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Replacing GB 3836.15-2000 and GB 12476.2-2010

Explosive Atmospheres – Part 15: Electrical Installations Design, Selection and Erection

爆炸性环境　第 15 部分：电气装置的设计、选型和安装

(IEC 60079-14:2007, Explosive atmospheres - Part 14: Electrical installations design, selection and erection, MOD)

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Foreword

"Explosive Atmospheres" is composed of the following parts:

— 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 Oil Immersion "o";

— Part 7: Equipment Protection by Powder Filling "q";

— Part 8: Equipment Protection by Type of Protection "n";

— Part 9: Equipment Protection by Type of Protection "m";

— Part 11: Material Characteristics for Gas and Vapour Classification - Test Methods and Data;

— Part 13: Equipment Repair, Overhaul and Reclamation;

— 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: Construction and Use of Rooms or Buildings Protected by Pressurization;

— Part 18: Intrinsically Safe Electrical Systems;

— Part 19: Fieldbus Intrinsically Safe Concept (FISCO);

— 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.

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This is Part 15 of "Explosive Atmospheres".

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

This Part replaces "Electrical Apparatus for Explosive Gas Atmospheres - Part 15: Electrical Installations in Hazardous Areas (other than Mines)" (GB 3836.15-2000) and "Electrical Apparatus for Use in the Presence of combustible dust - Part 2: Selection and Installation" (GB 12476.2-2010). The main changes as follows have been made in this revision, with respect to GB 3836.15-2000 and GB 12476.2-2010:

— some terms are added: competent body (see 3.1.1), zones (see 3.2.5), zone 0 (see 3.2.6), zone 1 (see 3.2.7), zone 2 (see 3.2.8), flameproof enclosure (see 3.3), increased safety (see 3.4), intrinsic safety "i" (see 3.5.1), galvanic isolation (see 3.5.3), intrinsically safe circuit (see 3.5.5), intrinsically safe electrical system (see 3.5.6), intrinsically safe sub-circuit (see 3.5.7), pressurization (see 3.7), type of protection "n" (see 3.8), oil-immersion "o" (see 3.9), powder filling "q" (see 3.10), encapsulation "m" (see 3.11), electrical supply systems (see 3.13), equipment (see 3.14);

— in the name of the standard, "Explosive Gas Atmospheres" is changed into "Explosive Atmospheres", and the explosive gas atmosphere and explosive dust atmosphere are combined as one;

— equipment protection levels (EPLs) is introduced (see Annex I);

— knowledge, skills and competencies of responsible persons, operatives and designers are explained (see Annex F);

— the requirements for selection and installation of ultrasonic radiation equipment, optical radiation are added (see 5.7, 5.8 and 6.8);

— preventive requirement for explosion in dust hazardous areas is deleted (4.9 of GB 12476.2-2010).

This Part is redrafted and modified in relation to "Explosive Atmospheres - Part 14: Electrical Installations Design, Selection and Erection" (IEC 60079-14:2007).

The structural adjustments have been made with respect to IEC 60079-14:2007:

— 5.6.3.1 General, 5.7.1 General, 5.8.1 General, 5.8.3.1 General, 5.10.1 General, 5.14.1 General, 6.2.1 General, 6.3.2.1 General, 9.3.1 General, 11.1 General, and 13.1 General are added, and clause numbers are extended accordingly;

— 1) and 2) of 13.3.5 are modified to 13.4.5.1 and 13.4.5.2;

— the "pressurized room and analysis room" in the title of 13.4.1 is deleted, and the clause number of 13.4.1.1 is modified to 13.5.1, and 134.1.2 to 13.5.2;

— the clause of "B.1 Intrinsically safe circuit" in Annex B is deleted.

The main technical differences as follows have been made with respect to IEC 60079-14:2007:

— the adjustment in "Normative References" of this Part has technical differences to meet the technical specification in China; the adjustment situations are embodied in a concentrated way in Clause 2 - "Normative References". The specific adjustments are as follows:

- IEC 60950 (all parts) is replaced by GB 4943.1 which modifies/adopts international standard;
- IEC 60079-7, IEC 60079-6, IEC 60079-5, IEC 60079-18, IEC 60079-10, IEC 60079-17, IEC/TR 60079-13, IEC 60079-27, IEC 60079-26 are respectively replaced by GB 3836.3-2010, GB 3836.6, GB 3836.7, GB 3836.9-2014, GB 3836.14-2014, GB/T 3836.16-2017, GB 3836.17-2007, GB 3836.19-2010, GB 3836.20-2010 which are identical to the respective international standards; IEC 60079-0, IEC 60079-1, IEC 60079-11, IEC 60079-2, IEC 60079-15, IEC 60079-19, IEC 60079-25, IEC 60079-28 are respectively replaced by GB 3836.1-2010, GB 3836.2-2010, GB 3836.4-2010, GB/T 3836.5-2017, GB 3836.8-2014, GB 3836.13-2013, GB/T 3836.18-2017, GB/T 3836.22-2017 which are modified in relation to the respective international standards;
- IEC 60079-10-2, IEC 61241-11, IEC 61241-1, IEC 61241-18, IEC 61241-4, IEC 61241-2-1 are respectively replaced by GB/T 12476.3-2017, GB 12476.4-2010, GB 12476.5-2013, GB 12476.6-2010, GB 12476.7-2010, GB 12476.8-2010, which are identical to the respective international standards; IEC 61241-0 is replaced by GB 12476.1-2013 which is modified in relation to the respective international standard;
- IEC 60364-4-41 is replaced by GB/T 16895.21-2011, which is identical to the respective international standard;
- IEC 62305-3 is replaced by GB/T 21714.3-2015, which is identical to the respective international standard;
- the references IEC 60050-826 and IEC 60364 (all parts) are deleted;

— the specification for “equipment without explosion-proof certificate” in 4.3.2 is modified as “apart from simple apparatus used within an intrinsically safe circuit in accordance with the provisions of GB 3836.4-2010 and GB/T 3836.18-2017, the equipment without certificate shall be restricted in explosion hazards”;

— see the note in Table 3 for application restriction of increased safety “e” in hazardous area zone 1;

— considering the current coexistence of national standards GB 3836 series (equipment for explosive gas atmospheres) and GB 12476 series (electrical apparatus for use in

Explosive atmosphere - Part 15: Electrical Installations Design, Selection and Erection

1 Scope

This Part of “Explosive Atmosphere” contains the specific requirements for the design, selection and erection of electrical installations in hazardous areas associated with explosive atmospheres.

Where the equipment is required to meet other environmental conditions, for example, protection against ingress of water and resistance to corrosion, additional methods of protection may be necessary. The method used shall not adversely affect the integrity of the enclosure.

The requirements of this standard apply only to the use of equipment under normal or near normal atmospheric conditions. For other conditions, additional precautions may be necessary. For example, most flammable materials and many materials which are normally regarded as non-flammable might burn vigorously under conditions of oxygen enrichment. Other precautions might also be necessary in the use of equipment under conditions of extreme temperature and pressure. Such precautions are beyond the scope of this Part.

These requirements are in addition to the requirements for installations in non-hazardous areas.

This Part applies to all electrical equipment including fixed, portable, transportable and personal, and installations, permanent or temporary.

It applies to installations at all voltages.

This Part does not apply to:

— electrical installations in mines susceptible to firedamp;

Note: This Part may apply to electrical installations in mines where explosive gas atmospheres other than firedamp may be formed and to electrical installations in the surface installation of mines.

— inherently explosive situations and dust from explosives or pyrophoric substances (for example explosives manufacturing and processing);

— rooms used for medical purposes;

— electrical installations in areas where the hazard is due to hybrid mixtures of combustible dust and explosive gas, vapour or mist.

See Annex H.

5.11 Transportable, portable and personal equipment

5.11.1 General

Due to the demand of the application and enhanced flexibility for use, transportable, portable or personal equipment may be required to be used in differing areas. Equipment of a lower EPL shall not be taken into an area requiring a higher EPL, unless it is otherwise protected. In practice, however, such a limitation may be difficult to enforce - particularly with portable equipment. It is recommended, therefore, that all equipment meet the requirements of the location to which the equipment will be exposed which requires the highest EPL. Similarly, the equipment group and temperature classification should be appropriate for all the gases, vapours and dusts in which the equipment may be used. Unless suitable precautions are taken, spare batteries shall not be taken into the hazardous area.

5.11.2 Transportable and portable equipment - Gas

Unlike equipment which is permanently installed, transportable or portable equipment may occupy the hazardous area on a temporary basis. Such equipment may include, for example, emergency generators, electrical arc welders, industrial lift (fork) trucks, air compressors, powered ventilation fans or blowers, portable electrically powered hand-tools, certain types of test and inspection equipment.

Equipment that may be transported or carried into a hazardous area shall be to the appropriate equipment protection level. Where there is a need to use transportable or portable equipment in a hazardous area for which the normally required EPL is not obtainable, a documented program for risk management shall be implemented. This program shall include appropriate training, procedures and controls. A safe work permit shall be issued appropriate to the potential ignition risk created by the use of the equipment (see Annex D).

If plugs and sockets are present in a hazardous area, they shall be to the required EPL for the area. Alternately, they shall only be energized or connections made under a safe work procedure (see Annex D).

5.11.3 Personal Equipment - Gas

Items of personal equipment which are battery or solar operated are sometimes carried by personnel and inadvertently taken into a hazardous area.

A basic electronic wrist watch is an example of a low voltage, electronic device which has been independently evaluated and found to be acceptable for use in a hazardous area under both historic and current EPL requirements.

All other personal battery or solar operated equipment (including electronic wrist watches incorporating a calculator) shall:

a) conform to a recognised type of protection appropriate to EPL, gas group and

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