

What's New in API 1104

The latest edition of the standard contains some significant changes

The American Petroleum Institute issued the 20th edition of API Standard 1104, *Welding of Pipelines and Related Facilities*, in November 2005. The standard covers the welding of butt-joint, fillet, and socket welds in carbon and low-alloy steel piping used in the compression, pumping, and transmission of crude petroleum, petroleum products, fuel gases, carbon dioxide, and nitrogen. Where applicable it also covers welding on gas distribution piping.

In addition, API 1104 includes procedures for radiographic, magnetic particle, liquid penetrant, and ultrasonic testing, as well as the acceptance standards to be applied to production welds tested to destruction or inspected by radiographic, magnetic particle, liquid penetrant, ultrasonic, and visual inspection.

The standard applies both to new construction and in-service welding.

The CWI Test

Candidates for the AWS Certified Welding Inspector examination who choose the API 1104 open codebook exam must use the 20th edition. This change became effective June 1, 2006.

The new API 1104 exam consists of 60 multiple choice questions taken in the same two-hour format as previous CWI tests. The new exam is not compatible with any previous editions of the code.

Candidates are responsible for purchasing the API 1104 20th edition and, if not in possession of a bound copy of the standard, must present proof of purchase for any photocopies presented.

Changes to the Standard

Significant changes include a new revision in the radiographic testing acceptance standard, the total elimination of the use of hole-type penetrameters, removal of the nick break testing requirement, and improved practices for welding on in-service pipelines. These and other changes from the 19th edition are detailed as follows:

- ◆ Definitions have been added, corrected, and clarified.
- ◆ A new revision in the radiographic testing acceptance standards is in the area of "burn-through" (known as melt-through in AWS terminology).

- ◆ A significant revision in the procedures for radiographic test methods involves the total elimination of the use of hole-type image quality indicators (IQIs/penetrameters) and will now only allow the use of wire-type IQIs (either ASTM or ISO).
- ◆ The primary change to the Mechanized Welding section, which was previously called "Automatic Welding," was its renaming, and in the Procedure and Welder Qualification segment, the requirement for nick break testing was removed. The Qualification of Welders and Equipment was rewritten for clarity.
- ◆ In Appendix A, the following was included: "Reference imperfection sizes (a*), which fall between the crack tip opening displacement (CTOD) values of 0.005 in. to 0.010 in. can be derived with an equation illustrated in the new edition of API 1104 as opposed to the graphical extrapolation method."

Significant changes include elimination of hole-type penetrameters and removal of nick break testing requirements.

- ◆ Appendix B improved the recommended practices for welding onto in-service pipelines. Significant revisions include clarification pertaining to discrepancies that exist between Appendix B and the main body of API 1104, the allowance of trade-offs that may be made between the carbon equivalent of the materials being welded and the thermal severity of the pipeline operating conditions without the need for procedure requalification, the revision of essential variable requirements for welder qualification and provisions for multiple qualification of an in-service welder, and additional in-service

welding guidance (welding sequence, time delay prior to inspection, etc.).

Department of Transportation Use

This edition replaces the 19th edition (with 2001 errata). However, the U.S. Department of Transportation (DOT) has not yet incorporated the 20th edition into regulation by reference into the *Federal Register*. This is expected to occur within the next 6–12 months. Consult the DOT Office of Pipeline Safety Web site, <http://ops.dot.gov/>, for updates.

The 20th edition of API 1104 is 68 pages long and can be purchased through World Engineering Xchange (WEX), Ltd., at (888) 935-3464 or www.aws.org/standards; and Global Engineering Documents at (800) 854-7179 or www.global.ih.com. Additional information is also available at www.api.org/cat. ❖

Based on information provided by the American Petroleum Institute, Washington, D.C., (www.api.org).