Description

This procedure is used to establish guidelines for pressure testing steel pipelines.

Regulatory Applicability

☒ Transmission Pipelines
☒ Regulated Gathering Pipelines (Type A)
☒ Regulated Gathering Pipelines (Type B)[1]
☒ Distribution Pipelines

Frequency

Prior to operating a new pipeline or returning to service a pipeline that has been relocated or replaced, pressure test the line according to the requirements of this procedure to substantiate the MAOP (See procedure P-192.619) and locate and eliminate each potentially hazardous leak.

Reference

49 CFR 192.501	*Scope*
49 CFR 192.503	*General Requirements*
49 CFR 192.505	*Strength Test Requirements for Steel Pipeline to Operate at a Hoop Stress of 30% or More of SMYS*
49 CFR 192.507	*Test Requirements for Pipelines to Operate at a Hoop Stress Less Than 30% of SMYS At or Above 100 psi*
49 CFR 192.509	*Test Requirements for Pipelines to Operate Below 100 psi*
49 CFR 192.511	*Test Requirements for Service Lines*
49 CFR 192.515	*Environmental Protection and Safety Requirements*
49 CFR 192.517	*Records*

Reference (Cont'd)

Forms / Record

F-192.517	*Pipeline Pressure Test Record / Life of Pipeline System,*

[1] If the line is new, replaced, relocated or changed.

Retention	*Keep most current copy of records*	
Related Specifications	None	
OQ Covered Task	0561	*Pressure Test – Non-Liquid Medium – MAOP Less Than 100 PSI*
	0571	*Pressure Test – Non-Liquid Medium – MAOP Greater Than or Equal to 100 PSI*
	0581	*Pressure Test – Liquid Medium*

(In order to perform the tasks listed above; personnel must be qualified in accordance with West Texas Gas's Operator Qualification program or directly supervised by a qualified individual.)

Procedure Steps

NOTE: A job-specific procedure must be developed to cover the items discussed in this procedure.

General Requirements

1. The test medium used must be liquid, air, natural gas or an inert gas that is compatible with the pipe material, relatively free of sedimentary materials, and nonflammable (except for natural gas).
2. Unless otherwise noted in this procedure, the following maximum hoop stress limitations apply:

	Maximum hoop stress allowed as percentage of SMYS	
Class Location	Natural Gas	Air or Inert Gas
1	80	80
2	30	75
3	30	50
4	30	40

3. Although each joint used to tie in a test segment of the pipeline is excepted from the specific requirements of this procedure, each non-welded joint must be leak tested to not less than its operating pressure.
4. If a component other than pipe is the only item being replaced or added to a pipeline, a strength test after installation is not required as long as the manufacturer of the component certifies that –
   a) the component was tested to at least the pressure required for the pipeline to which it is being added;
   b) the component was manufactured under a quality control system that ensures that each item manufactured is at least equal in strength to a prototype and that the prototype was tested to at least the pressure required for the pipeline to which it is being added; or
   c) The component carries a pressure rating established through applicable ASME.ANSI, MSS specifications, or by unit strength calculations as described in 49 CFR 192.143.
5. Safety is the primary consideration during planning and completion of all pressure test. All associated equipment and material must be secured or anchored to prevent uncontrolled pressure releases.

Strength Test Requirements for Steel Pipe Operating at a Hoop Stress >30%

1. In a Class 1 or Class 2 location, if a building(s) intended for human occupancy exists within 300 feet of a pipeline whose design hoop stress level is 30% or more of SMYS, the test pressure must be a minimum of 1.25 times MAOP (see P-192.619). In no event may the test section be less than 600 feet unless the length of the newly installed or relocated pipe is less than 600 feet. If an inert gas or air test is to be conducted, the building(s) must be evacuated while the hoop stress level exceeds 50% of SMYS. If building(s) cannot be evacuated, the piping must be hydrostatically tested.
2. In Class 1 or Class 2, each compressor station, regulating station and measuring station must be tested to at least Class 3 test requirements of a minimum of 1.50 times MAOP (see P-192.619)
3. The test pressure must be maintained throughout the part of the system being tested for eight (8) hours. However, fabricated units and short sections of pipe for which a post installation test is impractical, a pre-installation strength test may be conducted by maintaining the pressure at or above the test pressure for at least four (4) hours.

Strength Test Requirements for Steel Pipe Operating at a Hoop Stress <30% and At or Above 100

1. The test procedure must ensure discovery of all potentially hazardous leaks in the segment being tested.
2. If during the test the segment is to be stressed to 20% or more of SMYS and natural gas, inert gas or air is the test medium.
3. A leak test must be performed at a pressure between 100 psi gauge and the pressure required to produce a hoop stress of 20% or SMYS; or
4. The line must be checked for leaks using Leak Detection equipment Pipeline Inspection used while the hoop stress is help at approximately 20% of SMYS. (The TRRC recently gave approval to WTG to use aerial leak surveying for this task).
5. The pressure must be maintained at or above the test pressure for at least one (1) hour.
6. For fabricated units and short sections of pipe, for which a post installation test is impractical, a pre-installation hydrostatic pressure test must be conducted in accordance with the requirements of this section.

Test requirements for Pipelines to Operate Below 100 psig.

1. The test procedure must ensure discovery of all potentially hazardous leaks in the segment being tested.
2. Each main that is to be operated at less than 1 psig must be tested to at least 10 psig.
3. Each main that is to be operated at or above 1 psig must be tested to at least 90 psig.
4. Each test must be a minimum of 1 hour.

Test Requirements for Service Lines (Other than Plastic)

1. If feasible, the service line connection to the main must be included in the test. If this is not feasible, it must be given a leakage test at the operating pressure when placed in service.
2. Each segment of a service line intended to be operated at a pressure of at least 1 psi gauge but not more than 40 psi gage must be given a leak test at a pressure not less than 50 psi gauge.
3. Each segment of a service line intended to be operated at pressures of more than 40 psi gauge must be tested to at least 90 psi.

NOTE: Each segment of a steel service line stressed to 20% or more of SMYS must be tested in accordance with 49 CFR 192.507.

Environmental Protection and Safety Requirements

1. Every reasonable precaution must be taken to protect employees and the general public during testing. Whenever the hoop stress of the segment of the pipeline being tested will exceed 50% of SMYS, all practical steps shall be taken to keep people not working on the testing operations outside of the testing area until the pressure is reduced to or below the MAOP.
2. The test medium shall be disposed of in a manner that will minimize damage to the environment.

Records

1. A record of each test performed under 49 CFR 192.505 and 507 (steel pipelines operating above 100 psi) shall be maintained and kept for the useful life of the pipeline.
2. The record must contain: (Complete Form F-192.517 or equivalent documentation)
   a) The operator's name, the name of the operator, employee responsible for making the test, the name of the test company used;
   b) Test medium used;
   c) Test pressure;
   d) Test duration;
   e) Pressure recording charts, or other record of pressure readings;
   f) Elevation variations, whenever significant for the particular test; and
   g) Leaks and failures noted and their disposition.

Records of pressure tests performed under 49 CFR 192.509 and 192.511 must be maintained for the useful life of the pipeline.

Transmission lines: Spike hydrostatic pressure test.

1. *Spike test requirements.* Whenever a segment of steel transmission pipeline that is operated at a hoop stress level of 30 percent or more of SMYS is spike tested under this part, the spike hydrostatic pressure test must be conducted in accordance with this section.
   a) The test must use water as the test medium.
   b) The baseline test pressure must be as specified in the applicable paragraphs of §192.619(a)(2) or §192.620(a)(2), whichever applies.
   c) The test must be conducted by maintaining a pressure at or above the baseline test pressure for at least 8 hours as specified in §192.505.
   d) After the test pressure stabilizes at the baseline pressure and within the first 2 hours of the 8-hour test interval, the hydrostatic pressure must be raised (spiked) to a minimum of the lesser of 1.5 times MAOP or 100% SMYS. This spike hydrostatic pressure test must be held for at least 15 minutes after the spike test pressure stabilizes.
2. *Other technology or other technical evaluation process.* Operators may use other technology or another process supported by a documented engineering analysis for establishing a spike hydrostatic pressure test or equivalent. Operators must notify PHMSA 90 days in advance of the assessment or reassessment requirements of this subchapter. The notification must be made in accordance with §192.18 and must include the following information:
   a) Descriptions of the technology or technologies to be used for all tests, examinations, and assessments;
   b) Procedures and processes to conduct tests, examinations, assessments, perform evaluations, analyze defects, and remediate defects discovered;
   c) Data requirements, including original design, maintenance and operating history, anomaly or flaw characterization;
   d) Assessment techniques and acceptance criteria;
   e) Remediation methods for assessment findings;
   f) Spike hydrostatic pressure test monitoring and acceptance procedures, if used;
   g) Procedures for remaining crack growth analysis and pipeline segment life analysis for the time interval for additional assessments, as required; and
   h) Evidence of a review of all procedures and assessments by a qualified technical subject matter expert