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GB/T 3836.2-2021

Replacing GB 3836.2-2010

**Explosive Atmospheres – Part 2: Equipment
Protection by Flameproof Enclosures “d”**

爆炸性环境 第2部分：由隔爆外壳“d”保护的設備

(ISO 60079-1:2014, Explosive Atmospheres – Part 1: Equipment
Protection by Flameproof Enclosures “d”, MOD)

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Table of Contents

Foreword.....	4
Introduction	12
1 Scope.....	15
2 Normative References	15
3 Terms and Definitions	16
4 Level of Protection (Equipment Protection Level, EPL)	19
5 Flameproof Joints	21
6 Sealed Joints	34
7 Operating Rods.....	36
8 Supplementary Requirements for Shafts and Bearings	37
9 Light-Transmitting Parts	40
10 Breathing and Draining Devices which form Part of a Flameproof Enclosure	40
11 Fasteners and Openings.....	47
12 Materials	48
13 Entries for Flameproof Enclosures.....	50
14 Verification and Tests	55
15 Type Tests.....	55
16 Routine Tests	70
17 Switchgear for Group I.....	73
18 Lampholders and Lamp Caps.....	74
19 Non-Metallic Enclosures and Non-Metallic Parts of Enclosures.....	75
20 Marking	77
21 Instructions.....	78

Annex A (Normative) Additional Requirements for Crimped Ribbon Elements and Multiple Screen Elements of Breathing and Draining Devices	79
Annex B (Normative) Additional Requirements for Elements, with Non-Measurable Paths of Breathing and Draining Devices.....	80
Annex C (Normative) Additional Requirements for Flameproof Entry Devices	83
Annex D (Normative) Empty Flameproof Enclosures as Ex Components	95
Annex E (Normative) Cells and Batteries Used in Flameproof “d” Enclosures	99
Annex F (Informative) Mechanical Properties for Screws and Nuts	105
Annex G (Normative) Additional Requirements for Flameproof Enclosures with an Internal Source of Release (Containment System).....	106
Annex H (Normative) Requirements for Machines with Flameproof “d” Enclosures Fed from Converters	111
Annex I (Normative) Supplement Provisions of Group I Electrical Equipment	112
Annex J (Informative) Example of Supplemental Mechanical Means of Securing the Cemented Joint.....	114
Bibliography	115

Foreword

This Document was drafted as per the rules specified in GB/T 1.1-2020 *Directives for Standardization – Part 1: Rules for the Structure and Drafting of Standardizing Documents*.

This Document is Part 2 of GB/T 3836 *Explosive Atmospheres*. GB/T 3836 has published the following parts:

- Part 1: Equipment – General Requirements;
- Part 2: Equipment Protection by Flameproof Enclosure “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 Areas - Explosive Gas Atmosphere;
- 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 Systems for Equipment Manufacture;

- Part 22: Protection of Equipment and Transmission System Using Optical Radiation;
- Part 23: Group I, Category EPL Ma 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.

This Document replaced GB 3836.2-2010 *Explosive Atmospheres - Part 2: Equipment Protection by Flameproof Enclosures “d”*. Compared with GB 3836.2-2010, this Document made the major technical changes besides the structural adjustments and editorial modifications:

- Delete the clause of equipment category and temperature group (see Clause 4 of 2010 Edition);
- Add the Clause of protection level (see Clause 4 of this Edition);
- Add special conditions of use that the flameproof joints are not expected to be repaired (see 5.1 of this Edition);

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- Add the requirements when the thickness of the metal coating exceeds 0.008mm (see 5.1 of this Edition);
 - Add the requirements for multi-section joints (see 5.2.9 of this Edition);
 - Change the maximum gap value of the joint surface of Class-II A and Class-II B enclosures with a volume greater than 2000cm³ (see Table 2 of this Edition; Table 1 of 2010 Edition);
 - Add the requirements for the supplementary mechanical fixing method of the bonded joint surface (see 6.1.2 of this Edition);
 - Add the test requirements for bonded joint surface (see 6.1.2 of this Edition);
 - Add the requirements for the joint surface of molten glass (see 6.2 of this Edition);
 - Change the type test sequence of breathing and draining devices used as Ex components (see 10.9.3 of this Edition, 10.9.2 of 2010 Edition);
 - Change the requirements for the explosion-proof certificate of Ex component breathing and draining devices (see 10.9.4 of this Edition; 10.9.3 of 2010 Edition);
 - Increase the requirements for openings on the shell wall except for the introduction device (see 11.8 of this Edition);
 - Add the requirements for copper or copper alloy enclosures used in explosive environments containing acetylene (see 12.8 of this Edition);
 - Add the options of the requirements that the introduction device should meet (see 13.1 of this Edition);
 - Add the requirements for non-threaded holes for Class I equipment (see 13.3 of this Edition);
 - Increase the requirements for plugs and sockets to maintain the flameproof performance during the arc extinguishing period and the power factor requirements of the test circuit (13.6.4 of this Edition);
 - Change the conditions for determining the maximum surface temperature (see Table 6 of this Edition; Table 5 of 2010 Edition);
 - Change the requirements of the test sample (see 15.1 of this Edition; Clause 15 of 2010 Edition);
 - Change the number of tests for the explosion pressure determination of Class-II C electrical equipment (see 15.2.2.2 of this Edition; 15.1.2.1 of 2010 Edition);

- Change the test requirements for pressure overlap (see 15.2.2.4 of this Edition; 15.1.2.3 of 2010 edition);
- Add the requirement of batch test instead of routine overpressure test (see 15.2.3.2 of this Edition);
- Add the requirement of adjusting the static pressure test pressure of small and medium-sized equipment in the type test at low ambient temperature (see Table 8 of this Edition);
- Change the test coefficient of increased pressure or test gap for Class-II C electrical equipment (see Table 10 of this Edition; Table 10 of 2010 Edition);
- Add the oxygen-enriched test gas test method for the internal ignition and non-detonation test of Class-II C electrical equipment (see 15.3.3.4 of this Edition);
- Add the test of the "dc" protection level device (see 15.5 of this Edition);
- Add the requirement for static pressure test pressure to be adjusted at low ambient temperature in routine test (see Table 13 of this Edition);
- Change the requirements of routine tests when using the dynamic pressure method (see 16.1.3 of this Edition; 16.1.2 of 2010 Edition);
- Add the routine test requirements for enclosures containing welded structures (see 16.3 of this Edition);
- Add the batch test method instead of the routine overpressure test (see 16.6 of this Edition);
- Change the requirements for the type test of non-metallic enclosures and non-metallic parts of enclosures (see 19.3 of this Edition; 19.3 of 2010 Edition);
- Add the requirements for the mark protection level (see 20.1 of this Edition);
- Add the requirements of the instruction manual (see 20.4 of this Edition);
- Add the conditions of non-detonation test for insulating sleeves (see C.2.1.4 of this Edition);
- Add the requirements of the restriction conditions in the Ex component insulating sleeve explosion-proof certificate (see C.2.1.4 of this Edition);
- Add the option of for the threaded joint surface of the lead-in device to meet the requirements (see C.2.2.1 of this Edition);
- Add the requirements for non-threaded joints of Class-I equipment (see C.2.2.2

of this Edition);

- Add the requirements for metric Ex blanking element, NPT Ex blanking element and non-threaded Ex blanking element (see C.2.3.2~C.2.3.4 of this Edition);
- Increase the tightening torque requirements for thread size <16mm (see Table C.1 of this Edition);
- Increase the tightening torque requirements of NPT threads (see Table C.2 of this Edition);
- Change the marking requirements of Ex component enclosures (see D.3.8 of this Edition; D.3.8 of 2010 Edition);
- Change the permitted primary batteries and storage batteries (see Table E.1, Table E.2 of this Edition; and Table E.1 and Table E.2 of 2010 Edition);
- Add battery requirements that do not require additional protection to prevent the release of electrolytic gas during charging (see E.4.3 of this Edition);
- Change the requirements for batteries that can be charged in a flameproof enclosure (see E.5.1 of this Edition; E.5.1 of 2010 Edition);
- Add additional requirements for flameproof enclosures with internal release sources (see Annex G of this Edition);
- Add the requirements for motors with flameproof enclosure "d" powered by the inverter (see Annex H of this Edition).

This Document uses the redrafting method to modify and adopt IEC 60079-1:2014 *Explosive Atmospheres – Part 1: Equipment Protection by Flameproof Enclosures “d”*.

The technical differences and causes between this Document and IEC 60079-1:2014 are as follows:

- Regarding normative references, this Document has made adjustments with technical differences to adapt to China's technical conditions. The adjustments are reflected in Clause 2 "Normative References". The specific adjustments are as follows:
 - Use GB/T 197 that modifies and adopts the international standard to replace ISO 965-1 (see 5.3 of this Edition);
 - Use GB/T 1406.2 and GB/T 19148.2 that modify and adopt the international standard to replace IEC 60061 (all parts) (see 18.3.1 of this Edition);
 - Use GB/T 2516 that modifies and adopts the international standard to

replace ISO 965-3 (see 5.3 of this Edition);

- Use GB/T 3836.1 that modifies and adopts the international standard to replace IEC 60079-0 (see Clause 1);
- Use GB/T 3836.3 that modifies and adopts the international standard to replace IEC 60079-7 (see 17.2.2 of this Edition);
- Use GB/T 3836.4 that modifies and adopts the international standard to replace IEC 60079-11 (see 13.6.2 of this Edition);
- Use GB/T 3836.8 that modifies and adopts the international standard to replace IEC 60079-15 (see 19.2 of this Edition);
- Use GB/T 5163 that modifies and adopts the international standard to replace ISO 2738 (see B.1.3 of this Edition);
- Use GB/T 5249 that modifies and adopts the international standard to replace ISO 4003 (see B.1.2 of this Edition);
- Use GB/T 5250 that modifies and adopts the international standard to replace ISO 4022 (see B.1.4 of this Edition);
- Use GB/T 9364 (all parts) to replace IEC 60127 (all parts) (see E.4.1.2); the consistency degree between each part of the two standards is as follows:
 - ◆ GB/T 9364.1-2015 Miniature Fuses - Part 1: Definitions for Miniature Fuses and General Requirement for Miniature Fuse-Links (IEC 60127-1:2006, MOD);
 - ◆ GB/T 9364.2-2018 Miniature Fuses - Part 2: Cartridge Fuse-Links (IEC 60127-2:2014, MOD);
 - ◆ GB/T 9364.3-2018 Miniature Fuses - Part 3: Sub-Miniature Fuse-Links (IEC 60127-3:2015, MOD);
 - ◆ GB/T 9364.4-2016 Small Fuses - Part 4: Universal Module Fuse - Links (UMF) - Perforated and Surface Mount (IEC 60127-4:2012, MOD);
 - ◆ GB/T 9364.5-2011 Miniature Fuses - Part 5: Guidelines for Quality Assessment of Miniature Fuse-Links (IEC 60127-5:1988, IDT);
 - ◆ GB/T 9364.6-2001 Miniature Fuses - Part 6: Fuse-Holders for Miniature Cartridge Fuse-Links (IEC 60127-6:1994, IDT);
 - ◆ GB/T 9364.7-2016 Small Fuses - Part 7: Small - Sized Fuse - Links for Special Applications (IEC 60127-7:2013, MOD);

- ◆ GB/T 9364.10-2013 Miniature Fuses - Part 10: User Guide for Miniature Fuses (IEC 60127-10:2001, MOD).

--- Delete the zinc-mercury battery in Table E.1; and this type of battery has been deleted from the primary battery table in GB/T 3836.1-2021.

--- Add the Annex I "Supplementary Provisions for Class-I Electrical Equipment" to meet China's requirements for Class-I electrical equipment for mines.

This Document made the following editorial modifications:

--- In order to be consistent with the existing standard series, the name of this Document is revised to *Explosive Atmospheres - Part 2: Equipment Protection by Flameproof Enclosures "d"*;

--- Add a description of the scope of application of the standard in the scope of Clause 1;

--- Add a NOTE to 3.1 on the definition of flameproof type;

--- Add the letter symbol W to Table E.1; and delete the footnotes about letter symbols;

--- Add an example of a supplementary mechanical fixing method for the bonded joint surface (see Annex J of this Edition);

--- Include the technical corrigendum content of IEC 60079-1:2014/COR1:2018; and the outer margins of the involved clauses are marked with a vertical double line (||);

--- Revise the bibliography.

Please note some contents of this Document may involve the patents. The issuing agency of this Document shall not assume the responsibility to identify these patents.

This Document was proposed by China Electrical Equipment Industry Association.

This Document shall be under the jurisdiction of National Technical Committee on Explosion Protected Electrical Apparatus of Standardization of China (SAC/TC 9).

Drafting organizations of this Document: Nanyang Flameproof Electrical Research Institute Co., Ltd.; Shanghai Inspection and Testing Institute of Instruments and Automation Systems Co., Ltd.; Shanghai Institute of Quality Inspection and Technical Research; CCTEG Shenyang Research Institute; Warom Technology Incorporated Company; Shenyang Electric Appliances Transmission Research Institute Co., Ltd.; Hanwei Electronics Group Corporation; Zhongmei Scientific Industry Group Chongqing Design Institute Co., Ltd.; Wolong Electric Nanyang Explosion Protection

Explosive Atmospheres – Part 2: Equipment Protection by Flameproof Enclosures “d”

1 Scope

This Document contains specific requirements for the construction and testing of electrical equipment with the type of protection flameproof enclosure “d”, intended for use in explosive gas atmospheres.

This Document is applicable to electrical equipment protected by flameproof enclosure "d" intended to be used in explosive gas atmospheres.

This Document supplements and modifies the general requirements of GB/T 3836.1. Where a requirement of this Document conflicts with a requirement of GB/T 3836.1, the requirement of this Document will take precedence.

2 Normative References

The provisions in following documents become the provisions of this Document through reference in 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 197 General Purpose Metric Screw Threads – Tolerances (GB/T 197-2018, ISO 965-1:2013, MOD)

GB/T 1406.2 Types and Dimensions of Lamp Caps - Part 2: Pin Lamp Caps (GB/T 1406.2-2008, IEC 60061-1:2005, MOD)

GB/T 2516 General Purpose Metric Screw Threads - Limit Deviations (GB/T 2516-2003, ISO 965-3:1998, MOD)

GB/T 3836.1 Explosive Atmospheres - Part 1: Equipment - General Requirements (GB/T 3836.1-2021, IEC 60079-0:2017, MOD)

GB/T 3836.3 Explosive Atmospheres - Part 3: Equipment Protection by Increased Safety “e” (GB/T 3836.3-2021, IEC 60079-7:2015, MOD)

GB/T 3836.4 Explosive Atmospheres - Part 4: Equipment Protection By Intrinsic Safety “i” (GB/T 3836.4-2021, IEC 60079-11:2011, MOD)

GB/T 3836.8 Explosive Atmospheres - Part 8: Equipment Protection by Type of Protection "n" (GB/T 3836.8-2021, IEC 60079-15:2017, MOD)

GB/T 5163 Sintered Metal Materials, Excluding Hard Metals - Permeable Sintered Metal Materials - Determination of Density, Oil Content, and Open Porosity (GB/T 5163-2006, ISO 2738:1999, IDT)

GB/T 5249 Permeable Sintered Metal Materials - Determination of Bubble Test Pore Size (GB/T 5249-2013, ISO 4003:1977, IDT)

GB/T 5250 Permeable Sintered Metal Materials - Determination of Fluid Permeability (GB/T 5250-2014, ISO 4022:1987, IDT)

GB/T 9364 (all parts) Miniature Fuses [IEC 60127 (all parts)]

GB/T 19148.2 Types and Dimensions of Lamp Holders - Part 2: Pin Lamp Holders (GB/T 19148.2-2008, IEC 60061-2:2004, MOD)

ANSI/ASME B1.20.1 Pipe Threads, General Purpose (Inch)

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 3836.1 and the following apply.

NOTE: Additional definitions applicable to explosive atmospheres can be found in GB/T 2900.35.

3.1 Flameproof enclosure "d"

Enclosure in which the parts which can ignite an explosive gas atmosphere are placed and which can withstand the pressure developed during an internal explosion of an explosive mixture, and which prevents the transmission of the explosion to the explosive gas atmosphere surrounding the enclosure.

NOTE: "Flameproof type" is defined as: an explosion-proof type of electrical equipment whose shell can withstand the explosion of the explosive mixture that enters the shell through any joint surface or structural gap of the shell causing no damage to the shell; and it shall not cause the ignition of explosive gas environment formed by one or multiple gases or vapours. Both have the same meaning.

3.2 Volume

Total internal volume of the enclosure.

NOTE 1: For enclosures in which the contents are essential in service, the volume to be

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