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Code of Federal Regulations

Title 49. Transportation

Subtitle B. Other Regulations Relating to Transportation

Chapter I. Pipeline and Hazardous Materials Safety Administration, Department of Transportation (Refs & Annos)

Subchapter D. Pipeline Safety

Part 192. Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards (Refs & Annos)

Subpart C. Pipe Design

49 C.F.R. § 192.105

§ 192.105 Design formula for steel pipe.

Currentness

(a) The design pressure for steel pipe is determined in accordance with the following formula:

$$P=(2 St/D) xFxExT$$

P=Design pressure in pounds per square inch (kPa) gauge.

S=Yield strength in pounds per square inch (kPa) determined in accordance with § 192.107.

D=Nominal outside diameter of the pipe in inches (millimeters).

t=Nominal wall thickness of the pipe in inches (millimeters). If this is unknown, it is determined in accordance with § 192.109. Additional wall thickness required for concurrent external loads in accordance with § 192.103 may not be included in computing design pressure.

F=Design factor determined in accordance with § 192.111.

E=Longitudinal joint factor determined in accordance with § 192.113.

T=Temperature derating factor determined in accordance with § 192.115.

(b) If steel pipe that has been subjected to cold expansion to meet the SMYS is subsequently heated, other than by welding or stress relieving as a part of welding, the design pressure is limited to 75 percent of the pressure determined under paragraph (a) of this section if the temperature of the pipe exceeds 900 ° F (482 ° C) at any time or is held above 600 ° F (316 ° C) for more than 1 hour.

**Credits**

[49 FR 7569, March 1, 1984; Amdt. 192–85, 63 FR 37501, July 13, 1998]

SOURCE: 35 FR 13257, Aug. 19, 1970; 52 FR 32800, Aug. 31, 1987; 53 FR 1635, Jan. 21, 1988; Amdt. 192–73, 60 FR 14650, March 20, 1995; Amdt. 192–3, 60 FR 41828, Aug. 14, 1995; Amdt. 192–75, 61 FR 18516, April 26, 1996; 61 FR 38403, July 24, 1996; 70 FR 8302, Feb. 18, 2005; Amdt. 192–111, 74 FR 62505, Nov. 30, 2009; Amdt. 192–112, 74 FR 63326, Dec. 3, 2009; Amdt. 192–120, 80 FR 12777, March 11, 2015; Amdt. 192–119, 80 FR 46847, Aug. 6, 2015; Amdt. 192–122, 81 FR 91872, Dec. 19, 2016; Amdt. 192–123, 82 FR 7997, Jan. 23, 2017; Amdt. 192–124, 83 FR 58715, Nov. 20, 2018; Amdt. 192–125, 84 FR 52243, Oct. 1, 2019, unless otherwise noted.

AUTHORITY: 30 U.S.C. 185(w)(3), 49 U.S.C. 5103, 60101 et. seq., and 49 CFR 1.97.

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49 C.F.R. § 192.107

§ 192.107 Yield strength (S) for steel pipe.

Currentness

(a) For pipe that is manufactured in accordance with a specification listed in section I of appendix B of this part, the yield strength to be used in the design formula in § 192.105 is the SMYS stated in the listed specification, if that value is known.

(b) For pipe that is manufactured in accordance with a specification not listed in section I of appendix B to this part or whose specification or tensile properties are unknown, the yield strength to be used in the design formula in § 192.105 is one of the following:

(1) If the pipe is tensile tested in accordance with section II–D of appendix B to this part, the lower of the following:

(i) 80 percent of the average yield strength determined by the tensile tests.

(ii) The lowest yield strength determined by the tensile tests.

(2) If the pipe is not tensile tested as provided in paragraph (b)(1) of this section, 24,000 p.s.i. (165 MPa).

**Credits**

[Amdt. 192–78, 61 FR 28783, June 6, 1996; 61 FR 30824, June 18, 1996; Amdt. 192–83, 63 FR 7723, Feb. 17, 1998; Amdt. 192–85, 63 FR 37501, July 13, 1998]

SOURCE: 35 FR 13257, Aug. 19, 1970; 52 FR 32800, Aug. 31, 1987; 53 FR 1635, Jan. 21, 1988; Amdt. 192–73, 60 FR 14650, March 20, 1995; Amdt. 192–3, 60 FR 41828, Aug. 14, 1995; Amdt. 192–75, 61 FR 18516, April 26, 1996; 61 FR 38403, July 24, 1996; 70 FR 8302, Feb. 18, 2005; Amdt. 192–111, 74 FR 62505, Nov. 30, 2009; Amdt. 192–112, 74 FR 63326, Dec. 3, 2009; Amdt. 192–120, 80 FR 12777, March 11, 2015; Amdt. 192–119, 80 FR 46847, Aug. 6, 2015; Amdt. 192–122, 81 FR 91872, Dec. 19, 2016; Amdt. 192–123, 82 FR 7997, Jan. 23, 2017; Amdt. 192–124, 83 FR 58715, Nov. 20, 2018; Amdt. 192–125, 84 FR 52243, Oct. 1, 2019, unless otherwise noted.

AUTHORITY: 30 U.S.C. 185(w)(3), 49 U.S.C. 5103, 60101 et. seq., and 49 CFR 1.97.

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Subpart C. Pipe Design

49 C.F.R. § 192.109

§ 192.109 Nominal wall thickness (t) for steel pipe.

Currentness

(a) If the nominal wall thickness for steel pipe is not known, it is determined by measuring the thickness of each piece of pipe at quarter points on one end.

(b) However, if the pipe is of uniform grade, size, and thickness and there are more than 10 lengths, only 10 percent of the individual lengths, but not less than 10 lengths, need be measured. The thickness of the lengths that are not measured must be verified by applying a gauge set to the minimum thickness found by the measurement. The nominal wall thickness to be used in the design formula in § 192.105 is the next wall thickness found in commercial specifications that is below the average of all the measurements taken. However, the nominal wall thickness used may not be more than 1.14 times the smallest measurement taken on pipe less than 20 inches (508 millimeters) in outside diameter, nor more than 1.11 times the smallest measurement taken on pipe 20 inches (508 millimeters) or more in outside diameter.

**Credits**

[Amdt. 192–85, 63 FR 37501, July 13, 1998]

SOURCE: 35 FR 13257, Aug. 19, 1970; 52 FR 32800, Aug. 31, 1987; 53 FR 1635, Jan. 21, 1988; Amdt. 192–73, 60 FR 14650, March 20, 1995; Amdt. 192–3, 60 FR 41828, Aug. 14, 1995; Amdt. 192–75, 61 FR 18516, April 26, 1996; 61 FR 38403, July 24, 1996; 70 FR 8302, Feb. 18, 2005; Amdt. 192–111, 74 FR 62505, Nov. 30, 2009; Amdt. 192–112, 74 FR 63326, Dec. 3, 2009; Amdt. 192–120, 80 FR 12777, March 11, 2015; Amdt. 192–119, 80 FR 46847, Aug. 6, 2015; Amdt. 192–122, 81 FR 91872, Dec. 19, 2016; Amdt. 192–123, 82 FR 7997, Jan. 23, 2017; Amdt. 192–124, 83 FR 58715, Nov. 20, 2018; Amdt. 192–125, 84 FR 52243, Oct. 1, 2019, unless otherwise noted.

AUTHORITY: 30 U.S.C. 185(w)(3), 49 U.S.C. 5103, 60101 et. seq., and 49 CFR 1.97.

Current through March 18, 2021; 86 FR 14803.

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Subpart L. Operations

49 C.F.R. § 192.619

§ 192.619 Maximum allowable operating pressure: Steel or plastic pipelines.

Effective: July 1, 2020

Currentness

<For compliance date(s) of amendment(s) to subsection (a)(2)(ii), see 86 FR 2210.>

(a) No person may operate a segment of steel or plastic pipeline at a pressure that exceeds a maximum allowable operating pressure (MAOP) determined under paragraph (c), (d), or (e) of this section, or the lowest of the following:

(1) The design pressure of the weakest element in the segment, determined in accordance with subparts C and D of this part. However, for steel pipe in pipelines being converted under § 192.14 or uprated under subpart K of this part, if any variable necessary to determine the design pressure under the design formula (§ 192.105) is unknown, one of the following pressures is to be used as design pressure:

(i) Eighty percent of the first test pressure that produces yield under section N5 of Appendix N of ASME B31.8 (incorporated by reference, see § 192.7), reduced by the appropriate factor in paragraph (a)(2)(ii) of this section; or

(ii) If the pipe is 12 <sup>3</sup>/<sub>4</sub> inches (324 mm) or less in outside diameter and is not tested to yield under this paragraph, 200 p.s.i. (1379 kPa).

(2) The pressure obtained by dividing the pressure to which the pipeline segment was tested after construction as follows:

(i) For plastic pipe in all locations, the test pressure is divided by a factor of 1.5.

(ii) For steel pipe operated at 100 psi (689 kPa) gage or more, the test pressure is divided by a factor determined in accordance with the Table 1 to paragraph (a)(2)(ii):

<Text of table effective until March 21, 2021, as delayed by 86 FR 12834.>

Table 1 to Paragraph (a)(2)(ii)

Class location	Factors, <sup>1</sup> segment—			
	Installed before (Nov. 12, 1970)	Installed after (Nov. 11, 1970) and before July 1, 2020	Installed on or after July 1, 2020	Converted under § 192.14
1.....	1.1	1.1	1.25	1.25
2.....	1.25	1.25	1.25	1.25
3.....	1.4	1.5	1.5	1.5
4.....	1.4	1.5	1.5	1.5

<Text of table effective March 21, 2021, as delayed by 86 FR 12834.>

Table 1 to Paragraph (a)(2)(ii)

Class location	Installed before (Nov. 12, 1970)	Factors, <sup>1 2</sup> segment—		
	Installed after (Nov. 11, 1970) and before July 1, 2020	Installed on or after July 1, 2020	Converted under § 192.14	
1.....	1.1	1.1	1.25	1.25
2.....	1.25	1.25	1.25	1.25
3.....	1.4	1.5	1.5	1.5
4.....	1.4	1.5	1.5	1.5

(3) The highest actual operating pressure to which the segment was subjected during the 5 years preceding the applicable date in the second column. This pressure restriction applies unless the segment was tested according to the requirements in paragraph (a)(2) of this section after the applicable date in the third column or the segment was updated according to the requirements in subpart K of this part:

Pipeline segment	Pressure date	Test date
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—Onshore gathering line that first became subject to this part (other than § 192.612) after April 13, 2006.....	March 15, 2006, or date line becomes subject to this part, whichever is later.....	5 years preceding applicable date in second column.
—Onshore transmission line that was a gathering line not subject to this part before March 15, 2006.		
Offshore gathering lines.....	July 1, 1976.....	July 1, 1971.
All other pipelines.....	July 1, 1970.....	July 1, 1965.

(4) The pressure determined by the operator to be the maximum safe pressure after considering and accounting for records of material properties, including material properties verified in accordance with § 192.607, if applicable, and the history of the pipeline segment, including known corrosion and actual operating pressure.

(b) No person may operate a segment to which paragraph (a)(4) of this section is applicable, unless over-pressure protective devices are installed on the segment in a manner that will prevent the maximum allowable operating pressure from being exceeded, in accordance with § 192.195.

(c) The requirements on pressure restrictions in this section do not apply in the following instance. An operator may operate a segment of pipeline found to be in satisfactory condition, considering its operating and maintenance history, at the highest actual operating pressure to which the segment was subjected during the 5 years preceding the applicable date in the second column of the table in paragraph (a)(3) of this section. An operator must still comply with § 192.611.

(d) The operator of a pipeline segment of steel pipeline meeting the conditions prescribed in § 192.620(b) may elect to operate the segment at a maximum allowable operating pressure determined under § 192.620(a).

(e) Notwithstanding the requirements in paragraphs (a) through (d) of this section, operators of onshore steel transmission pipelines that meet the criteria specified in § 192.624(a) must establish and document the maximum allowable operating pressure in accordance with § 192.624.

(f) Operators of onshore steel transmission pipelines must make and retain records necessary to establish and document the MAOP of each pipeline segment in accordance with paragraphs (a) through (e) of this section as follows:

- (1) Operators of pipelines in operation as of [July 1, 2020 must retain any existing records establishing MAOP for the life of the pipeline;
- (2) Operators of pipelines in operation as of July 1, 2020 that do not have records establishing MAOP and are required to reconfirm MAOP in accordance with § 192.624, must retain the records reconfirming MAOP for the life of the pipeline; and
- (3) Operators of pipelines placed in operation after July 1, 2020 must make and retain records establishing MAOP for the life of the pipeline.

**Credits**

[35 FR 13257, Aug. 19, 1970, as amended by Amdt. 192–1, 35 FR 17660, Nov. 17, 1970; Amdt. 192–78, 61 FR 28785, June 6, 1996; 61 FR 30824, June 18, 1996; Amdt. 192–85, 63 FR 37501, 37504, July 13, 1998; Amdt. 192–102; 71 FR 13303, March 15, 2006; Amdt. 192–103, 71 FR 33407, June 9, 2006; 73 FR 62177, Oct. 17, 2008; 73 FR 72737, Dec. 1, 2008; Amdt. 192–125, 84 FR 52247, Oct. 1, 2019; Amdt. 192–128, 86 FR 2241, Jan. 11, 2021; 86 FR 12834, March 5, 2021]

SOURCE: 35 FR 13257, Aug. 19, 1970; 52 FR 32800, Aug. 31, 1987; 53 FR 1635, Jan. 21, 1988; Amdt. 192–73, 60 FR 14650, March 20, 1995; Amdt. 192–3, 60 FR 41828, Aug. 14, 1995; Amdt. 192–75, 61 FR 18516, April 26, 1996; 61 FR 38403, July 24, 1996; 70 FR 8302, Feb. 18, 2005; Amdt. 192–111, 74 FR 62505, Nov. 30, 2009; Amdt. 192–112, 74 FR 63326, Dec. 3, 2009; Amdt. 192–120, 80 FR 12777, March 11, 2015; Amdt. 192–119, 80 FR 46847, Aug. 6, 2015; Amdt. 192–122, 81 FR 91872, Dec. 19, 2016; Amdt. 192–123, 82 FR 7997, Jan. 23, 2017; Amdt. 192–124, 83 FR 58715, Nov. 20, 2018; Amdt. 192–125, 84 FR 52243, Oct. 1, 2019, unless otherwise noted.

AUTHORITY: 30 U.S.C. 185(w)(3), 49 U.S.C. 5103, 60101 et. seq., and 49 CFR 1.97.

Current through March 18, 2021; 86 FR 14803.

**Footnotes**

- 1 For offshore pipeline segments installed, uprated or converted after July 31, 1977, that are not located on an offshore platform, the factor is 1.25. For pipeline segments installed, uprated or converted after July 31, 1977, that are located on an offshore platform or on a platform in inland navigable waters, including a pipe riser, the factor is 1.5.
- 1 For offshore pipeline segments installed, uprated or converted after July 31, 1977, that are not located on an offshore platform, the factor is 1.25. For pipeline segments installed, uprated or converted after July 31, 1977, that are located on an offshore platform or on a platform in inland navigable waters, including a pipe riser, the factor is 1.5.
- 2 For a component with a design pressure established in accordance with § 192.153(a) or (b) installed after July 14, 2004, the factor is 1.3.