

# Gas Industry Standard

GIS/LC9:2013

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Specification for

**Methods of repairing threaded joints on  
screwed pipework**

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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

<p>First published as GBE/LC9 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 technical standard forum or Gas National collaboration forum by BSI</p>	<p>August 1993 June 2001 November 2002 August 2004 August 2006 September 2013</p>
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## 1 Scope

This Gas Industry Standard specifies the requirements relating to the repair of threaded joints on screwed pipe, risers and service laterals operating at pressures up to and including 75 mbar.

This standard is applicable to sealants for threaded joints of metallic gas pipework carrying fuel gas of the second family (natural gas).

The standard is applicable for repair methods in the following categories:

- anaerobic jointing compounds;
- non-hardening jointing compounds;
- external encapsulating compounds;
- heat shrink sleeves.

## 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 751-1:1997, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 1: Anaerobic jointing compounds.*

BS EN 751-2:1997, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 2: Non-hardening jointing compounds.*

BS EN 13090:2000, *Means for resealing threaded joints of gas pipework in buildings.*

### Gas Industry Standards

GIS/LC8-1, *Specification for methods of repairing leaking ferrous gas mains — Part 1: External encapsulation systems.*

## 3 Material requirements

### 3.1 Requirements to be met by the repair materials as received

**3.1.1** All repair materials shall conform to **4.1** of BS EN 13090:2000. Furthermore, the different types of repair materials shall also conform to the following requirements:

**3.1.2** Anaerobic jointing compounds shall conform to BS EN 751-1:1997:

- subclause **5.1.1**, “Visual quality”;
- subclause **5.1.2**, “Chemical stability”;
- subclause **5.1.3**, “Corrosive properties”;
- subclause **5.1.4**, “Storage properties”.

**3.1.3** Non-hardening jointing compounds shall conform to BS EN 751-2:1997:

- subclause **5.1.1**, “General”;
- subclause **5.1.2**, “Corrosive properties”;
- subclause **5.1.3**, “Storage properties”.

**3.1.4** External encapsulating compounds shall conform to GIS/LC8-1:

- subclauses **7.1** to **7.8** (to be amended as a function of next edit of GIS/LC8-1).

**3.1.5** Heat shrink sleeves shall be made of polyethylene material.

### **3.2 Requirements to be met by the repair materials after assembly**

All repair materials shall conform to **4.2.1.1**, **4.2.1.2** and **4.2.2** of BS EN 13090:2000.

## **4 Test material and documentation**

Test material and documentation shall conform to **5.1** and **5.2** of BS EN 13090:2000.

## **5 Test methods**

### **5.1 Test of repair materials as received**

#### **5.1.1 Test of corrosiveness**

This test is not applicable to external encapsulating compounds conforming to GIS/LC8-1 or heat shrink sleeves made from polyethylene.

The repair materials shall be tested in accordance with **6.1.1** of BS EN 13090:2000, except that in the case of repairs for steel and cast iron pipe and fittings it shall not be necessary to include test strips made from copper, copper-zinc alloy or zinc.

#### **5.1.2 Test of the effect on seals**

This test is not applicable to external encapsulating compounds conforming to GIS/LC8-1 or heat shrink sleeves.

The repair materials shall be tested in accordance with **6.1.2** of BS EN 13090:2000.

### **5.2 Preparation of test samples using repair materials**

#### **5.2.1 Preparation of test pipes**

In the case of repairs that are carried out in accordance with **5.2.2**, **5.2.3** and **5.2.4**, test assemblies shall be prepared in accordance with **6.2.1.1** and **6.2.1.2** of BS EN 13090:2000. In the case of repairs that are carried out in accordance with **5.2.5**, test assemblies shall be prepared in accordance with **6.2.1.1** and **6.2.1.2** of BS EN 13090:2000 except that it shall not be necessary to weld steel bars onto the sockets and pipes in accordance with the second and third sentences of **6.2.1.1** of BS EN 13090:2000.

#### **5.2.2 Sealing by the internal filling method**

Sealing by the internal filling method shall be in accordance with **6.2.1.2.1** of BS EN 13090:2000.

#### **5.2.3 Sealing by the internal spraying method**

Sealing by the internal spraying method shall be in accordance with **6.2.1.2.2** of BS EN 13090:2000.

#### **5.2.4 Sealing by wicking or capillary flow**

Sealing by wicking or capillary flow shall be in accordance with **6.2.1.2.3** of BS EN 13090:2000.



### **5.2.5 Sealing by external application**

**5.2.5.1** This is applicable to external encapsulating compounds and heat shrink sleeves.

**5.2.5.2** The preparation of the test sample shall be in accordance with **6.2.1.2.1** of BS EN 13090:2000 but without the pressure vessel.

**5.2.5.3** Pressurize the test samples to a pressure of 100 mbar using nitrogen.

**5.2.5.4** Apply the external repair materials in accordance with the manufacturer's instructions and allow the repair to cure.

### **5.3 Soundness test**

This shall be in accordance with **6.2.1.3** of BS EN 13090:2000.

### **5.4 Ageing test**

This shall be in accordance with **6.2.1.4** of BS EN 13090:2000. The soundness of the test assemblies shall then be tested in accordance with **5.3**.

### **5.5 Test of vibration resistance**

This shall be in accordance with **6.2.1.6** of BS EN 13090:2000. The soundness of the test assemblies shall then be tested in accordance with **5.3**.

### **5.6 Test of resistance against gas condensate**

Eight of the test assemblies shall be tested in accordance with **6.2.1.5** of BS EN 13090:2000. The soundness of the test assemblies shall then be tested in accordance with **5.3**.

### **5.7 Test of resistance to thermal cycling**

#### **5.7.1 Principle**

This test determines whether or not the repair method is resistant to temperature effects that can be encountered during normal operating conditions. This test is only applicable for repairs to pipes that are external to buildings.

#### **5.7.2 Apparatus**

**5.7.2.1** *Means of controlling temperature of test samples*, between  $-5\text{ }^{\circ}\text{C}$  to  $+30\text{ }^{\circ}\text{C}$ .

**5.7.2.2** *Water bath*.

**5.7.2.3** *Pneumatic pressure source*, at 150 mbar.

**5.7.2.4** *Pressure gauge*, capable of measuring up to 170 mbar in steps of 1 mbar.

#### **5.7.3 Procedure**

Cap four of the test assemblies carefully using fittings with a non-setting jointing paste.

Partially immerse the test assemblies within the water bath.

Subject the test pieces to 400 freeze/thaw cycles from  $-5\text{ }^{\circ}\text{C}$  to  $+30\text{ }^{\circ}\text{C}$  with a minimum cycle time of 4 h.

Test the soundness of the test assemblies in accordance with **5.3**.

Examine the test assemblies internally for visual evidence of repair method disbonding or deterioration.

#### **5.7.4 Expression of results**

Record the test pressure.

Record if there is any leak during the soundness test.

Record if there is any evidence of repair method disbonding or deterioration.

There shall be no leaks during the soundness test.

There shall be no evidence of repair method disbonding or deterioration.

#### **5.8 Dismantling**

Dismantling shall be in accordance with **6.2.2** of BS EN 13090:2000.

### **6 Field application test**

**6.1** A field application test shall be carried out for each type of repair method

**6.2** A minimum total of 100 repairs, spanning the range of pipe sizes by the contractor, shall be sealed.

**6.3** All repairs shall be carried out in accordance with the contractor's procedures.

**6.4** In the case of pipe repairs that are carried out under dead conditions (i.e. the pipe has been disconnected from a gas supply and purged to air), apply a 100 mbar air test for 5 min. There shall be no pressure loss from the pipe.

**6.5** In the case that repairs are carried out on a live gas pipe, the repair shall be tested for leakage using approved leak detecting fluid and/or with approved gas detection equipment. There shall be no gas leakage from the pipe

**6.6** All repairs shall be logged using the pro-forma in Annex A and the contractor shall retain copies of the pro-forma. All repaired joints shall be tagged, using a non-degradable material, containing the following information:

- product name;
- batch or serial number;
- date.

### **7 Marking**

Products conforming to GIS/LC9 shall be permanently marked with the following information:

- a) the number and date of this standard, i.e. GIS/LC9:2013 <sup>1)</sup>;
- b) the name or trademark of the manufacturer or their appointed agent;
- c) the manufacturer's contact details;

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<sup>1)</sup> Marking GIS/LC9:2013 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.

- 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.

**Annex A (normative)**  
**Field application test report**

<b>General information</b> Date of repair:  Name of contractor:  Job address:  Diameter of pipe required:  Proprietary name of repair material:	<b>Repair method (please circle)</b> Sealing by filling Sealing by internal spray Sealing by wicking or capillary flow Sealing by external application
	<b>Installation temperature (please circle)</b> Very cold / cold / warm / very warm /hot
	<b>Approximate time to repair</b> Time taken:
	<b>Result (please circle)</b> Passed leak test Failed leak test
<b>Repair material type</b> Anaerobic Non-hardening Encapsulation Heat shrink sleeve	<b>Comments</b>