



Standard Specification for Ductile Iron Gravity Sewer Pipe¹

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1. Scope

1.1 This specification covers 4 to 64-in. ductile iron gravity sewer pipe centrifugally cast with push-on joints. This specification may be used for pipe with other types of joints, as may be agreed upon at the time of purchase.

1.2 This specification covers trench load design procedures for both cement-lined pipe and flexible-lined pipe. Maximum depth of cover tables are included for both types of linings.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

2. Referenced Documents

2.1 ASTM Standards:²

D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D3282 Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
E8 Test Methods for Tension Testing of Metallic Materials
E23 Test Methods for Notched Bar Impact Testing of Metallic Materials

2.2 ANSI/AWWA Standards:

C104/A21.4 Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water³
C111/A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings³
C150/A21.50 Thickness Design of Ductile-Iron Pipe³
C600 Installation of Ductile-Iron Water Mains and Their Appurtenances

¹ This specification is under the jurisdiction of ASTM Committee A04 on Iron Castings and is the direct responsibility of Subcommittee A04.12 on Pipes and Tubes.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

2.3 ASCE Standards:

Manuals and Reports on Engineering Practice, No. 37, (WCPF Manual of Practice No. 9). "Design and Construction of Sanitary and Storm Sewers"⁴

2.4 AASHTO Standard:

AASHTO T-99 Standard Method of Test for the Moisture-Density Relations of Soils Using a 5.5 lb (2.5 kg) Rammer and a 12 in. (305 mm) Drop

3. Terminology

3.1 Symbols:

3.1.1 A —outside radius of pipe,

$$ft = \frac{D}{24}$$

$$\left(\text{in metres} = \frac{D}{2000} \right)$$

3.1.2 a —conversion factor, lb/ft^2 to $\text{psi} = 144$ (kN/m^2 to $\text{kPa} = 1$)

3.1.3 B —1.5 ft (0.457 m)

3.1.4 b —Effective pipe length: 36 in. (0.914 m)

3.1.5 C —surface load factor, Table 1

3.1.6 D —outside diameter, in., Table 2

3.1.7 E —modulus of elasticity, 24×10^6 psi (165.5×10^6 kPa)

3.1.8 E' —modulus of soil reaction, psi, Table 3

3.1.9 F —impact factor, 1.5

3.1.10 f —design bending stress, 48 000 psi (331×10^3 kPa)

3.1.11 H —depth of cover, ft (m)

3.1.12 K_b —bending moment coefficient, Table 3

3.1.13 K_x —deflection coefficient, Table 3

3.1.14 P —wheel load, 16 000 lb (7257 kg)

3.1.15 P_e —earth load, psi (kPa)

3.1.16 P_t —truck load, psi (kPa)

3.1.17 P_v —trench load, psi (kPa) $= P_e + P_t$

3.1.18 R —reduction factor which takes into account the fact that the part of the pipe directly below the wheels is aided in

⁴ Available from American Society of Civil Engineers (ASCE), 1801 Alexander Bell Dr., Reston, VA 20191, <http://www.asce.org>.