Prepared by: [redacted]

DESIGN AND TEST REQUIREMENTS FOR ASSEMBLIES AND EQUIPMENT

A-35

Department: Gas System Maintenance and Technical Support **Section:** System Integrity **Date:** 12-03-04

Approved by: [redacted] **Approved by:** [redacted]

Rev. #00: This document replaces PG&E Drawing 086532. For a description of the changes, see Page 3.

Purpose and Scope

This gas standard specifies the minimum requirements for testing and fabricating assemblies for natural gas service.

Acronyms

API:	American Petroleum Institute
ASME:	American Society of Mechanical Engineers
ASTM:	American Society for Testing and Materials
CFR:	*Code of Federal Regulations*
GSM&TS:	Gas System Maintenance and Technical Support
psig:	pounds per square inch gauge
SMYS:	specified minimum yield strength

References

	Gas Standard
Piping Design and Test Requirements	A-34
Welder Qualification for Under 20% of SMYS	D-30

Application

1. These requirements apply primarily to assemblies specified for purchase by PG&E, but also to all items fabricated by PG&E. Items fabricated by PG&E must meet all the requirements of this standard, except for the pre-installation strength test, which is not required for facilities that will receive an 8-hour post-installation test. (Refer to Gas Standard A-34, Attachment A).
2. The requirements of this standard apply to most filters, dehydrators, orifice meters, test heads, tanks, and other assemblies and equipment. Products fabricated in accordance with a specification listed in Appendix A of 49 CFR 192 (latest edition) are generally exempted from this standard (see "Requirements for Items Constructed Under a Specification Listed in Appendix A of 49 CFR 192 (Latest Edition)" section on Page 3). The GSM&TS department shall authorize other exceptions to this standard. More stringent requirements for certain products or applications may be issued, if needed.
3. This standard shall not be interpreted in a manner that would allow relaxation of any requirements specified elsewhere. Other standards, specifications, or special instructions that are more stringent shall be followed. Consult GSM&TS if there are questions regarding compliance, application of this standard, or if further information is required.

Qualification of Welding Procedures

Each welding procedure used in the fabrication of the assembly must be qualified under Section IX of the ASME Boiler and Pressure Vessel Code, or Section 2 of API Standard 1104. The editions of the ASME Boiler and Pressure Code and API 1104 used for qualification of welding procedures shall be those referenced in the latest edition of 49 CFR 192, Appendix A.

Qualification of Welders

4. For assemblies with a hoop stress level of less than 20% of SMYS, each welder shall be qualified under Item 5 below or qualified under Gas Standard D-30.
5. For assemblies with a hoop stress level of 20% or more of SMYS, each welder shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code or Section 3 of API Standard 1104. The editions of

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the ASME Boiler and Pressure Code and API 1104 used for qualification of welding procedures shall be those referenced in the latest edition of 49 CFR 192, Appendix A.

Weld Inspection

6. Assemblies shall have 100% of all welds visually inspected by a qualified welding inspector. Visual inspection shall verify that:
   A. Welding is performed in accordance with the welding procedure, and
   B. The weld is acceptable according to standards of Section 6 of API 1104 using the edition referenced in the latest edition of 49 CFR 192, Appendix A.
7. Assemblies with a hoop stress level of 20% or more of SMYS shall have 100% of all butt welds on pipe or vessels 6" diameter or larger inspected by radiography.

   Reference: 49 CFR 192.241, 49 CFR 192.243, and Appendix A (latest edition).

Pressure Tests at Time of Assembly (Pre-Installation Tests)

All assemblies shall be strength tested to a minimum of 1.5 times the design pressure. The test duration shall be a minimum of 1 hour for those designed to operate under 30% of SMYS, and 4 hours for those designed to operate at 30% or more of SMYS.

Reference: 49 CFR 192.507 (b) and 49 CFR 192.505 (a) (latest edition).

Note: (Refer to Gas Standard A-38, Attachment A for post-installation test requirements.)

Materials

8. All pipe shall be Grade B seamless. Pipe shall be standard weight or heavier, unless an alternate is approved by GSM&TS. Pipe shall be manufactured to API 5L, ASTM A-53, or ASTM A-106 specifications.
9. Where applicable, fittings and other material used in the assembly shall be manufactured under a specification listed in the latest edition of 49 CFR 192, Appendix A.

Report

10. A test report shall be prepared for each assembly. This report shall specify test pressure and duration, and shall indicate that appropriate weld inspection was performed.
11. Alternatively, in lieu of providing individual reports on specified units, the manufacturer may send a letter to GSM&TS certifying that the units meet the weld inspection and strength test requirements of this standard provided that:
    A. The manufacturer receives prior approval by GSM&TS and
    B. The equipment is purchased at the rate of at least several units per year and has a hoop stress level of less than 20% of SMYS.

Pressure Rating

12. Each assembly shall have a rated pressure that will not produce a hoop stress in the pipe component of the assembly that exceeds 50% of the SMYS of the material used. For pipe, this pressure shall be calculated using the following formula:

$$P = \frac{S \times t}{D}$$

Where:

P = maximum rated pressure (psig)

S = SMYS of material

D = nominal outside diameter of pipe (inches)

t = nominal wall thickness of pipe (inches)

All fittings used as components of assembly shall have a pressure rating equal to or greater than the assembly's rated pressure. Refer to Section B of the *Gas Standards and Specifications* for fitting ratings, material, and ANSI manufacturing standards.

13. Weld inspection and strength test requirements are based on maximum calculated hoop stress at rated pressure.

Requirements for Items Constructed Under a Specification Listed in *Appendix A* of 49 CFR 192 (Latest Edition)

14. The supplier may be requested to provide verification that the product complies with the specification.
15. For items constructed under the ASME Boiler and Pressure Vessel Code, Section VIII, ASME test certificates will be required for hoop stress levels over 20% of SMYS. Exceptions shall be approved by GSM&TS.

Revision Notes

Revision 00 has the following changes:

1. Converted PG&E Drawing 086532 to Gas Standard A-35.
2. This document is part of Change 55.

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