



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Explosive atmospheres - Part 31: Equipment dust ignition
protection by enclosure 't'**

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1 Scope

This document specifies the design, construction, and testing requirements for Ex equipment and Ex Components with dust ignition protection by enclosure "t".

This document is applicable to electrical equipment protected by enclosure and surface temperature limitation for use in explosive dust atmospheres.

This document does not apply to dusts of explosives, which do not require atmospheric oxygen for combustion, or to pyrophoric substances.

This document does not apply to Ex equipment or Ex Components intended for use in underground parts of mines as well as those parts of surface installations of such mines endangered by firedamp and/or combustible dust.

This document does not take account of any risk due to an emission of flammable or toxic gas from the dust.

This document is a supplement and modification to the general requirements of GB/T 3836.1. When the requirements of this document conflict with the requirements of GB/T 3836.1, the requirements of this document take precedence.

2 Normative references

The contents of the following documents, through normative references in this text, constitute indispensable provisions of this document. Among them, for dated references, only the edition corresponding to that date applies to this document. For undated

references, the latest edition (including all amendments) applies to this document.

GB/T 197 General purpose metric screw threads - Tolerances (GB/T 197-2018, ISO 965-1:2013, MOD)

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

GB/T 4208 Degrees of protection provided by enclosure (IP code) (GB/T 4208-2017, IEC 60529:2013, IDT)

GB/T 4942.1 Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification (GB/T 4942.1-2006, IEC 60034-5:2000, IDT)

3 Terms and definitions

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

3.1 Dust ignition protection by enclosure "t" Type of protection for explosive dust atmospheres where electrical equipment is provided with an enclosure providing dust ingress protection and a means to limit surface temperatures.

4.1 Levels of protection

Type of protection "t" is divided into three Levels of Protection based on the risk of the Ex equipment becoming an ignition source in an explosive dust atmosphere. The equipment with dust ignition protection by enclosure "t" shall be either.

4.2 Equipment groups and ingress protection

The relationship between the level of protection, the equipment group, and ingress protection (IP) is shown in Table 1.

4.3.1 Fault current

Ex equipment not marked as specified in Clause 7 shall only be connected to circuits with an expected short-circuit current not exceeding 1.5 kA.

4.3.2 Maximum surface temperature

The following requirements are modifications and additions to the requirements of GB/T 3836.1.

4.3.3 Overpressure

An internal pressure of 4 kPa shall be applied to the enclosure in accordance with 6.1.1.3 prior to the dust exclusion test.

4.3.4 Dust exclusion

Group IIIC Level of Protection Group IIIB Group IIIA Test of dust exclusion by enclosure shall be carried out in accordance with 6.1.1.

4.3.6 Internal supplementary enclosure

If the equipment contains components that generate arcs and sparks, then these components shall be equipped with supplementary enclosures within the main enclosure. In accordance with the provisions of 4.3.2, the maximum surface temperature of the enclosure is used to determine the marked surface temperature of the equipment.

4.4.1 Fault current

For Ex equipment with Level of Protection "tb" and "tc", which is used for power connection and can cut off fault currents above 10 kA, the maximum short-circuit current shall be determined. The test is carried out in accordance with 6.1.1.1. It shall be marked in accordance with Clause 7.

4.4.2 Maximum surface temperature

The maximum surface temperature shall be measured on the external surfaces of the enclosure for Ex equipment with levels of protection "tb" and "tc" in accordance with 6.1.2 under normal operating conditions.

4.4.5.2 Thermal protective devices

The Ex equipment shall be protected by one or more integral thermal protective devices.

Thermal protective devices shall not be of a self-resettable type and shall be duplicated unless conforming to GB/T 9364 (all parts), GB/T 9816.1 or ANSI/UL 248 (all parts), in which case only one device is necessary.

5.1.1 General

All joints in the structure of the enclosure, whether permanently closed or designed to be opened from time to time, shall fit closely together within the tolerances specified in the documentation. They shall be effectively sealed against the ingress of dust and shall comply with the following particular requirements and be subjected to the test of 6.1.1.

The use of grease alone to maintain the integrity of the seal is not considered to satisfy this requirement.

5.1.4 Cemented joints

Cemented joints shall not be used on mating parts which need to be removed to gain access to field wiring connections or in-service adjusting facilities.

5.1.5 Operating rods, spindles and shafts

Openings in enclosures for operating rods, spindles or shafts shall have means to inhibit the ingress of dust, other than only grease or compound, both when the spindles, rods or shafts are in motion and when they are at rest.

5.2.2.1 Plain entries

The clearance holes for plain entries shall have a diameter not more than 0.7 mm greater than the nominal diameter of the entry thread gland or fitting. The inside of the enclosure shall be provided with sufficient room to attach a locknut to the gland or fitting.

5.2.2.2 Threaded entries

Threaded entries are considered to meet the requirements for Ex equipment with levels of protection "ta", "tb" and "tc" if they are.

6.1.1.1 General

Samples of the Ex equipment shall be subjected to the endurance to heat, endurance to cold and impact tests specified in GB/T 3836.1 and the drop test if applicable. If there is a supplementary enclosure, there shall be no visual damage to the supplementary enclosure caused by the impact testing of the equipment enclosure.

6.1.1.2 Impact test for supplementary enclosures

The impact test for supplementary enclosures shall be performed in accordance with the resistance to impact test of GB/T 3836.1 using the 1 kg mass dropped from a height of 0.2 m. There shall be no damage which invalidates the type of protection.

6.1.1.3 Pressure test

Internal pressure shall be at least the following values for a duration of 60 0+10 s.

6.1.1.4 IP test

According to the requirements of Table 1, according to the provisions of GB/T 3836.1 on the ingress protection (IP) of the enclosure, the IP test shall be carried out for samples with different levels of protection. It shall meet the following modified requirements.