of their standards outside North America. In addition, ASME has been revising the standards to facilitate their use around the world. One method they are using is to explicitly adopt other national or regional material specifications into the ASME Code using essentially the same process as is used for ASTM materials.

In 1994, ASME International created the Subgroup on International Material Specifications (originally called the Special Working Group on Non-ASTM Material Specifications) under Subcommittee II, Materials. The Subgroup reviews material specifications other than ASTM for suitability in ASME Boiler and Pressure Vessel Code construction. Prior to this, the only option to use non-ASTM materials was to submit a request to ASTM to write a specification for the material, which ASME could adopt, or through UG/PG-10.

Requests for adoption of non-ASTM materials are submitted like any other Code change, using the guidelines in the appropriate Appendix in one of the sections of the code. [For example, see Appendix 16 of Section VIII, Division 1, or Appendix I of Section I.] In addition, inquirers must comply with the requirements of App. 5 of Section II, Part D, unless the material is a "near-equivalent" to an existing ASME material.

**Adoption Process**

The process to adopt a foreign material first includes a review of the material specification to ensure that the essential elements of an ASME-quality material are included. If there are one or more items that ASME finds lacking, the specification can be changed, just as with ASTM materials. This is noted in the subtitle of the specification or on the cover sheet. This was done on the coversheet of SA/EN 10028-2.

The material specification is published or referenced in Section II. If copyright permission has not been granted by the standard developing organization, a coversheet is published in Section II, indicating the material specification, year date, additional requirements, and an address for the approved standard developing organization from which the standard may be obtained.

The next step in the process is to assign allowable stresses. Some specifications list material properties in addition to room temperature yield strength, tensile strength, etc., and possibly include allowable stresses. ASME develops their own allowable stresses using specification minimum properties and ASME trend curves for temperature. These allowable stresses for the requested construction codes are published in Section II, Part D.

A structural steel similar to SA-36 was the Subgroup's first material. Section IV was the first code to approve use of the material via a Code Case. It has subsequently been adopted into Appendix 4 of Section IV. This material's coversheet is contained in Section II, Part A as SA/CSA-G40.21 after SF-568. This material was later approved for Section VIII, Division 1 by its inclusion in Table UCS-23; Section II, Part D; and Section IX, Table QW/QB-422.

The second material to be adopted was a European material specification, similar to SA-516. This material was added to Section II, Part A as SA/EN 10028-2. It is being adopted for Section VIII, Division following the same procedure used for the CSA material.

The Subgroup is currently working on adopting a Japanese material specification, JIS G3118. Looking ahead, ASME International, in conjunction with Japanese standards organizations and code users, has also been exploring the possibility of directly cross-referencing material specifications and allowable stresses from within each other's construction codes. Additional requests have been submitted to ASME for adoption of European, Australian, Chinese and German material specifications.

Further details can be found in the PVP Conference Proceedings Vol. 360, 1998, pp. 145-148; in *Mechanical Engineering* magazine, July 1997, p. 106; and on ASME International's Web site, www.asme.org/cns/material.pdf.

# ISO 9000 UPDATE

## ISO 9000 Certification Makes Good Business Sense

*by Sam Corona, HSB Registration Services*

ISO 9000 is a series of voluntary consensus standards focused on quality management developed and published in 1987 by the International Organization for Standardization. The standards require an organization to address quality planning, customer satisfaction and continuous improvement. ISO 9000 has been adopted by most countries as national standards and is often required in contractual agreements.

In addition to complying with international standards, however, organizations are finding that the process of becoming certified has its own benefits. For instance, organizations are seeing that, in their pursuit of better process controls, ISO 9000 represents a way to help focus on core business issues, processes, and customer satisfaction. Just in the United States, over 20,000 organizations have implemented these standards and are realizing real and measurable bottom-line results.

ISO 9000 has been proven to be an extremely effective management tool for a variety of reasons:

- ISO 9000 requires each organization to determine which core business processes and procedures are vital to manage and

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|---|---|---|---|
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| September 23-24 | Basic NDE Methods | Williamsburg, VA | 501 |
| | **Full week schedule: Process Piping and Basic NDE** | | **902** |
| September 20-24 | QC Manager Certification | Williamsburg, VA | 702 |
| October 11-12 | Introduction to Section VIII, Div. 1 | Reno, NV | 201 |
| October 13 | Repairs and Alterations to Boilers and Pressure Vessels | Reno, NV | 206 |
| October 14-15 | Section IX, Welding Qualifications | Reno, NV | 401 |
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## ISO 9000 Update *Continued from previous page*

control a business. Through the process of achieving ISO 9000 certification, not only are fundamental quality processes installed, but complying with the standard ensures that every member in the organization is following effective procedures and is heading in the same direction. As a result, the organization is in a better position to identify and improve the fundamentals of its business operations.

- Another key area for improvement is human resources. Organizations need to utilize the expertise of the people engaged in each work process and encourage them to become responsible and accountable for the results. ISO 9000 is about people and process consistency. The focus on the people side of the quality equation drives greater employee empowerment through all levels of the organization. ISO 9000 is not just a single generic standard with 20 elements; it consists of linked business processes that are based on the "plan-do-check-act" philosophy resulting in customer satisfaction and continuous improvement.
- Companies going through the ISO 9000 certification process eliminate non-value-added work by evaluating the current work flow, determining how the work process can become more efficient, and making the appropriate changes. Done right, ISO 9000 brings about a fundamental change that results in significant improvements. It is more than just cutting out steps in a process, it means focusing on the core competencies, meeting customer expectations, and improving bottom line performance through reducing costs and cycle-time.
- ISO 9000 provides assurance for an organization's customers that its corrective action and customer complaint resolution processes are doing what they say they are doing.
- Most quality programs tend to fail because organizations do not adequately involve the people closest to the process. In the ISO 9000 system, employee involvement is not only an essential element but is absolutely required or the program will not work.
- An ISO 9000 system is continually checked and evaluated. This ensures that the processes continue to be effective and are producing expected results. Simply, what is measured tends to improve. ISO 9000 includes key elements that have the most impact on the overall success of a quality system: management review, internal quality audits, and corrective and preventive action.

### Continuous Improvement

A dynamic quality system requires planning for change and keeping the quality system current and relevant to the organization. Understanding how to incorporate a continuous improvement process into the quality system can enable a company to grow and achieve better bottom-line results. ISO 9000 offers an organization the discipline to manage the continuous improvement process by providing a baseline starting point, measuring the success of continuous improvement activities, and ensuring that the organizational infrastructure is process-driven and focused on customer satisfaction.

Companies are in business to make money, not getting ISO 9000 certified. With this in mind, an ISO 9000 quality system must always keep focused on the core competencies, customer expectations, satisfaction, and bottom-line results, regardless of the emphasis on process reengineering, change management, and continuous improvement. ISO 9000 is the foundation to a successful business.

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P.O. Box 5024
One State Street
Hartford, Connecticut 06102-5024