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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 20936.4-2017

**Gas detectors for explosive atmospheres -- Part 4: Performance
requirements of open path detectors for flammable gases**

爆炸性环境用气体探测器 第4部分：开放路径可燃气体探测器性能要求

(English Translation)

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Foreword

GB/T 20936 Gas detectors for explosive atmospheres is divided into several parts:

- Part 1: Performance requirements of detectors for flammable gases;
- Part 2: Selection, installation, use and maintenance of detectors for flammable gases and oxygen;
- Part 3: Guidance on functional safety of fixed gas detection systems;
- Part 4: Performance requirements of open path detectors for flammable gases;
- ...

This part is Part 4 of GB/T 20936.

This part was drafted in accordance with the rules given in GB/T 1.1-2009.

This part is modified in relation to IEC 60079-29-4:2009 Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases with the use of the redrafted method.

Compared with IEC 60079-29-4:2009, the following structural adjustments have been made in this part:

-- 4.3.1 General rule is added, and the numbers of subsequent articles are postponed.

The main technical differences between this part and IEC 60079-29-4:2007 and their reasons are as follows:

-- Regarding normative references, adjustments with technical differences have been made in this part to adapt to Chinese technical conditions. The adjustments are reflected in Chapter 2 "Normative references". The specific adjustments are as follows:

lambda IEC 60079(all parts) is replaced with GB/T 3836(all parts). The degree of consistency between the parts of the two standards is shown in Appendix

B;

lambda IEC 60079-0 is replaced with GB 3836.1, IEC 60825-1 is replaced with GB 7247.1, IEC 61000-4-1 is replaced with GB/T 17626.1, IEC 61000-4-

3 is replaced with GB/T 17626.3, and IEC 60079-29-1 is replaced with GB/T 20936.1-2017.

The following editorial changes have been made to this part:

Gas detectors for explosive atmospheres - Part 4:

Performance requirements of open path detectors for flammable gases

1 Scope

This part of GB/T 20936 specifies performance requirements of equipment for the detection and measuring of flammable gases or vapours in ambient air by measuring the spectral absorption by the gases or vapours over extended optical paths, ranging typically from one metre to a few kilometres.

Such equipment measures the integral concentration of the absorbing gas over the optical path in units such as LEL.m for flammable gases.

NOTE 1: Actual values of concentration can be deduced only where it can be established that the concentration is uniform over the optical path, for example in very short optical paths (< 100 mm). In

such cases, the equipment is within the scope of GB/T 20936.1-2017.

NOTE 2: This part is based on present absorption techniques using infrared radiation. Other techniques

and applications may require additional test considerations (e.g., pressure test).

Equipment falling within the scope of this part is classified by the following types:

Type 1: an optical transmitter and receiver, located at either end of a path through the atmosphere to be monitored.

Type 2: an optical transceiver (i.e., combined transmitter and receiver) and a suitable reflector, which may be a topographic feature or a retroreflector, located at either end of a path through the atmosphere to be monitored.

This part is also applicable when an equipment manufacturer makes any claims regarding any special features of construction or superior performance that exceed the minimum requirements of this part. All such claims shall be verified and the test procedures should be extended or supplemented, where necessary, to verify the claimed performance. The additional tests shall be agreed upon between the manufacturer and the test laboratory and identified and described in the test report.

This part does not apply to any of the following:

- a) equipment intended to provide range resolution of gas concentration (e.g., Light direction and ranging (LIDAR));

5.2.2 Constructional checks

Equipment shall be checked to ensure that the constructional requirements of 4.2 are satisfied.

5.2.3 Preparation of samples

The sample equipment shall, as nearly as possible, be prepared and mounted as for typical service using the manufacturer's brackets and fittings, including all necessary interconnections and initial adjustments, and in accordance with the manufacturer's written instructions.

For Type 2 equipment designed for use with a natural topographical feature, such as a reflector, that feature shall be represented by a plane diffusing surface set normal to the optical axis of the measured volume.

The surface shall be large enough in extent to intercept the whole of the measured volume and its albedo shall lie between 0.1 and 0.3 over the wavelength range employed by the equipment.

For equipment without an indication of measurement, for example, in alarm only apparatus, the output of equipment from a test point shall be connected to a continuously recording output display device.

5.2.4.1 Use of gas cells

The test facility shall be designed such that the test gas in individual cells can be changed and that when using the equipment, such as shown in Figure 1, the cells can be exchanged sufficiently quickly in order that transient obscuration during the exchange by the walls or window retaining structure shall not create a "beam blocked" condition. The transverse dimension of the cells shall be large enough not to cause partial blockage of the beam.

NOTE 1: The test described in 5.4.8 and 5.4.21 may require cells of large dimensions or the use of an alternate gas simulation filter.

Cells shall be located as close as possible to the receiving aperture of the equipment having regard to minimizing unwanted effects on the equipment of reflections from the cell on the receiver, and the cells shall not cause partial blockage of the beam.

The characteristics (e.g., material, thickness and flatness) and inclination of the