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Replacing GB/T 13295-2013

# Ductile iron pipes, fittings and accessories for water or gas applications

(ISO 2531:2009, Ductile iron pipes, fittings, accessories and their joints for water applications, MOD)

水及燃气用球墨铸铁管、管件和附件

**[Including 2021XG1]**

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**Standardization Administration of the People's Republic of China.**

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# Ductile iron pipes, fittings and accessories for water or gas applications

## 1 Scope

This Standard specifies the terms and definitions, technical requirements, test methods, dimensions and tolerances, inspection rules and quality certificate for ductile iron pipes, fittings, accessories and their joints for water or gas applications, which are processed by any type of casting process or assembled from cast iron parts; this Standard also gives the type test requirements for joint components.

This Standard is applicable to pipes, fittings, accessories and their joints that include sockets, spigots or flanges, which are generally delivered in the state of internal and external coating. The range of dimensions is DN40 ~ DN3000, and the fluid temperature is 0 °C ~ 50 °C. The scope of application is as follows:

-- to convey different types of water for various purposes;

-- conveyed with or without pressure;

-- installed below or above ground;

-- to convey gas whose design pressure is medium-pressure grade A and below (such as artificial gas, natural gas, liquefied petroleum gas).

This Standard does not apply to conveying fluids at temperatures below freezing (this does not exclude the use of products at higher temperatures).

Pipes and fittings shall be classified by the allowable operating pressure or wall thickness.

**Note:** All pressures in this Standard are relative pressures in megapascals (MPa).

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 41-2016, Hexagon nuts, style 1 - Product grade C (ISO 4034:2012, MOD)

GB/T 95, Plain washers - Product grade C (GB/T 95-2002, ISO 7091:2000, IDT)

**4.4.1.5** The external coating of ductile iron pipes for non-excavation laying shall also meet the requirements of the construction method. For example, ductile iron pipes for pipe jacking may not be sprayed with finishing layer, and the sheath protection pipe and its outer surface coating shall be made; the outer surface coating of ductile iron pipes for horizontal directional drilling shall have certain wear resistance.

**4.4.1.6** Cast flanged pipes may be coated as fittings.

**4.4.2 External coatings**

**4.4.2.1 Zinc coating and finish layer**

**4.4.2.1.1** The outer coating of centrifugal ductile iron pipes and fittings shall include a metal zinc layer and a zinc-compatible synthetic resin finishing layer covering it, and these two coatings shall be applied in the factory.

**4.4.2.1.2** When the zinc coating is measured according to 6.6.1, the zinc coating and finish layer of pipes shall meet the relevant requirements of GB/T 17456.1, and the zinc coating and finish layer of fittings shall meet the requirements of GB/T 17456.2. The color of the finish layer of the pressure classified pipe shall be different from that of the wall thickness classified pipe. When the user has special requirements, it can be implemented according to the user's requirements.

**4.4.2.1.3** The average weight per unit area of the zinc coating sprayed on pressure classified pipes shall not be less than 200 $g/m^2$, and the local minimum value shall not be less than 180 $g/m^2$. For low-corrosion areas, the average weight per unit area of the zinc coating may not be less than 130 $g/m^2$, and the local minimum value shall not be less than 110 $g/m^2$ after negotiation between the supplier and the purchaser and specified in the contract.

**4.4.2.2 Other outer coatings**

**4.4.2.2.1** Ductile iron piping may be installed in a wide range of external environments. These environments can be described according to their corrosiveness. F.1 of Appendix F gives relevant factors, which can be considered when selecting a suitable outer coating.

**4.4.2.2.2** F.2 of Appendix F gives the outer coating applicable to pipes, and F.3 gives the outer coating applicable to fittings and accessories. Other coatings are also allowed.

**4.4.2 Internal linings**

**4.4.3.1 Cement mortar lining**

**4.4.3.1.1** The cement mortar lining shall meet the requirements of GB/T 17457. The lining after curing shall meet the requirements of 4.1.4. Aluminate cement can be used when conveying raw water, and shall comply with national regulations, or be used for

**5.2.3 External pressure**

The leaktightness of joints to external pressure shall be type tested as specified in 7.3; the joints shall exhibit no visible leakage when subjected to a shear load, expressed in newtons, not less than 30 times the nominal diameter, DN. The test pressure shall be not less than 0.2 MPa.

**5.2.4 Negative internal pressure**

The leaktightness of joints to negative internal pressure shall be type tested as specified in 7.4 at a test pressure of 0.09 MPa below atmospheric pressure (approximately 0.01 MPa absolute pressure). The maximum pressure change during the test period shall not be more than 0.009 MPa after 2 h, when tested in the following two positions:

a) joint aligned and subjected to shear; the shear force across the joint (expressed in N) shall not be less than 30 times nominal diameter, DN;

b) joint deflected: the test angular deflection shall be the maximum allowable deflection indicated in the manufacturer's handbook:

-- not less than 3° 30' for nominal diameter DN40 ~ DN300;

-- not less than 2° 30' for nominal diameter DN350 ~ DN600;

-- not less than 1° 30' for nominal diameter DN700 ~ DN2600;

-- not less than 1° for nominal diameter DN2800 ~ DN3000.

**5.2.5 Cycle pressure**

The leaktightness of joints to cycle pressure shall be type tested as specified in 7.5; the joints shall exhibit no visible leakage when subjected to a shear load, expressed in newtons, not less than 30 times the nominal diameter, DN.

**5.3 Flanged joints as cast, screwed, welded and adjustable**

**5.3.1 General**

**5.3.1.1** All flanged joints for ductile iron pipes and components shall be designed in compliance with the requirements of 5.3. If the design has been tested and documented by the manufacturer and successfully used for a minimum of 10 years, the performance of a type test as specified in 5.3.2 is only required for significant changes in design which could adversely affect the performance of the joint.

**5.3.1.2** When flanges are involved, there shall be a type test for at least one DN for each of the groupings given in Table 9. The PN to be tested is the highest PN existing for each flange design. One PN is representative of a grouping when the performances are based on the same design parameters throughout the size range.

# 6 Test methods

## 6.1 Dimensions

### 6.1.1 External diameter

**6.1.1.1** Pipes with sockets and spigot ends shall be measured at their spigot by means of a circumferential tape for compliance with the outer diameter tolerance. They can also be verified by means of pass-fail gauges.

**6.1.1.2** In addition, the pipes shall be visually inspected at their spigot for compliance with the ovality tolerance and, in case of doubt, checked by measurement of the maximum and minimum axes. This control may also be carried out by pass-fail gauges.

**6.1.1.3** The frequency of testing is related to the system of production and the quality control used by the manufacturer.

### 6.1.2 Inner diameter

The inner diameter is measured by using suitable equipment such as templates and other tools to measure twice at a right angle to each other on the cross section at or above 200 mm from the end face, and calculating the average value of the two measurement results, or by using a go-no-go gauge for inspection.

### 6.1.3 Wall thickness

**6.1.3.1** Pipe wall thickness compliance shall be demonstrated by the manufacturer; a combination of various means may be used, such as:

-- weight control;

-- direct wall thickness measuring or gauging by suitable equipment, such as mechanical or ultrasonic equipment. The frequency of testing is related to the system of production and quality control used by the manufacturer.

**6.1.3.2** The wall thickness shall be measured using suitable equipment with a margin of error of ±0.1 mm.

**Note:** When the pipe is pulled out from the pipe mold, the color uniformity of the pipe body reflects the uniformity of the wall thickness.

### 6.1.4 Length

The length of centrifugally cast pipes with sockets and spigot ends shall be measured by means of suitable equipment:

-- on the first pipe cast from a new mold, for standardized-length pipes;

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