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Standard for design of electric power in mine

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1 General

1.0.1 This standard is formulated in order to implement national laws, regulations and policies in mine power design, ensure life safety and equipment safety, achieve reliable power supply and distribution, save energy, be environmentally friendly, technologically advanced and economically reasonable.

1.0.2 This standard is applicable to the electric power design of all kinds of mines newly built, rebuilt and expanded except petroleum mines.

1.0.3 Mine power design scheme and equipment level should be reasonably determined according to mine scale, process characteristics, load nature, power consumption capacity and regional power supply conditions.

1.0.4 Mine power design should correctly handle the relationship between short-term and long-term development of mine power construction based on mine project scale, service life and development planning, focusing on the short-term and reasonably taking into account long-term construction. When conditions permit, capital construction should be combined with production power facilities.

1.0.5 In addition to complying with this standard, mine power design should also comply with the current relevant national standards.

2.0.1 mining area substation

The substation that distributes power to the entire mining area or part of the mining area usually includes a number of mines, open-pit mines, ore dressing plants and their mining area administration, production management agencies, auxiliary and affiliated enterprises, etc.

2.0.2 surface main substation surface main substation

It is an enterprise power transformation and distribution center that is located on the ground of a mine or an open-pit mine, accepts and collects the external power supply of the enterprise, and has the function of completing all or part of the load distribution in the enterprise. Also known as the total step-down substation.

2.0.3 underground main substation underground main substation

Underground car parks or transportation lanes set at the main underground mining level, accept ground power from the mine, and have the ability to complete the full or partial load distribution function of the mining level (or sometimes including adjacent mining levels) Underground substation and distribution center. Also known as underground central substation.

2.0.4 working section substation of mining area substation

A substation that distributes power to one or more underground mining area-wide loads.

2.0.5 Comprehensive utilization of mine resources plant of utilizing waste for by-product in mine for generating electricity

Enterprises that use low calorific value waste generated during mine production and processing and mining by-products such as coal bed methane as fuel to produce electricity and heat.

2.0.6 Mining electric apparatus for non-explosive atmospheres

It meets the specific safety requirements of mines and is suitable for electrical equipment in underground normal non-explosive environments.

2.0.7 Underground main ground electrode underground main earth electrode

The metal plate grounding electrode set in the main and auxiliary water tanks in the well.

2.0.8 Underground local ground electrode underground local earth electrode

In addition to the main grounding electrode, the grounding electrode is set up in the underground or at a single place where electrical equipment is installed.

2.0.9 Underground protective conductor underground protective conductor

A conductor set for underground electrical safety.

2.0.10 underground earth device underground earth device

The sum of downhole ground electrodes, downhole ground conductors and downhole ground busbars. Among them, the grounding device containing the underground main

grounding electrode is called the main grounding device, and the grounding device containing the underground local grounding electrode is called the local grounding device.

2.0.11 Underground grounding network underground general earth network

Connect multiple scattered main grounding devices and local grounding devices with grounding conductors to form a complete grounding system with good electrical conductivity between each other at one or more mining levels or local areas in the well.

2.0.12 underground conventional prospective touch voltage limit underground conventional prospective touch voltage limit

In order to ensure personal safety, the maximum value of the expected contact voltage that is allowed to exist for an unlimited time in the underground environment.

3 basic rules

3.0.1 Mine power load should be divided into primary load, secondary load and tertiary load, and the load division should meet the following requirements.

1 The following conditions shall be classified as Class I loads.

- 1) There are main drainage pumps for mines in submerged dangerous environments and drainage pumps for downhill mining;
- 2) The main ventilator of a mine in a dangerous environment where there is an explosion or serious damage to human health;
- 3) Shaft hoists for frequent lifting of personnel in mines;
- 4) Drainage pumps for open-pit mines in submerged dangerous environments or drainage pumps for drainage in shafts;
- 5) Other equipment that should be regarded as a first-class load according to the current relevant national standards.

2 The following situations should be classified as secondary loads.

- 1) A single piece of equipment or a group of interrelated equipment directly related to mineral mining, transportation, lifting, processing and outbound transportation in large mines except for the primary load;
- 2) Underground fixed lighting equipment without portable lighting fixtures, or emergency lighting equipment used to ensure the continuation of normal activities in workplaces with primary loads on the ground and secondary loads in large mines;
- 3) Power supply equipment for mine communication and safety monitoring devices;
- 4) Drainage pumps for large open-pit mines;

5) Signal power supply equipment at railway stations;

6) Other equipment that should be regarded as secondary load according to the current relevant national standards.

3 The electrical equipment that does not belong to the first-level load and the second-level load shall be divided into the third-level load.

3.0.2 The mine power supply should be taken from the substation of the regional power system, the substation of the mining area, the power plant of the coal-electricity joint operation or the self-provided power plant of the mining area (mine). When it is difficult to obtain from the above-mentioned substations or power plants, it can also be obtained from the substations of neighboring enterprises.

3.0.3 Mine power supply and power lines shall comply with the following regulations.

1 A mine with a primary load should be powered by dual power sources; when one power supply is interrupted, the other power supply should not be damaged at the same time, and the capacity of the power supply should at least ensure the mine's entire primary load power demand, and should meet the mine's secondary load power demand.

2 Large and medium-sized mines should be powered by two power lines; when any one of the two power lines is interrupted, the other power line should ensure the supply of all primary and secondary load power requirements.

3 Small mines without primary load can be powered by primary power lines.

3.0.4 The setting of self-provided power supply in mining areas (mines) shall be based on regional power development planning, overall mining area planning, comprehensive utilization planning, relevant national industrial policies, industry access policies, and environmental and water resource protection policies, after technical and economic comparisons OK, and should meet one of the following conditions.

1 The mine is located far away from the power system, or it is difficult to obtain all the required power from the power system;

2 Mine production and processing produce enough low-calorific-value waste or coal-bed methane and other mining by-products for power generation as fuel, which is suitable for the construction of power plants for comprehensive utilization of mine resources;

3 There is a reliable heat load in or near the mine, and it has the conditions for centralized heating, which is suitable for the development of combined heat and power projects;

4 Possess the conditions for developing other distributed power sources.