

Gas Industry Standard

GIS/E5:2013

Specification for

**Pipe cutting wheels for hand-operated wheeled
pipe cutters**



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Foreword

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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

<p> First published as BGC/PS/E5 Amended issue published as GBE/E5 Editorial update to reflect demerger November 2000 Editorial update to reflect merger October 2002 Editorial update to comply with GRM Edited by BSI in accordance with BS 0-3:1997 Reviewed on behalf of the Gas Distribution Networks' Technical Standard Forum by BSI Reviewed by TSF Reviewed by TSF </p>	<p> May 1978 April 1993 June 2001 November 2002 August 2004 August 2006 September 2013 June 2018 April 2023 </p>
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1 Scope

This Gas Industry Standard (GIS) specifies the material and dimensional requirements of cutting wheels suitable for use with existing hand-operated wheeled pipe-cutters.

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 EN 969, *Ductile Iron pipes, fittings, accessories and their joints for gas pipelines – requirements and test methods.*

BS 1134 (all parts), *Assessment of surface texture.*

BS EN ISO 6507 (all parts), *Metallic materials — Vickers hardness test.*

BS EN ISO 6508-1:2005, *Metallic materials. Rockwell hardness test. Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

BS EN ISO 6508-2:2005, *Metallic materials. Rockwell hardness test. Verification and calibration of testing machines (scales A, B, C, D, E, F, G, H, K, N, T)*

BS EN ISO 6508-3:2005, *Metallic materials. Rockwell hardness test. Calibration and reference blocks (scales A, B, C, D, E, F, G, H, K, N, T)*

BS EN 3183, *Petroleum and natural gas industries. Steel pipe for pipeline transportation systems.*

Gas Industry Standards

GIS/L2, *Specification for steel pipe 21.3 mm to 1 219 mm outside diameter for operating pressures up to 7 bar.*

3 Terms and definitions

For the purposes of this GIS the following definition applies.

3.1

SG iron

spheroidal graphite iron, having an as-cast structure containing graphite particles in the form of small rounded, “spheroidal”, “globular” or “nodular” particles in a ductile metallic matrix

NOTE Also referred to as ductile iron.

4 Material

4.1 General

Wheels shall be one of the following types:

- a) to cut grey cast iron or SG iron pipe conforming to BS EN 969;
- b) to cut steel pipe conforming to GIS/L2;
- c) universal, to cut materials conforming to both BS EN 969 or GIS/L2.

4.2 Method of manufacture

Wheels shall be manufactured from forged blanks or rolled bar, or produced as precision castings.

In the case of forged or rolled material, any directionality of properties resulting from the method of manufacture shall not reduce wheel life.

4.3 Composition

4.3.1 Plain carbon tool steels shall not be used.

4.3.2 Wheel material shall be of tool steel and contain alloying additions to improve its response to heat treatment and to achieve the required hardness and cutting life.

4.3.3 Where wheels are machined from rolled bar, the starting material shall not contain elongated sulphides, or other inclusions of a size and location that could lead to premature failure of the cutting edge. When machined from rolled bar, the maximum sulphur content shall be 0.015 %.

4.3.4 Where wheels are produced from forged blanks or castings, the maximum sulphur content shall be 0.03 %.

4.4 Heat treatment and hardness

The heat treatment procedures shall be compatible with the wheel material (see **4.3.2**) and shall avoid the development of cracks, distortion or surface decarburization.

The hardness of the wheels shall be within the range 650 HV to 750 HV when tested in conformance with BS EN ISO 6507, or 57 HRC to 61 HRC when tested in conformance with BS EN 10109.

4.5 Examination of finished product

The cutting edge of every wheel shall be inspected at a minimum of x10 optical magnification under good illumination.

Surface defects at the cutting edge shall not be accepted as they can reduce cutting life.

5 Dimensions

5.1 Wheel profile and boss dimensions

The wheel profile and boss dimensions shall be as shown in Figure 1.

5.2 Surface finishes

The surface finishes of the cutting wheels shall be as shown in Figure 1, the roughness numbers conforming to the BS 1134 Series.

6 Protection

The wheels shall be supplied with protection against corrosion and mishandling.

7 Sampling

7.1 Chemical analyses

Certificates of chemical composition shall be provided showing the results of cast and product analyses.

7.2 Hardness tests

7.2.1 Wheels for hardness tests shall be selected at the rate of one per cast or one per heat treatment batch. The minimum rate of testing shall be one per 50 wheels.

7.2.2 On each sample wheel, at least four hardness measurements shall be made, at least two of these being made diametrically opposite each other on the cutting edge. At least two hardness measurements shall be made on the boss after suitable preparation.

7.2.3 All hardness tests shall be conducted on completion of all heat treatment and manufacturing processes.

8 Qualification test

The contractor shall document the material, methods of production and heat treatment for approval by the gas transporter and shall manufacture four specimen wheels for type testing.

Type testing shall be carried out on steel distribution pipe of 100 mm nominal size using the specimen set of wheels in a suitable cutting machine.

To qualify for acceptance, the wheels shall make at least 100 cuts without any deterioration of the cutting edge likely to impair further cutting operations.

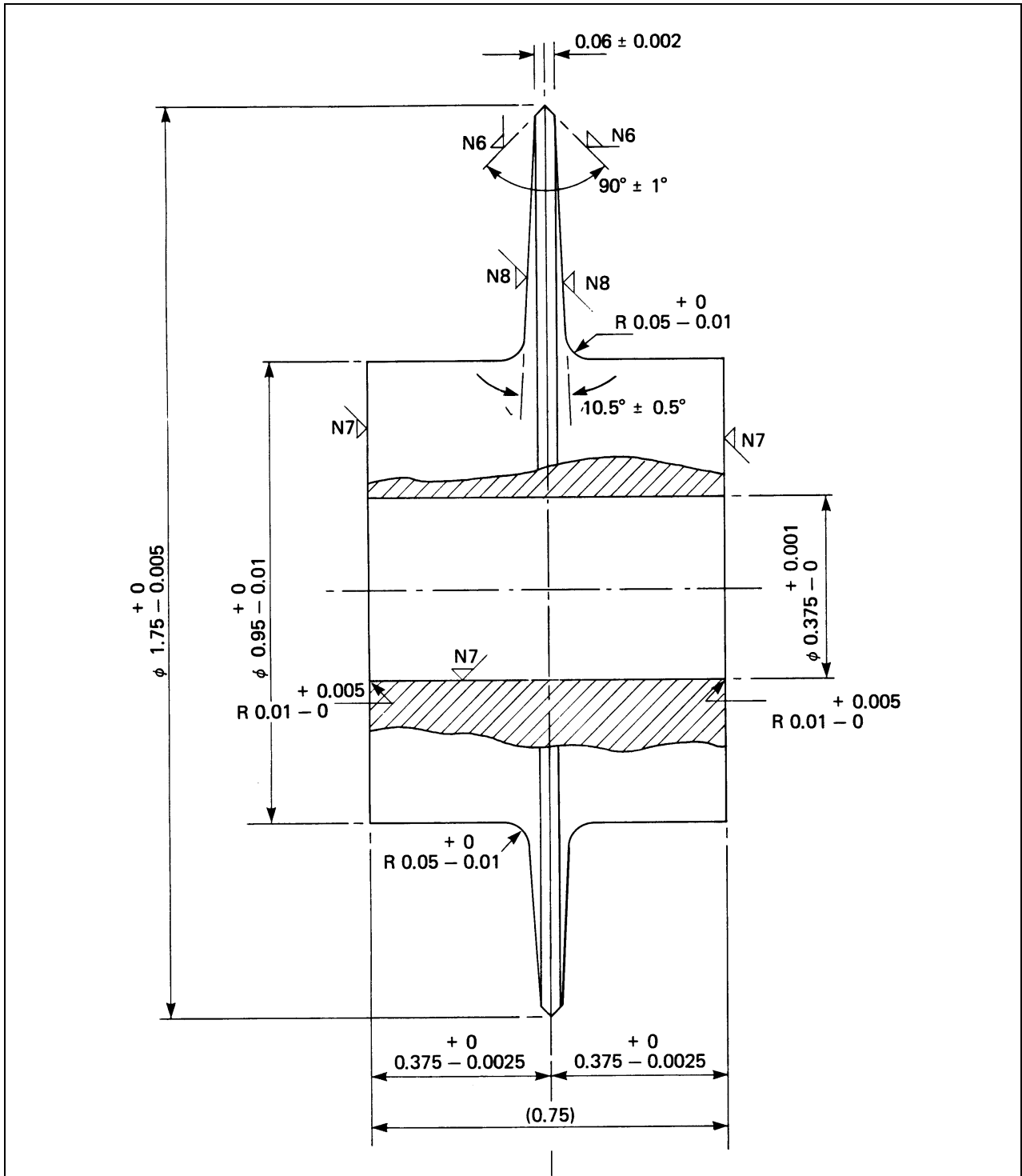
9 Marking

Products conforming to GIS/E5 shall be permanently marked, using a method specified by the gas transporter, with the following information:

- a) the number and date of this standard, i.e. GIS/E5:2013 ¹⁾;
- b) the name or trademark of the manufacturer or their appointed agent;
- c) the manufacturer's contact details;
- d) 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.

¹⁾ Marking GIS/E5:2013 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.



NOTE 1 All dimensions in inches unless otherwise stated.

NOTE 2 Roughness numbers (e.g. N6) for surface texture conforming to BS 1134.

NOTE 3 Wheel and blade axes to be square to within $\pm 1.2^\circ$.

Figure 1 — Wheel dimensions