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GB/T 3836.11-2022 / ISO/IEC 80079-20-1:2017

Replacing GB/T 3836.11-2017

**Explosive atmospheres - Part 11: Material characteristics for
gas and vapour classification - Test methods and data**

爆炸性环境 第 11 部分:气体和蒸气物质特性分类 试验方法和数据

(ISO/IEC 80079-20-1:2017, Explosive atmospheres - Part 20-1: Material
characteristics for gas and vapour classification - Test methods and data, IDT)

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document is Part 11 of GB/T 3836 "Explosive atmospheres". The following parts of GB/T 3836 have been issued:

- Part 1: Equipment - General requirements
- Part 2: Equipment protection by flameproof enclosures "d"
- Part 3: Equipment protection by increased safety "e"
- Part 4: Equipment protection by intrinsic safety "i"
- Part 5: Equipment protection by pressurized enclosure "p"
- Part 6: Equipment protection by liquid immersion "o"
- Part 7: Equipment protection by powder filling "q"
- Part 8: Equipment protection by type of protection "n"
- Part 9: Equipment protection by encapsulation "m"
- Part 11: Material characteristics for gas and vapour classification - Test methods and data
- Part 12: Material characteristics for combustible dusts - Test methods
- Part 13: Equipment repair, overhaul, reclamation and modification
- Part 14: Classification of hazardous areas
- Part 15: Electrical installations design, selection and erection
- Part 16: Electrical installations inspection and maintenance
- Part 17: Equipment protection by pressurized room "p" and artificially ventilated room "v"
- Part 18: Intrinsically safe electrical systems
- Part 20: Equipment with equipment protection level (EPL) Ga
- Part 21: Application of quality management systems for Ex Product manufacture

- Part 22: Protection of equipment and transmission system using optical radiation
- Part 23: Group I, category EPL equipment intended to remain functional in atmospheres endangered by firedamp and/or coal dust
- Part 24: Equipment protection by special protection "s"
- Part 25: Requirements for process sealing between flammable process fluids and electrical systems
- Part 26: Electrostatic hazards - Guidance
- Part 27: Electrostatic hazards - Test
- Part 28: Non-electrical equipment for explosive atmospheres - Basic method and requirements
- Part 29: Non-electrical equipment for explosive atmospheres - Constructional safety "c", control of ignition source "b", liquid immersion "k"
- Part 30: Equipment and components in explosive atmospheres in underground mines
- Part 31: Equipment dust ignition protection by enclosure "t"
- Part 32: Intrinsically safe systems with electronically controlled spark duration limitation
- Part 33: Equipment in adverse service conditions
- Part 34: Equipment assemblies
- Part 35: Classification of areas for explosive dust atmospheres
- Part 36: Electrical safety devices for the control of potential ignition sources from Ex Equipment.

This document replaces GB/T 3836.11-2017 "Explosive atmospheres - Part 11: Material characteristics for gas and vapour classification - Test methods and data". Compared with GB/T 3836.11-2017, in addition to the structural adjustments and editorial changes, the main technical changes in this document are as follows:

- the range that needs to simultaneously determine the maximum test safety gap and the minimum ignition current ratio is changed (see 4.2, 4.3 of this Edition, 4.4 of Edition 2017);
- cases where classification should not be based on similarity in chemical structure are added (see 4.4 of this Edition);

- the requirements for the short-circuit current of the ignition device and the requirements for the spark discharge time are added (see 6.3.4 of this Edition);
- the requirements for the autoignition temperature test device are changed (see 7.2 of this Edition, 7.2 of Edition 2017);
- the sampling, preparation and storage requirements for auto-ignition temperature test specimens are added (see 7.3 of this Edition);
- the procedures for auto-ignition temperature test are changed (see 7.4 of this Edition, 7.3 of Edition 2017);
- the criterion for the validity of auto-ignition temperature test results is changed (see 7.6 of this Edition, 7.5 of Edition 2017);
- the requirements for test record data are changed (see 7.7 of this Edition, 7.6 of Edition 2017).

This document identically adopts ISO/IEC 80079-20-1:2017 "Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data".

The following minimal editorial changes have been made to this document:

- to coordinate with existing standards, the name of the standard is changed to "Explosive atmospheres - Part 11: Material characteristics for gas and vapour classification - Test methods and data";
- the molecular formulas for substances with CAS numbers as 98-01-1, 100-40-3, 103-11-7, 106-58-1, 106-92-3, 108-89-4, 106-96-7, 111-43-3, 123- 63-7, 142-29-0, 151-56-4, 291-64-5, 1738-25-6, 2426-08-6 are corrected;
- the description of X and Y in Figure D.1 is corrected;
- the technical corrigenda of ISO/IEC 80079-20-1:2017/COR1:2018 are incorporated. The position of the outer margin of the clause involved is marked with a vertical double line (||);
- Bibliography is modified.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority shall not be held responsible for identifying any or all such patent rights.

This document was proposed by China Electrical Equipment Industry Association.

Explosive atmospheres - Part 11: Material characteristics for gas and vapour classification - Test methods and data

1 Scope

This document specifies the test methods and classification principles for determining the maximum experimental safe gaps (MESG) of gas-air mixtures or vapour-air mixtures under normal temperature and pressure conditions (20°C, 101.3kPa). It provides guidance for the classification of gases and vapours. This document also gives the characteristic parameters of common flammable gases and vapours in order to select the appropriate equipment category. This document also specifies the test method for the determination of the auto-ignition temperature (AIT) of vapour-air or gas-air mixtures at atmospheric pressure in order to select the appropriate equipment temperature group. The chemical property values of the substances are provided to assist in the selection of suitable equipment for hazardous locations. When verification test results are available, further data can be added.

The materials and the characteristics included in a table (see Annex B) have been selected with particular reference to the use of equipment in hazardous areas.

The data in this document are derived from some of the references listed in Bibliography.

These methods for determining the MESG or the AIT may also be used for gas-air-inert mixtures or vapour-air-inert mixtures. However, data on air-inert mixtures are not tabulated.

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.

ISO1773, *Laboratory glassware - Narrow-necked boiling flasks*

NOTE: GB/T 22362-2008, *Laboratory glassware - Flasks* (ISO 1773:1997, NEQ)

IEC 60050-426, *International Electrotechnical Vocabulary - Part 426: Equipment for explosive atmospheres*

NOTE: GB/T 2900.35-2008, *Electrotechnical terminology - Equipment for explosive atmospheres* (IEC 60050-426:2008, IDT)

IEC 60079-11, *Explosive atmospheres -Part11: Equipment protection by intrinsic safety "i"*

NOTE: GB/T 3836.4-2021, *Explosive atmospheres - Part 4: Equipment protection by intrinsic safety "i"* (IEC 60079-11:2011, MOD)

IEC 60079-14, *Explosive atmospheres - Part 14: Electrical installations design, selection and erection*)

NOTE: GB/T 3836.15-2017, *Explosive atmospheres - Part 15: Electrical installations design, selection and erection* (IEC 60079-14:2007, MOD)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-426 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC: <http://www.electropedia.org/>
- ISO: <http://www.iso.org/obp>

3.1 auto-ignition

reaction which is evidenced by a clearly perceptible flame and/or explosion, and for which the ignition delay time does not exceed 5 min

NOTE: See Clause 7 for a test method.

3.2 ignition delay time

time between the completed injection of the flammable material and the ignition

3.3 auto-ignition temperature; AIT

lowest temperature (of a surface) at which under specified test conditions an ignition of a flammable gas or vapour in mixture with air or air-inert gas occurs

NOTE: See Clause 7 for a test method.

3.4 maximum experimental safe gap; MESG

maximum gap of a joint of 25 mm in width which prevents any transmission of an explosion during tests made under the conditions specified in this document

NOTE: See Clause 6 for a test method.

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