NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 3836.29-2021

Explosive atmospheres - Part 29: Non-electrical equipment for explosive atmospheres - Constructional safety 'c', control of ignition source 'b', liquid immersion 'k'

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1 Scope

This document specifies the requirements for the design and construction of nonelectrical equipment, intended for use in explosive atmospheres, protected by the types of protection constructional safety "c", control of ignition source "b" and liquid immersion "k".

This document applies to Ex equipment, Ex components, protection systems, devices and assemblies of these products, protected by the types of protection constructional safety "c", control of ignition source "b" and liquid immersion "k".

This document supplements and modifies the requirements in GB/T 3836.28-2021.Where a requirement of this standard conflicts with the requirement of

GB/T 3836.28-2021, the requirement of this standard takes precedence.

Types of Protection "c", "k" and "b" are not applicable for Group I, EPL Ma without additional protective precautions.

The types of ignition protection described in the standard can be used either on their own or in combination with each other to meet the requirements for equipment of Group I, Group II, and Group III depending on the ignition hazard assessment in GB/T 3836.28-2021.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 3766, Hydraulic fluid power - General rules and safety requirements for systems and their components (GB/T 3766-2015, ISO 4413.2010, MOD)

GB/T 3836.1, Explosive atmospheres - Part 1.Equipment - General requirements (GB/T

3836.1-2021, IEC 60079-0.2017, MOD)

GB/T 3836.26, Explosive atmospheres- Part 26.Electrostatic hazards -Guidance (GB/T 3836.26-2019, IEC TS 60079-32-1.2013, MOD)

GB/T 3836.28-2021, Explosive atmospheres - Part 28.Non-electrical equipment for explosive atmospheres - Basic method and requirements (ISO 80079-36.2016, MOD)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 3836.28-2021, GB/T 3836.1 and the following apply.

3.1 constructional safety "c" ignition protection where constructional measures are applied so as to protect against the possibility of ignition from hot surfaces, sparks and adiabatic compression generated by moving parts 3.2 mechanical generated sparks sparks produced by mechanical impact or friction burning particles, as well as showers of particles, produced by impact or friction between two solid materials 3.4 liquid immersion "k" type of protection where potential ignition sources are made ineffective or separated from the explosive atmosphere by either totally immersing them in a protective liquid, or by partially immersing and continuously coating their active surfaces with a protective liquid in such a way that an explosive atmosphere which may be above the liquid, or outside the equipment enclosure, cannot be ignited 3.4.4 open equipment equipment that is immersed, or has its components immersed, in a protective liquid that is open to the external atmosphere

4 Determination of suitability

Before a decision is made to protect equipment or parts of equipment for use as an assembly, including interconnecting parts, by the measures described in this standard, it shall have been subjected to the ignition hazard assessment in accordance with GB/T 3836.28-2021.

5.1 General requirements

Equipment designed and constructed according to the applicable safety requirements of the relevant industrial standards is intended to be capable of functioning in conformity with the operational parameters established by the manufacturer, including any mechanical and thermal stresses that they are intended to be subjected to.

5.3.1 Unlubricated gaskets, seals, sleeves, bellows and diaphragms

Un-lubricated gaskets, seals, sleeves, bellows and diaphragms shall not become an effective ignition source, e.g., if there is a risk of mechanically generated sparks and hot surfaces which can become an effective ignition source. Light metals shall not be used for these parts in this case (see GB/T 3836.28-2021).

5.5 Vibration

Effective ignition sources, hot surfaces or mechanically generated sparks or loss of protection, caused by vibration shall be avoided. Vibration can arise from the equipment itself or from the place where it is mounted.

5.7.1 General

Bearings are basically divided into three types, sliding plane motion, sliding rotary motion and rolling element. When assessing bearings, as part of the ignition hazard assessment required by GB/T 3836.28-2021, at least the following shall be considered.

5.8.1 Gear drives

Gear drives shall comply with the requirements in 5.1.Where the ignition hazard assessment (see GB/T 3836.28-2021) shows there could still be an ignition source, another form of ignition protection shall be used (e.g., protection by liquid immersion, see Clause 7).

Where equipment includes facilities to change the gear ratios (manually, or automatically), the gear changing mechanisms shall be so arranged as to ensure that they are incapable of producing either temperatures exceeding the maximum surface temperature or incendive mechanically generated sparks.

6 Requirements for equipment with Type of Protection

control of ignition source "b"

6.1 General

For application of Type of Protection "b", control systems are required that are.

6.2.1 General

Where the ignition hazard assessment described in GB/T 3836.28-2021 has revealed potential ignition sources and the manufacturer has decided to reduce the likelihood of them becoming effective by the application of the protection described in Clause 6, the equipment manufacturer shall determine, by calculation or type tests, the control parameters (e.g., temperature, speed, pressure, etc.) associated with those potential ignition sources.

6.2.2 Determination of the safety critical values

Each safety critical value shall be determined by the manufacturer as that value above or below which a potential ignition source may become effective. The set points relevant for control of ignition sources shall be given in the instructions of the controlled equipment and

shall be clearly identified as safety critical.

6.3.1 Determining the performance requirements or operating characteristics

The manufacturer shall specify the performance requirements or operating characteristics (e.g., if the device is a fusible plug) of the ignition prevention systems / devices intended to be used in the equipment. Examples of the factors that should be considered are.

6.3.2 Instructions

The performance characteristics of the ignition prevention system specified by the manufacturer shall be included in the instructions.

7.1 Determination of the maximum / minimum criteria

The manufacturer of the equipment shall determine by calculation and / or by type testing the following maximum / minimum criteria.

7.2 Protective liquid

The protective liquid used shall be of such viscosity and chemical composition that it.

7.3.5 Level monitoring

Monitoring device(s), indicator(s), or gauge(s) shall be so designed and constructed that they indicate the actual level.

7.3.6 Loss of liquid

Where there is the possibility of the protective liquid being lost e.g., by evaporation, capillary or siphon action, the loss shall be avoided or means provided to replenish the liquid.

8.1 Type tests for equipment with Type of Protection constructional safety

"c" See GB/T 3836.28-2021.

8.2 Type tests for equipment with Type of Protection control of ignition

source "b"

8.3.1 General

When tested in accordance with 8.3.2 or 8.3.3, no loss of liquid shall occur to the equipment, which would cause the liquid level to fall below the minimum criteria determined in Clause 5.The following tests shall be performed without the equipment operating.