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GB/T 3836.28-2021

Replacing GB 25286.1-2010

**Explosive atmospheres - Part 28: Non-electrical
equipment for explosive atmospheres - Basic method
and requirements**

爆炸性环境 第 28 部分: 爆炸性环境用非电气设备 基本方法 and 要求
(ISO 80079-36:2016, Explosive atmospheres - Part 36: Non-electrical equipment
for explosive atmospheres - Basic method and requirements, MOD)

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Foreword

This Standard 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 Standard is Part 28 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 vapor 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: Inspection and maintenance of electrical installation (other than mines);
- Part 17: Construction and use of rooms or building protected by pressurization;
- Part 18: Intrinsically safe system;
- 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 assembly;
- Part 35: Classification of areas for explosive dust atmospheres.

This Standard replaces GB 25286.1-2010 "Non-electrical equipment for potentially explosive atmospheres - Part 1: Basic method and requirements". Compared with GB 25286.1-2010, in addition to structural adjustments and editorial changes, the main technical changes in this Standard are as follows:

- changed the supplementary standards of this Standard (see Clause 1; Clause 1 of GB 25286.1-2010);
- added the use of explosion-proof type "d", "p", "t" (see Clause 1 and Annex A);
- added the applicability of corresponding clauses in GB/T 3836.1-2021 (see Table 1);

- added the assessment and control methods for possible ignition sources (see Clause 6);
- changed the requirements for verification and testing (see Clause 8; Clause 13 of GB 25286.1-2010);
- added the document requirements (see Clause 9);
- changed the requirements for marks (see Clause 11; Clause of GB 25286.1-2010).

This Standard uses redrafting method to modify and adopt ISO 80079-36:2016 "Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements".

Compared with ISO 80079-36:2016, the structural adjustments in this Standard are as follows:

- Annex A corresponds to Annex G of ISO 80079-36:2016;
- Annex C corresponds to Annex I of ISO 80079-36:2016;
- Annex D corresponds to Annex A of ISO 80079-36:2016;
- Annex F corresponds to Annex C of ISO 80079-36:2016;
- Annex G corresponds to Annex H of ISO 80079-36:2016;
- Annex H corresponds to Annex F of ISO 80079-36:2016;
- deleted Annex D of ISO 80079-36:2016.

The technical differences between this Standard and ISO 80079-36:2016 and the reasons are as follows:

- Regarding normative reference documents, this Standard has been adjusted with technical differences to adapt to Chinese technical conditions. The adjustments are collectively reflected in Clause 2 "Normative references", and the specific adjustments are as follows:
 - Use GB/T 3836.1-2021 that adopts IEC 60079-0 to replace IEC 60079-0 (see Clause 1);
 - Use GB/T 3836.2 that adopts IEC60079-1 to replace IEC60079-1 (see Clause 1);
 - Use GB/T 3836.5 that adopts IEC 60079-2 to replace IEC 60079-2 (see Clause 1);

- Use GB/T 3836.22 that adopts IEC 60079-28 to replace IEC 60079-28 (see 6.2.5.1);
 - Use GB/T 3836.31 that adopts IEC 60079-31 to replace IEC 60079-31 (see Clause 1);
 - Use GB/T 3836.29 that adopts ISO 80079-37 to replace ISO 80079-37 (see Clause 1);
 - Use GB/T 3836.30 that adopts ISO/IEC 80079-38 to replace ISO/IEC 80079-38 (see 6.4.2.1);
 - Delete ANSI/UL 746B and move to Bibliography.
- Modified the file version in Table 1 to be consistent with GB/T 3836.1-2021;
 - Deleted the electrification test in Annex D of ISO 80079-36:2016; In the text, use the test 26.17 and Table 10 of GB/T 3836.1-2021 to keep consistent with GB/T 3836.1-2021.

This Standard made the following editorial modifications:

- To be consistent with the existing standard series, the name of this Standard is revised to "Explosive atmospheres - Part 28: Non-electrical equipment for explosive atmospheres - Basic method and requirements";
- In Clause 1, added the description of the scope of application of this Standard;
- Deleted the note on the standard version information in Table 1;
- In 4.1, added the note about Annex C;
- In 4.4, added the note about the reclassification of Class III equipment;
- Deleted the note about replacing the separator "." in 11.2;
- In 6.4.2.1, the footnote on hard steel and non-sparking metal is replaced by a note;
- Included the technical errata content of ISO 80079-36:2016/COR1:2019; The position of the outer margin of the involved clause is marked with a vertical double line (||);
- modified the Bibliography.

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

Explosive atmospheres - Part 28: Non-electrical equipment for explosive atmospheres - Basic method and requirements

1 Scope

This Standard specifies the basic methods and requirements for the design, structure, testing and marking of non-electrical equipment used in explosive atmospheres.

This Standard applies to non-electrical Ex equipment, Ex components, protective systems, devices and assemblies of these products that have their own potential ignition sources used in explosive atmospheres.

Hand tools and manually operated equipment without energy storage are excluded from the scope of this Standard. This Standard does not address the safety of static autonomous process equipment when it is not part of equipment referred to in this Standard.

NOTE 1: Static autonomous process equipment includes items such as tanks, vessels, fixed pipework and hand operated valves which do not have their own source of energy that could create a potential ignition source during operation.

This Standard does not specify requirements for safety, other than those directly related to the risk of ignition which may then lead to an explosion.

The standard atmospheric conditions (relating to the explosion characteristics of the atmosphere) under which it may be assumed that Ex equipment can be operated are:

- temperature: -20°C ~ +60°C;
- pressure: 80 kPa~110 kPa;
- air with normal oxygen content, typically 21% (volume fraction).

Such atmospheres can also exist inside the equipment. In addition, the external atmosphere can be drawn inside the equipment by natural breathing produced as a result of fluctuations in the equipment's internal operating pressure, and/or temperature.

NOTE 2: Although the standard atmospheric conditions above give a temperature range

for the atmosphere of $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$, the normal ambient temperature range for Ex equipment is $-20^{\circ}\text{C} \sim +40^{\circ}\text{C}$, unless otherwise specified and marked. It is considered that $-20^{\circ}\text{C} \sim +40^{\circ}\text{C}$ is appropriate for most Ex equipment and that to manufacture all equipment to be suitable for a standard atmosphere upper ambient temperature of $+60^{\circ}\text{C}$ would place unnecessary design constraints.

NOTE 3: The requirements of this Standard can also be helpful for the design, construction, testing and marking of equipment intended for use in atmospheres outside the validity range stated above. In this case however, the ignition hazard assessment, ignition protection provided, additional testing (if necessary), manufacturer's technical documentation and instructions to the user, clearly demonstrate and indicate the equipment's suitability for the conditions it may encounter. It is also recognized that changes in temperature and pressure can have a significant influence on characteristics of the explosive atmosphere, such as ignitability.

This Standard specifies the requirements for the design and construction of equipment, intended for explosive atmospheres in conformity with all Equipment Protection Levels (all EPLs) of Group I, II and III.

NOTE 4: It is not unusual for equipment designed and constructed in accordance with this Standard for a particular EPL to be used in areas requiring an EPL with a higher level of safety by including the application of additional measures. Such measures include for example inerting, suppression, venting or containment or for example by dilution, drainage, monitoring and shut-down. Such measures are outside the scope of this Standard.

This Standard supplements and modifies the general requirements of GB/T 3836.1-2021, as shown in Table 1. Where a requirement of this Standard conflicts with a requirement of GB/T 3836.1-2021, as far as applicable for non-electrical equipment, the requirement of this Standard takes precedence.

This Standard is supplemented or modified by the following standards concerning specific types of protection:

- GB/T 3836.29, Explosive atmospheres - Part 29: Non-electrical equipment for explosive atmospheres - Constructional safety "c", control of ignition source "b", liquid immersion "k";
- GB/T 3836.2, Explosive atmospheres - Part 2: Equipment protection by flameproof enclosures "d";
- GB/T 3836.5, Explosive atmospheres - Part 5: Equipment protection by pressurized enclosure "p";
- GB/T 3836.31, Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t".

The nature and ignition sources of non-electrical equipment shall be considered

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