MAJOR CODE AND STANDARDS CHANGES AFFECTING PRODUCTION EQUIPMENT

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Codes and standards as promulgated by the various agencies governing oil and gas production equipment have changed so dramatically since 1934 that most manufacturing companies and production companies have little or no idea what is required. These changes started with the advent of OSHA as passed into law in 1970. This paper will address the changes that have occurred since the advent of OSHA to the present day as pertaining to pressure vessels.

With the coming of OSHA, all pressure vessels that are placed in service and hold flammable or combustible liquids and exceed a working pressure of 15 psig must have an ASME Code stamped on the name plate.[1] Pressure vessels manufactured prior to OSHA were grandfathered as long as these vessels remained in the same location and in the same service. Insurance companies insuring vessels in service require compliance with OSHA; therefore, the ASME Code stamp is required.

From the 1930s to the mid-1950s, most manufacturers and users were using the API/ASME Code as applied to pressure vessels. Shortly after that, API/ASME went their separate ways.

API turned all its attention to standardization of equipment -- toward items used by the petroleum industry. ASME turned all its attention to the boiler, pressure vessel industry, and the users of all boilers. Since that separation, not all states have a boiler law that, simply stated, requires all boilers to have a Code stamp and to be registered with the National Board of Boilers and Pressure Vessels. All but two states have a pressure vessel law that requires the use of ASME Code stamped vessels. These states are Texas and Missouri.

API changed in the early 1980s and is still changing its direction. Prior to 1980, API standards were a recommended practice to be used by manufacturers and users. Since then, in order to obtain API certification, the procedures must be adhered to in their entirety and an approved quality control manual must be in place with an audit of the manufacturer on a yearly basis.[2] ASME requires a quality control manual and an audit every three years.

ASME will not accept a quality control manual written for API, and API will not accept a quality control manual written for ASME. ASME requires its own authorized inspector and API requires its own authorized inspector. The inspectors at this time are not one and the same. Each vessel, heater, etc. will have to have two inspectors, two quality control manuals, two sets of rules, two of everything, and twice the cost incurred by the manufacturers to produce a product and be in compliance with both organizations, even though both organizations recognize each other in their codes and standards.

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[1] Federal Register, Vol. 37, No. 202, October 18, 1972, Page 22171, Paragraph (V)(6)

[2] API Quality Control Document Second Edition January 1

With this in mind, consider recent changes API has made in its codes and standards for heater treaters, line heaters, separators, and quality programs discussed in:

1. Heater Treaters API 12L Third Edition January 1, 1986
2. Line Heaters API 12K Seventh Edition June 1, 1988
3. Separator API 12J Sixth Edition June 1, 1988
4. API Spec. Q1, Specification for Quality Programs January 1, 1988.

The following tables list these API codes and standards:

Vertical and Horizontal Emulsion Treaters API 12L 1/1/86

	API STAMPED	ASME STAMPED
PRE 1986		
Vessel	Yes	User Option
Firetube	N/R	N/R
Water Leg	N/R	N/R
POST 1986		
Vessel	Yes	Yes
Firetube	Yes	Yes
Water Leg	Yes	Yes

Indirect Type Oil-Field Heaters (Line Heaters) API 12K 6/1/88

PRE 1984		
Shell Working Pressure		N/A
Shell Thickness		N/A
Firetube Heat Flux (max.)		12,000 BTU/HR/sq. ft.
Coil Nondestructive Examination		N/A
Hydrostatic Test		1.5 (Coil design pressure)=Test
Stress relieving		N/A
Coil Design Pressures	2" X-Hvy	3372 psig
	2" XX-Hvy	6747 psig
	2-½" .750	N/A
	2-½" .875	N/A
	3" X-Hvy	3150 psig
	3" XX-Hvy	6300 psig
	4" X-Hvy	2753 psig
	4" XX-Hvy	5410 psig

POST 1984		
Shell Working Pressure		1 lb. Max.
Shell Thickness		3/16" (0.1793) min.
Firetube Heat Flux (max.)		12,000 BTU/hr/sq. ft.
Coil Nondestructive Examination	X-Hvy	10% all buttwelds
	XX-Hvy	10% all buttwelds
	.750	100% all buttwelds
	.375	100% all buttwelds
Hydrostatic Test		1.5 (coil design pressure)= Test
Stress relieving	.750	Full Stress Relieve
	.875	Full Stress Relieve
Coil Design Pressure	2" X-Hvy	3440 psig
	2" XX-Hvy	7340 psig
	2-½" .750	10,720 - 12,490 psig
	2-½" .875	12,530 - 14,600 psig
	3" X-Hvy	3200 psig
	3" XX-Hvy	6820 - 7940 psig
	4" X-Hvy	2770 psig
	4" XX-Hvy	5860 - 6830 psig

Oil and Gas Separators API 12J Sixth Edition June 1, 1988

This edition expanded what was to be included on the name plate and what the name plate should look like. Additional drawings are provided for the user.

It should be noted at this point that API says that all pressure vessels must be manufactured to ASME Section VIII Division I; however, a manufacturer can build a vessel to these specifications without the use of the API monogram. API has not at this time taken a firm stand on their position. In each publication, they say the specification is a guide for manufacturers and purchasers. With this in mind let's look at:

Specification for Quality Programs API Q1 Second Edition January 1, 1988

APPENDIX I
AN EXAMPLE OF A QUALITY MANUAL OUTLINE

1. General
   - Table of Contents
   - Scope
   - Definitions
   - Quality Policy Statement
   - Organization Charts
   - Control of Quality Manual
   - Training and Qualification
2. Design Control
   - Design Documentation and Analysis
   - Design Verification
   - Design Changes
3. Instructions, Procedures, Specifications and Drawings
   - Control/Distribution of Instructions, Procedures, Specifications and Drawings
   - Revision Control of Instructions, Procedures, Specifications and Drawings
4. Process Control
   - Traveler/Process Sheet Program
   - Revision Control
   - Records
5. Procurement Control
   - Purchasing Specification Control
   - Services Specification Control
   - Supplier Evaluation
   - Inspection
   - Records
   - Material/Product Verification
6. Identification/Material Control
   - Material/Product Identification
7. Traceability
   - Traceability Program
   - Materials
   - Products
   - Records
   - Services
8. Special Processes
   - Identification of Special Processes
   - Special Processes Program
   - Records
9. Inspection/Testing
   - Inspection Program
   - Testing Program
   - Records
10. Measuring and Testing Equipment
    - Calibration Program
    - Records
11. Handling, Storing and Shipping
    - Handling Controls
    - Storing Controls
    - Shipping Controls
    - Packaging Controls
    - Cleaning Controls
12. Acceptance Status
    - Status Indicators
    - Status of Materials/Products
    - Application of API Monogram
13. Non-Conformance
    - Control of Non-Conforming Materials and Products
    - Records
14. Audits
    - Internal Audit Program
    - Records
15. Corrective Action
    - Controls
    - Actions
    - Records
16. Quality Records
    - Identification of Applicable Records
    - Record Storage
17. Typical Forms

None of the above comments should be construed to make API appear as if they are not doing their job -- they are. The statements have to be made by API to protect the organization from lawsuits by manufacturers, users, and other individuals.

ASME, on the other hand, is very firm in its position, and a holder of an ASME Code Certificate has to conform to all applicable codes and standards or the certificate and Code symbol stamped will be picked up. ASME has had so many changes over the last ten years with respect to pressure vessel construction that this paper cannot even attempt to cover all of them. In 1988, ASME made a most significant change by stipulating the material used to construct the vessel.

Prior to 1988, pressure vessels made from grade 515-70 and 516-70 material had a design temperature range of -20°F to +650°F -- this is no longer the case.

PART UCS — CARBON AND LOW ALLOY STEEL VESSELS

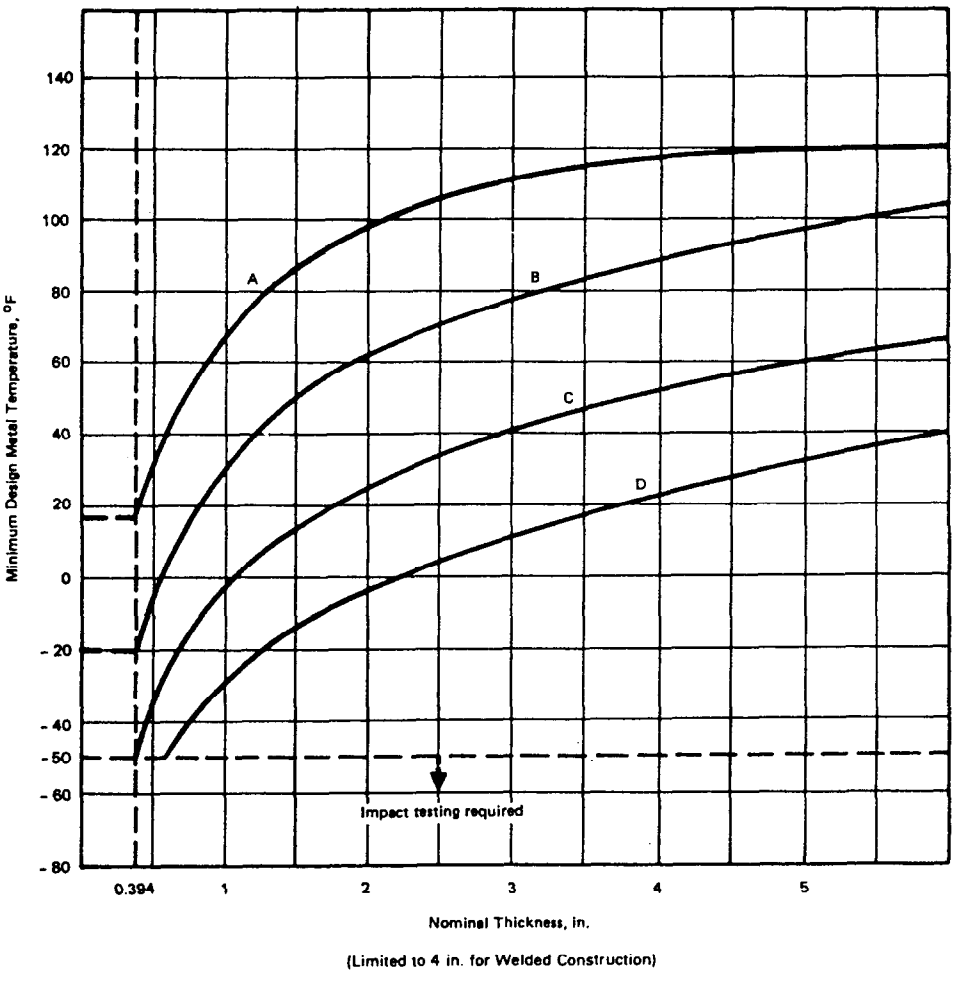

FIG. UCS-66 IMPACT TEST EXEMPTION CURVES [SEE UCS-66(a)]