

# Gas Industry Standard

GIS/C8:2006

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Specification for

**Distribution split tee and collar pipe fittings cast in  
grey or ductile iron for use up to 7 bar maximum  
operating pressures**

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## Foreword

Gas Industry Standards (GIS) are revised, when necessary, by the issue of new editions. Users should ensure that they are in possession of the latest edition. Contractors and other users external to Gas Transporters should direct their requests for copies of a GIS to the department or group responsible for the initial issue of their contract documentation.

Comments and queries regarding the technical content of this document should be directed in the first instance to the contract department of the Gas Transporter responsible for the initial issue of their contract documentation.

This standard calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Compliance with this engineering document does not confer immunity from prosecution for breach of statutory or other legal obligations.

## Mandatory and non-mandatory requirements

For the purposes of a GIS the following auxiliary verbs have the meanings indicated:

- can** indicates a physical possibility;
- may** indicates an option that is not mandatory;
- shall** indicates a GIS requirement;
- should** indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment needs to be completed to show that the alternative method delivers the same, or better, level of protection.

## Disclaimer

This engineering document is provided for use by Gas Transporters and such of their contractors as are obliged by the terms of their contracts to comply with this engineering document. Where this engineering document is used by any other party, it is the responsibility of that party to ensure that the engineering document is correctly applied.

## Brief history

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## 1 Scope

This Gas Industry Standard specifies requirements for distribution split tee and collar pipe fittings cast in grey or ductile iron for use up to 7 bar maximum operating pressures. This standard does not specify wrap-around steel fittings.

This standard applies to fittings in the DN 40 to DN 600 size range which are manufactured with socketed, flanged or spigot ends for jointing by means of various types of gaskets which are not within the scope of this standard.

## 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.

### Formal standards

BS 3416, *Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water.*

BS 4164, *Specification for coal-tar-based hot-applied coating materials for protecting iron and steel, including a suitable primer.*

BS EN 969:1996, *Specification for ductile iron pipes, fittings, accessories and their joints for gas pipelines — Requirements and test methods.*

BS EN 1561, *Founding — Grey cast irons.*

BS EN 1563, *Founding — Spheroidal graphite cast iron.*

### Gas Industry Standards

GIS/C5, *Specification for distribution pipe fittings cast in grey cast iron for use up to 7 bar maximum operating pressure.*

GIS/C6, *Specification for distribution pipe fittings cast in ductile iron for use up to 7 bar maximum operating pressures.*

## 3 Terms and definitions

For the purposes of this standard the following terms and definitions apply.

### 3.1

#### **ductile iron (spheroidal graphite cast iron)**

iron in which the graphite is present substantially in spheroidal form

### 3.2

#### **grey cast iron**

iron-carbon cast material in which the free carbon is present as graphite, mainly in lamellar form (flake graphite)

NOTE The characterizing properties of the material are its tensile strength and hardness.

## 4 General

### 4.1 Materials

Grey cast iron shall be compatible with the manufacturer's design. Grey cast iron fittings shall be in accordance with BS EN 1561. Ductile iron fittings shall be in accordance with

BS EN 1563. Castings used for fittings shall be in accordance with GIS/C5 (grey cast iron) and GIS/C6 (ductile iron).

#### **4.2 Dimensions**

Dimensions of ductile iron pipe fittings including wall thickness, external diameter, length and straightness of pipes shall be in accordance with BS EN 969:1996, Clause 4. The functional properties of ductile iron pipes and fittings shall be in accordance with BS EN 969:1996, Annexes A and B.

#### **5 Freedom from defects**

Pipe fittings and accessories shall be free from defects and surface imperfections which could lead to non-compliance with BS EN 969:1996, Clauses 4 and 5 for ductile iron pipe fittings and BS EN 1561 for grey cast iron pipe fittings.

#### **6 Examination**

**6.1** Castings shall be examined in accordance with 6.2 to 6.6. Any castings which do not conform to these requirements shall be discarded or recycled.

**6.2** Each casting shall be visually examined. It shall be clean, well fettled and free of injurious defects; bolt holes shall be clean and free of flash. Particular attention shall be paid to all sealing faces, sealing grooves and recesses; they shall be smooth, free of all defects and obstructions. Sealing faces, recesses or grooves shall be visually examined following machining. Castings shall also be examined after coating to ensure that the sealing faces, grooves, etc., have not been obstructed by solidified coating materials.

**6.3** Each casting shall be examined to ensure that sealing faces between halves mate correctly.

**6.4** From each batch of castings 10 % shall be checked for wall thickness on critical dimensions which shall conform to the manufacturer's engineering drawing design. If any critical wall thickness is found to be below minimum design thickness, all the castings in the relevant batch shall be checked.

**6.5** Critical dimensions of castings shall be subject to agreement between purchaser and manufacturer. From each batch of castings 1 % shall be subjected to a full check of critical dimensions. For batches comprising less than 100 castings, one casting per batch shall be checked. If any critical dimension is found to be outside design tolerances all castings in the relevant batch shall be examined.

**6.6** Dimensions of outlet flanges shall be subject to agreement between purchaser and manufacturer. Each outlet flange shall be visually examined to check dimensions.

#### **7 Type approval tests**

Testing shall be carried out in accordance with BS EN 969:1996, Clauses 5 and 6 for ductile iron fittings and BS EN 1561 for grey cast iron fittings.

NOTE For ductile iron fittings this includes tests on joints, dimensions, straightness of pipes, tensile test, Brinell hardness and works leaktightness tests.

Fittings and joints shall be designed to be leaktight at their maximum operating pressure and shall conform to the requirements for performance and testing specified in BS EN 969:1996, Clause 5, 6.5 and Clause 7. For grey cast iron fittings the tensile and hardness testing shall be in accordance with BS EN 1561.

## 8 Production testing

### 8.1 Leaktightness

Pressure testing for leaktightness shall be in accordance with BS EN 969:1996, **6.5** and Clause **7**.

### 8.2 Test schedule

After all machining and repair operations have been completed each individual casting shall be pressure tested prior to coating operations being carried out. The test schedule shall be in accordance with **8.3** and **8.4**.

### 8.3 Hydrostatic testing

Hydrostatic testing for ductile iron fittings and grey cast iron fittings shall be in accordance with BS EN 969:1996, **6.5.3** except the minimum test pressures shall be in accordance with Table 1. This test pressure shall be maintained for not less than 2 min. There shall be no leaking or weeping.

**Table 1 — Hydrostatic test pressures**

Casting duty	Test pressure
	bar
Medium pressure (MP)	4
Intermediate pressure (IP)	14

### 8.4 Pneumatic testing

Following the hydrostatic test each casting shall be pneumatically tested to not less than the appropriate test pressure specified in Table 2. Where castings are submerged in water for examination, this test pressure shall be maintained for not less than 1 min after submersion. Where castings are examined by covering the outer surface with a soap solution, the test pressure shall be maintained for not less than 4 min after soaping. There shall be no leaking or weeping in either instance.

**Table 2 — Pneumatic test pressures**

Casting duty	Test pressure
	bar
Medium pressure (MP)	3.5
Intermediate pressure (IP)	7

### 8.5 Frequency of sampling

The maximum batch sizes for ductile iron fittings shall be in accordance with BS EN 969:1996, Table 9 and for grey cast iron the sampling shall be in accordance with BS EN 1561.

NOTE The frequency of production/sample testing is related to the system of production and quality control used by the manufacturer.

## 9 Repair of castings

**9.1** Repairs to pipe fittings to remove surface imperfections and localized defects shall not affect the entire wall thickness provided that the repairs meet the requirements of BS EN 969:1996, **4.1.2** for ductile iron and BS EN 1561 for grey cast iron

**9.2** The repair of castings by impregnation processes shall be carried out using a resin based filler only. The leakpath shall not cause a deterioration in the mechanical strength of the castings.

**9.3** Proprietary metal fillers shall not be used before all pressure testing is complete or where the minimum wall thickness of the metal wall is below the limits specified.

NOTE Proprietary metal fillers may be used to enhance the appearance of castings.

**9.4** Repairs in accordance with **9.1**, **9.2** and **9.3** shall be completed before any testing is carried out in accordance with Clause **7**. Castings reclaimed in accordance with **9.2** shall be pressure tested in accordance with Clause **8** after the completion of all repairs.

## 10 Coating

All pipe fittings shall be coated internally and externally by either hot-applied coal tar-based material in accordance with BS 4164 or cold-applied black bitumen paint in accordance with BS 3416. Coating shall not be applied to castings until surfaces are clean, dry and free from rust.

## 11 Marking

Products conforming to GIS/C8 shall be permanently marked with the following information:

- a) the name or trademark of the manufacturer or their appointed agent;
- b) the manufacturer's contact details;
- c) where authorized, the product conformity mark of a third party certification body, e.g. BSI Kitemark;

NOTE Attention is drawn to the advantages of using third party certification of conformance to a standard.

- d) indication of the maximum operating pressure;
- e) on medium pressure castings for maximum operating pressures up to 2 bar:  
GIS/C8:2013-A <sup>1)</sup>;
- f) on intermediate pressure castings for maximum operating pressures up to 7 bar:  
GIS/C8:2013-B <sup>1)</sup>;
- g) size;
- h) casting batch identity code.

## 12 Installation instructions

Installation instructions shall be provided with each item of equipment.

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<sup>1)</sup> Marking GIS/C8:2013 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.