ASME B31.8-2016
(Revision of ASME B31.8-2014)

Gas Transmission and Distribution Piping Systems

ASME Code for Pressure Piping, B31

AN INTERNATIONAL PIPING CODE®

The American Society of Mechanical Engineers

Appendix B

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ASME issues written replies to inquiries concerning interpretations of technical aspects of this Code. Interpretations are published on the Committee Web page and under go.asme.org/Interpretations. Periodically certain actions of the ASME B31 Committee may be published as Cases. Cases are published on the ASME Web site under the B31 Committee Page at go.asme.org/B31committee as they are issued.

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N or fewer, or the design factor, F, is 0.4 or less. For purposes of applying this screening criterion, pressure cycles larger than 50% of the MAOP in magnitude should be counted as full-MAOP cycles. Seam welds that are not oriented parallel to the longitudinal axis of the pipe are exempt from the evaluation.

841.1.10 Protection of Pipelines and Mains From Hazards

(a) When pipelines and mains must be installed where they will be subject to natural hazards, such as washouts, floods, unstable soil, landslides, earthquake-related events (such as surface faulting, soil liquefaction, and soil and slope instability characteristics), or other conditions that may cause serious movement of, or abnormal loads on, the pipeline, reasonable precautions shall be taken to protect the pipeline, such as increasing the wall thickness, constructing revetments, preventing erosion, and installing anchors.

(b) Where pipelines and mains cross areas that are normally under water or subject to flooding (i.e., lakes, bays, or swamps), sufficient weight or anchorage shall be applied to the line to prevent flotation.

(c) Because submarine crossings may be subject to washouts due to the natural hazards of changes in the waterway bed, water velocities, deepening of the channel, or changing of the channel location in the waterway, design consideration shall be given to protecting the pipeline or main at such crossings. The crossing shall be located in the more stable bank and bed locations. The depth of the line, location of the bends installed in the banks, wall thickness of the pipe, and weighting of the line shall be selected based on the characteristics of the waterway.

(d) Where pipelines and mains are exposed, such as at spans, trestles, and bridge crossings, the pipelines and mains shall be reasonably protected by distance or barricades from accidental damage by vehicular traffic or other causes.

841.1.11 Cover, Clearance, and Casing Requirements for Buried Steel Pipelines and Mains

(a) Cover Requirements for Mains. Buried mains shall be installed with a cover not less than 24 in. (610 mm). Where this cover provision cannot be met, or where external loads may be excessive, the main shall be encased, bridged, or designed to withstand any such anticipated external loads. Where farming or other operations might result in deep plowing, in areas subject to erosion, or in locations where future grading is likely, such as road, highway, railroad, and ditch crossings, additional protection shall be provided. [See (e) for suggested methods to provide additional protection.]

(b) Cover Requirements for Pipelines. Except for offshore pipelines, buried pipelines shall be installed with a cover not less than that shown in Table 841.1.11-1.

Table 841.1.11-1 Pipeline Cover Requirements

Location	Cover, in. (mm)		
		For Rock Excavation [Note (1)]	
	For Normal Excavation	Pipe Size NPS 20 (DN 500) and Smaller	Pipe Size Larger Than NPS 20 (DN 500)
Class 1	24 (610)	12 (300)	18 (460)
Class 2	30 (760)	18 (460)	18 (460)
Classes 3 and 4	30 (760)	24 (610)	24 (610)
Drainage ditch at public roads and railroad crossings (all locations)	36 (910)	24 (610)	24 (610)

NOTE:
(1) Rock excavation is excavation that requires blasting.

Where these cover provisions cannot be met or where external loads may be excessive, the pipeline shall be encased, bridged, or designed to withstand any such anticipated external loads. In areas where farming or other operations might result in deep plowing, in areas subject to erosion, or in locations where future grading is likely, such as at roads, highways, railroad crossings, and ditch crossings, additional protection shall be provided. [See (e) for suggested methods to provide additional protection.]

(c) Clearance Between Pipelines or Mains and Other Underground Structures

(1) There shall be at least 6 in. (150 mm) of clearance wherever possible between any buried pipeline and any other underground structure not used in conjunction with the pipeline. When such clearance cannot be attained, precautions to protect the pipe shall be taken, such as the installation of casing, bridging, or insulating material.

(2) There shall be at least 2 in. (50 mm) of clearance wherever possible between any buried gas main and any other underground structure not used in conjunction with the main. When such clearance cannot be attained, precautions to protect the main shall be taken, such as the installation of insulating material or casing.

(d) Casing Requirements Under Railroads, Highways, Roads, or Streets. Casings shall be designed to withstand the superimposed loads. Where there is a possibility of water entering the casing, the ends of the casing shall be sealed. If the end sealing is of a type that will retain the maximum allowable operating pressure of the carrier pipe, the casing shall be designed for this pressure and at least to the design factor of 0.72. Venting of sealed casings is not mandatory; however, if vents are installed they should be protected from the weather to prevent

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water from entering the casing. (Requirements for crossings within casing of railroads and highways are shown in Table 841.1.6-2.)

(e) Additional Underground Pipe Protection. The pipe design factor, *F*, shall be in accordance with Table 841.1.6-2 for the crossing of roads and railroads. The guidance provided by API RP 1102, Steel Pipelines Crossing Railroads and Highways; or GRI Report No. 91/0284, Guidelines for Pipelines Crossing Highways; or Gas Piping Technology Committee's Guide Material Appendix G-15, Design of Uncased Pipelines Crossing of Highways and Railroads, may be considered for design and installation of pipeline crossing. The pipeline operator shall evaluate the need for extending additional pipe protection over the pipeline when the road or railroad right-of-way width is undefined based on anticipated loading from traffic or heavy equipment performing maintenance activities adjacent to the road or railroad.

Varying degrees of additional protection from third-party damage to a buried main or pipeline crossing within (or parallel to) the right-of-way of road or railroad may be achieved using the following techniques, or variants thereof, singly or in combination:

(1) A physical barrier or marker may be installed above or around the pipe (see para. 851.7). If a physical barrier is used, the potential conflict with the right-of-way maintenance activities should be recognized. Physical barrier or marker methods include

(-a) a concrete or steel barrier placed above the pipe

(-b) a concrete slab placed vertically adjacent to the pipe on each side and extended above the top of pipe elevation

(-c) damage-resistant coating material, such as concrete

(-d) extra depth of cover additional to that required in (b)

(-e) buried high-visibility warning tape placed parallel to and above the pipe

(-f) pipe casing [see (d) and para. 861.1.6]

(2) A heavier wall thickness than is required by the pipe design factor, *F*, in accordance with Table 841.1.6-1 or Table 841.1.6-2.

(3) Pipeline alignment should be as straight and perpendicular to the road or railroad alignment as possible to promote reliable marking of the pipe location through the right-of-way and at the right-of-way limits.

Additional underground pipe protection shall be used in conjunction with an effective educational program (para. 850.4.4), periodic surveillance of pipelines (para. 851.1), pipeline patrolling (para. 851.2), and utilization of programs that provide notification to operators regarding impending excavation activity, if available.

841.1.12 Design Factors Summary. Design factors are summarized in Table 841.1.6-2.

841.2 Installation of Steel Pipelines and Mains

841.2.1 Construction Specifications. All construction work performed on piping systems in accordance with the requirements of this Code shall be done under construction specifications. The construction specifications shall cover all phases of the work and shall be in sufficient detail to cover the requirements of this Code.

841.2.2 Inspection Provisions

(a) The operating company shall provide suitable inspection. Inspectors shall be qualified either by experience or training. The inspector shall have the authority to order the repair or removal and replacement of any component found that fails to meet the standards of this Code.

(b) The installation inspection provisions for pipelines and other facilities to operate at hoop stresses of 20% or more of the specified minimum yield strength shall be adequate to make possible at least the following inspections at sufficiently frequent intervals to ensure good quality of workmanship:

(1) Inspect the surface of the pipe for serious surface defects just prior to the coating operation. [See para. 841.2.4(b)(1).]

(2) Inspect the surface of the pipe coating as it is lowered into the ditch to find coating lacerations that indicate the pipe might have been damaged after being coated.

(3) Inspect the fitup of the joints before the weld is made.

(4) Visually inspect the stringer beads before subsequent beads are applied.

(5) Inspect the completed welds before they are covered with coating.

(6) Inspect the condition of the ditch bottom just before the pipe is lowered in, except for offshore pipelines.

(7) Inspect the fit of the pipe to the ditch before backfilling, except for offshore pipelines.

(8) Inspect all repairs, replacements, or changes ordered before they are covered.

(9) Perform such special tests and inspections as are required by the specifications, such as nondestructive testing of welds and electrical testing of the protective coating.

(10) Inspect backfill material prior to use and observe backfill procedure to ensure no damage occurs to the coating in the process of backfilling.

841.2.3 Bends, Miters, and Elbows in Steel Pipelines and Mains. Changes in direction may be made by the use of bends, miters, or elbows under the limitations noted below:

(a) Bends

(1) A bend shall be free from buckling, cracks, or other evidence of mechanical damage.

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