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GB/T 40337-2021

Gas tightness of equipment for gas welding and allied processes

Issued on: May 21, 2021 **Implemented on: December 1, 2021**

Issued by: SAMR; SAC

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1 Scope

This Document specifies the maximum allowable external leakage rate and measurement test methods for welding, cutting and allied process equipment (hereinafter referred to as "equipment").

This Document is applicable to independent welding and cutting equipment parts or devices from the hose connection (the outlet of the gas cylinder valve or the connection end of the gas supply station) at the gas supply end to the gas outlet of the welding and cutting torch.

This Document is not applicable to gas supply stations.

Some equipment standards stipulate the maximum allowable external leakage rate, which shall be implemented in accordance with their standard provisions.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 3375 Welding Terminology

GB/T 7899 Regulators for Welding, Cutting and the Similar Processes (GB/T 7899-2006,

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ISO 2503-1998, MOD)

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 3375 and the following apply.

3.1 External gas leakage

The phenomenon of undesirable gas escaping from the inside of the equipment into the atmosphere.

6 Test Pressure

6.1 Pressure reducer The pressure reducer of the gas supply system of the welding and cutting equipment shall be tested under the pressure p1 and p2 specified in GB/T 7899.

6.2 Other equipment

6.2.1 Type test Other equipment shall be tested under the following pressures:

a) The maximum working pressure given by the manufacturer;

b) 10% of the maximum working pressure or 0.05MPa, whichever is lower.

6.2.2 Routine test All equipment shall be tested under one of the pressure conditions given in 6.2.1; the pressure conditions shall be the most unfavourable pressure conditions obtained in the type test.

7 The Maximum Allowable Total External Leakage Rate Under the above-Defined Pressure Conditions

7.1 Pressure reducer The overall leakage rate of the pressure reducer shall be no greater than 10cm3/h.

7.2 Welding and cutting torch The total external leakage rate of the welding and cutting torch shall be no greater than 8cm3/h. The leakage rate through a separate gas valve shall be no greater than 4cm3/h.

The test method is carried out in accordance with the provisions of Appendix D.

The test method given in Appendix D can measure the overall leakage rate of the welding and cutting torch and the leakage rate of a separate gas valve. In the 6 sets of test conditions (Figures D.1 ~ D.6: Blocking the inlet and/or outlet, adjusting the valve switch state, connecting the gas hose to different inlets) for measuring the leakage rate, there are 3 sets of measuring welding/heating torches, and 3 sets of measuring cutting torches. It is stipulated that the leakage rate of the equipment in Figures D.1, D.2, and D.4 shall be no greater than 8cm3/h; and the leakage rate of the equipment in Figures D.3, D.5, and D.6 shall be no greater than 4cm3/h.

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Other test methods are allowed, provided that the accuracy of the results obtained by these methods can be proved to be the same as the above methods.

8.3 Immersion test device

8.3.1 The water tank shall be of sufficient size to be able to completely immerse the equipment to be tested in the water.

8.3.2 During the test, allow the air supply end to pressurize the equipment to be tested.

8.3.3 The measuring cylinder shall be filled with water at the beginning of the test and installed above the equipment to be tested. The measuring cylinder range shall be sufficient, and the accuracy shall be no less than 0.5cm3.

8.3.4 The funnel is used to collect the gas escaping from the equipment. The funnel shall be suitable for collecting all gases that may escape from the equipment to be tested. The gas leaking at the connection of the gas supply pipeline shall not be collected.

8.3.5 The immersion test device for measuring the gas leakage rate of the equipment is shown in Figure 1.

8.4 Test procedures

8.4.1 Connect the equipment to be tested with the gas source (see Figure 1, which shall meet the requirements of 8.3.2), close all other possible openings in order to determine the leakage rate.

8.4.2 Immerse the equipment to be tested in water (see Figure 1, which shall meet the requirements of 8.3.1), and the depth shall be at least 20cm. And supply gas to the equipment to be tested according to the test pressure given in Clause 6 plus the pressure delta p generated by the immersion depth.

8.4.3 Wait for 10min; allow the trapped gas adhering to the outer surface of the equipment to be tested to escape; and then set the measuring cylinder (see Figure 1, which shall meet the requirements of 8.3.3) and the funnel (see Figure 1, which shall meet the requirements of 8.3.4) in place; and keep the device under pressure for 1h.

8.4.4 At the end of the test, raise or drop the measuring cylinder to balance the water level in the measuring cylinder tube and the water tank; and measure the volume of the collected gas by reading the scale on the measuring cylinder tube.

8.4.5 Calibrate the measured volume in accordance with the methods specified in Clauses 4 and 5, and include the gas type and standard temperature and pressure conditions into the calibration calculation.

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