

Gas Industry Standard

GIS/V12:2006

Specification for

Sealant replacement for valves operating up to and including 2 bar

Cadent
Your Gas Network

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Gas Networks

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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

First published T/SP/V/12 to also include 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	October 2004 August 2006 September 2013 June 2018 April 2023
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1 Scope

This Gas Industry Standard details the performance and operational requirements for a system capable of restoring the functionality of selected slides valves on a pressure reduction station (PRS), which experience the problem of either passing gas when in the closed position or being seized and therefore are inoperable.

This standard only applies to systems with valves that have a maximum operating pressure (MOP) of up to 2 bar. Furthermore, only those types of valves as shown in Table 1 are covered by this standard.

NOTE Whilst a valve might be connected into a system that has an overall pressure rating above 2 bar, only those valves, which are limited to 2 bar in their operation, can be considered for remedial treatment as covered by this standard.

Table 1 — Valves suitable for treatment with the system.

	Valve type			
	Audco Plug valve in	Donkin 555 in	Donkin softseal in	Bailey shearseal in
Valve size	3	3	3	3
	4	4	4	4
	6	6	6	6
	8	8	8	8
	10	10	10	10
	12	12	12	12

It is accepted that the new sealant, which is injected into the valve, will have a finite operating life. However, once the valve has been drilled, the valve flushing and sealing operation can be repeated as required.

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 21, *Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions)*.

3 Materials

All proprietary materials and components shall state which standard they are deemed to conform to. In particular, any associated injection system shall state which standard(s) it conforms to together with its maximum operating pressure.

All fluids used for flushing out the old sealing material, and new sealing materials shall be identified together with their material safety data sheets and any I.C.E. sheets. The gas transporter will need to determine whether all of the proposed materials are acceptable for use with the equipment.

The maximum safe working load of any hold down straps shall be stated together with their working life.

All materials subject to corrosion shall be suitably protected to ensure that the equipment remains fit-for-purpose during its working life.

4 Design of equipment

4.1 The equipment shall be designed so that it can safely withstand the following loading conditions:

- a) the maximum operating pressure of the valve;
- b) the maximum loads encountered when drilling and tapping into the valve body in order to introduce a flushing medium and replacement sealant;
- c) the maximum pressure associated with the injection of a flushing medium and replacement sealant;
- d) the maximum side load inadvertently applied by an operator, which is taken to be equivalent to 20 kg at right angles to the centre line of the equipment.

4.2 The equipment shall be designed so that it can be securely attached to the body of a valve that is to be rehabilitated. The means of attachments shall be capable of safely withstanding all of the loads identified in **4.1a)** to d).

4.3 In the case that the equipment is attached to a valve by means of straps, there shall be at least two separate straps, each of which are rated at four times the maximum hold down load under all operating conditions. Note that the angle of contact the strap makes to the body of the valve shall be taken into account when calculating the hold down loads. (See Figure 1 for clarification of the angle of contact and strap load determination as a function of hold down load.)

4.4 To ensure that the injection processes does not exceed the maximum operating pressure (2 bar) of the valve, a pressure relief valve device shall be incorporated. The setting of the relief valve shall not exceed the maximum operating pressure of the valve to be rehabilitated.

4.5 There shall be a means to limit the travel of any associated drill such that the valve body cannot be drilled beyond the internal chamber which contains the old sealant to be removed.

4.6 The equipment shall be capable of being depressurized before removing from a valve body.

4.7 All integral equipment including drills, taps, pressure conducting devices and access tooling shall be securely retained by the equipment under all operating and pressure conditions.

4.8 Swarf generated from drilling and tapping operations shall not be allowed to remain within the valve itself. This is especially important since swarf present in a tapped hole could lead to increased stresses being induced when inserting screwed items into the tapped hole.

4.9 Where plugs or threaded components are to be introduced into a tapped hole having a taper thread, there shall be a means to limit the applied torque to minimize the risk of damaging the body of a valve that has been produced by the casting process. In this case, the equipment supplier shall give advice on the maximum torque levels to be applied.

4.10 All holes that are drilled and tapped into a valve that is to be rehabilitated shall conform to BS 21 and have a parallel thread form.

4.11 It is in the contractor's interest to take measures that will give confidence that the drilling and tapping of holes into an existing valve body, under the worst conditions, shall not compromise the strength and integrity of the valve under all operating conditions.

5 Performance tests

5.1 Static pressure test

5.1.1 Principle

This test determines the leaktightness of the equipment when subjected to pneumatic test pressures.

5.1.2 Apparatus

5.1.2.1 *Pressure source*, at 3 bar.

5.1.2.2 *Pressure gauge*, capable of measuring up to 3.2 bar in steps of 1 mbar.

5.1.2.3 *Representative valve*.

5.1.3 Procedure

Attach the equipment to the body of a representative valve and tighten the hold down mechanism in accordance with the contractor's operating procedures.

Subject the equipment to a 3 bar pneumatic test for a period of 30 min.

5.1.4 Expression of results

Record the pressure at the start of the test (in bar).

Record the pressure after a period of 30 min (in bar).

The equipment has passed the pressure test if there is no pressure drop.

5.2 Lateral load test

5.2.1 Principle

This test determines the leaktightness of the equipment when subjected to a lateral load that simulates operational conditions.

5.2.2 Apparatus

5.2.2.1 *20 kg mass*.

5.2.2.2 *Mass carrier*.

5.2.2.3 *Pressure source*, at 3 bar.

5.2.2.4 *Pressure gauge*, capable of measuring up to 3.2 bar in steps of 1 mbar.

5.2.2.5 *Representative valve*.

5.2.3 Procedure

Attach the equipment to the body of a representative valve and tighten the hold down mechanism in accordance with the contractor's operating procedures. Position the valve so that the centre line of the equipment is horizontal (see Figure 2).

Pressurize the equipment to 3 bar and isolate from the pressure source. Apply a 20 kg mass to the equipment at a point 0.1 m away from the interface between it and the valve for a period of 30 min.

5.2.4 Expression of results

Record the pressure at the start of the test (in bar).

Record the pressure after a period of 30 min (in bar).

The equipment has passed the pressure test if there is no leakage and there is no vertical movement.

5.3 Drilling and tapping test

5.3.1 Principle

This test determines the leaktightness of the equipment when subjected to drilling and tapping operations.

5.3.2 Apparatus

5.3.2.1 *Pressure source*, at 3 bar.

5.3.2.2 *Pressure gauge*, capable of measuring up to 3.2 bar in steps of 1 mbar.

5.3.2.3 *Leak detection fluid*.

5.3.2.4 *Representative valve*.

5.3.3 Procedure

Attach the equipment to the body of a representative valve and tighten the hold down mechanism in accordance with the contractor's operating procedures.

Pressurize the equipment pneumatically to 3 bar then undertake drilling and tapping operations. Next introduce the valve with extended conduit into the tapped hole (valve in the closed position).

5.3.4 Expression of results

Monitor the pressure at the start of operations.

Determine whether there has been any leakage during the operation by means of leak detection fluid.

The equipment has passed the pressure test if there is no leakage.

5.4 Functional injection test

5.4.1 Principle

This test determines the practicability of injecting sealant into a representative valve.

5.4.2 Apparatus

5.4.2.1 *Representative valve*, that has been drilled and tapped.

5.4.2.2 *Pressure gauge*, capable of measuring up to 2.2 bar in steps of 1 mbar.

5.4.2.3 *Sealant*.

5.4.3 Procedure

After the drilling and tapping test (see 5.3), depressurize all equipment and connect a relief valve via a second tapped hole in the valve body (see Figure 3). Ensure the relief valve is set to a value between 2.0 bar and 2.1 bar. Also connect a fluid return line and ensure that the valve on this section is open. Ensure that the valve to be treated is in the closed position.

Connect the injection equipment in accordance with the contractor's installation procedures.

Commence injection of sealant and monitor the valve pressure. Continue to inject the sealant until it begins to emerge from the return line (see Figure 3).

5.4.4 Expression of results

Monitor the pressure throughout the operation.

The equipment is deemed acceptable if the maximum pressure rise monitored during the whole operation is below the relief valve operating pressure.

6 Documentation

Following completion of the approval tests, the supplier shall compile a certified data folder that includes details of all test results, all valve body integrity studies, and equipment drawings together with their relevant issue numbers. Details of all proprietary equipment shall be included.

The data shall be presented in a manner, which clearly indicates compliance with the requirements of this standard. The data folder shall be submitted to the gas transporter.

7 Design changes

Any proposed changes in design, materials or system configuration proposed by the supplier as a variant shall be submitted to the gas transporter for consideration together with a copy of the original data folder.

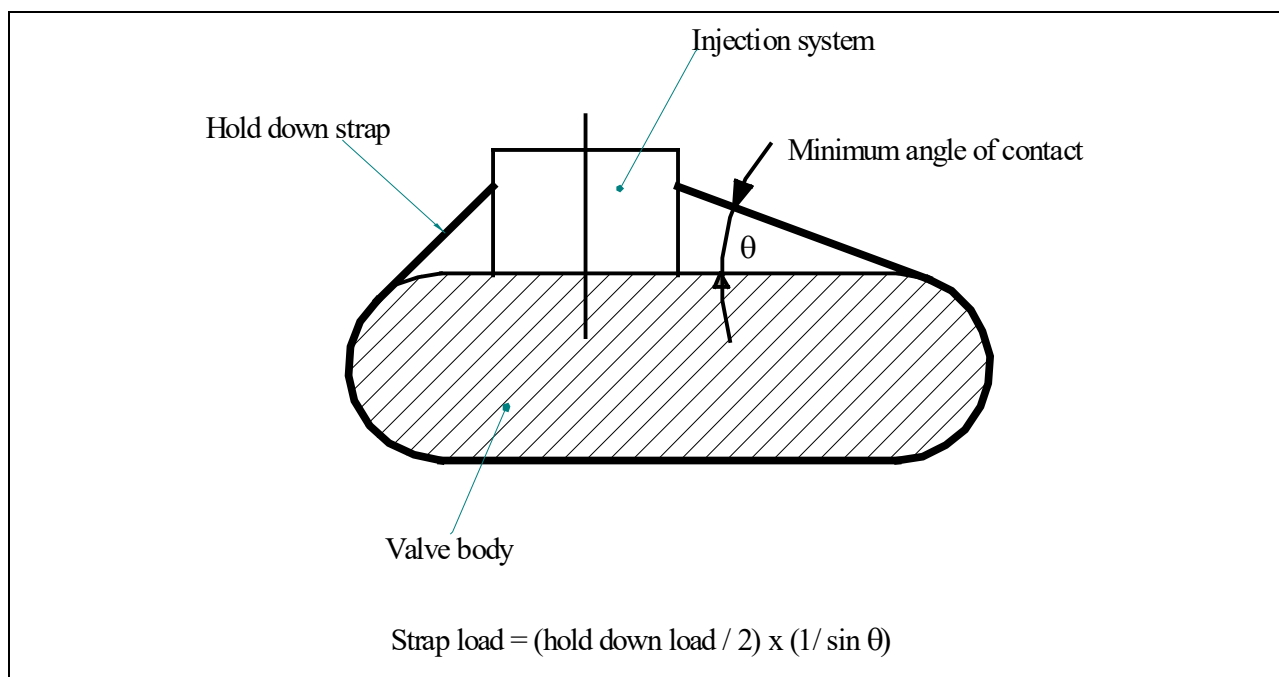


Figure 1 — Strap hold down loads

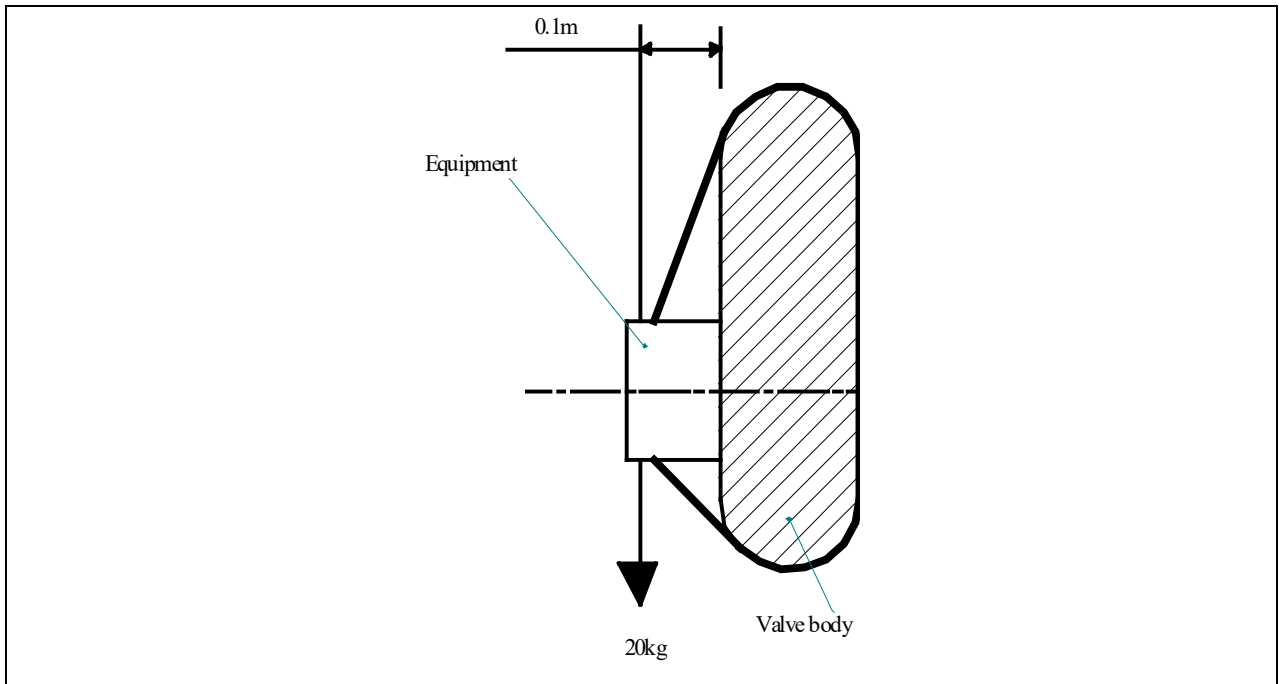


Figure 2 — Side load test set

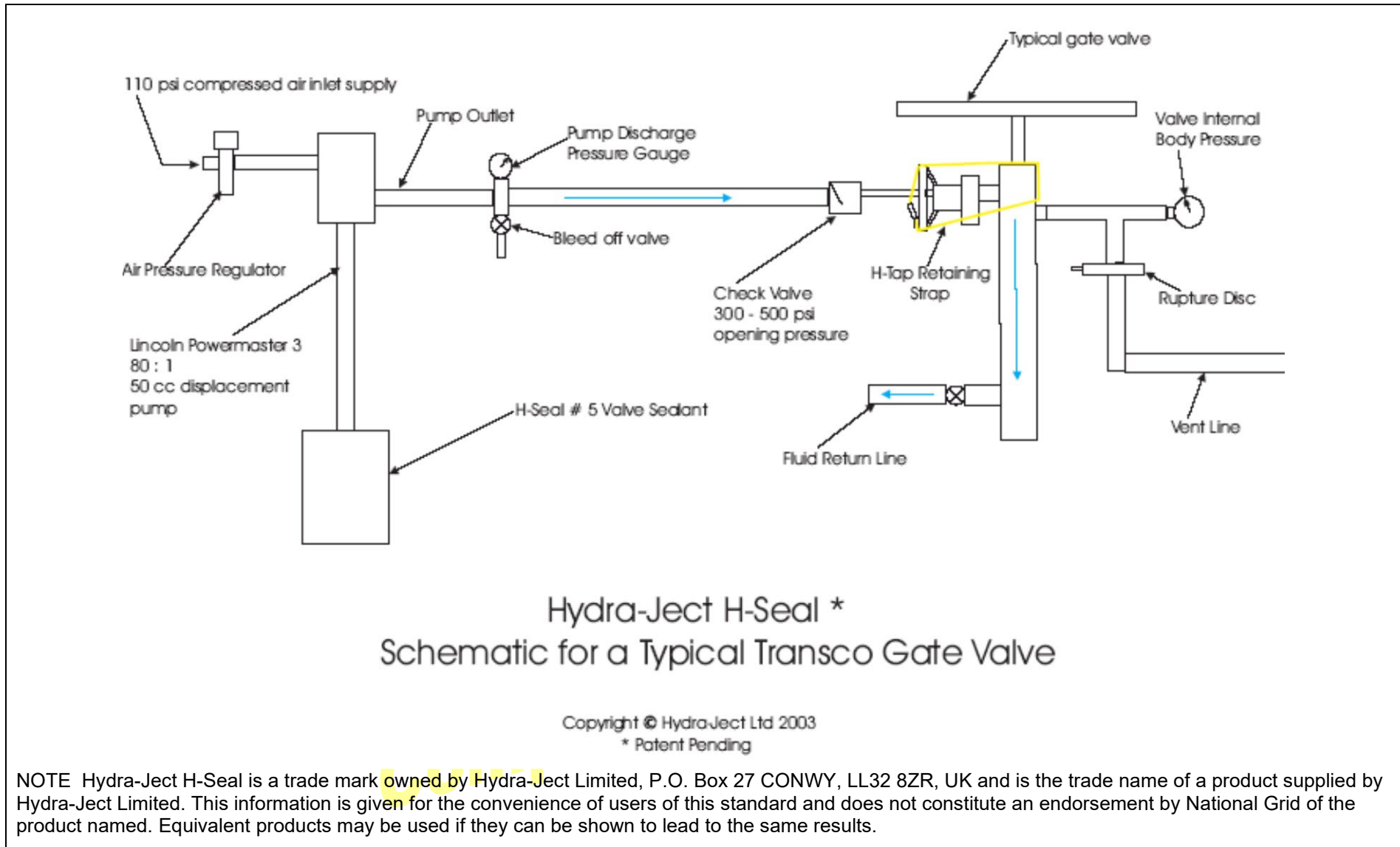


Figure 3 — Set up for injection test

