Translated English of Chinese Standard: GB/T40617-2021

www.ChineseStandard.net → Buy True-PDF → Auto-delivery.

Sales@ChineseStandard.net

GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 29.020

CCS K 09

GB/T 40617-2021

Guideline for construction of safety ecological in electrical place

电气场所的安全生态构建指南

Issued on: October 11, 2021 **Implemented on: May 1, 2022**

Issued by: State Administration for Market Regulation;
Standardization Administration of PRC.

Table of Contents

Guideline for construction of safety ecological in electrical place

1 Scope

This document provides guidelines for the construction of the safety ecology in electrical places, including the general principles of the safety ecology in electrical places; the safety coordination of the influencing factors (such as electrical equipment and systems, the environment, and the personnel) of safety ecology in electrical places; as well as the role and management of the safety ecology in electrical places.

This document applies to the safety ecology construction in electrical places where electrical equipment and systems operate with an AC rated voltage of 1000 V and a DC rated voltage of 1500 V and below.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 4776-2017 Electrical safety terminology

GB/T 17045 Protection against electric shock -- Common aspects for installations and equipment

GB 19517-2009 National safety technical code for electric equipment

GB/T 24612.1-2009 Requirements for electrical safety in the workplace -- Part 1: General rules

GB/T 24612.2-2009 Requirements for electrical safety in the workplace -- Part 2: Safety measure of operation on power off

GB/T 40431-2021 Guidelines for personal safety restraint in electrical operation place

3 Terms and Definitions

The terms and definitions defined in GB/T 4776-2017, GB 19517-2009 and the following apply to this document.

3.1 Electrical place

A closed and/or open place where the electrical equipment and systems operate and only professionals or persons with electrical training can enter.

3.2 Safety ecological in electrical place

An electrical place where multiple electrical equipment and systems are installed (or connected), the electrical equipment (systems), the environment, and personnel form a unified whole, and within a certain period, its functions maintain safe and reliable as expected in a dynamic balance state.

3.3 Interface of electrical place

A specific area in which two different types (for example, different functions or different safety level requirements) of electrical places are adjacent.

4 General rules

4.1 Factors to be considered for the safety ecology in electrical places

4.1.1 The safety ecology in electrical places is affected by the following factors:

--- Safety of electrical equipment and systems; the content specified in GB 19517-2009 is applicable to all electrical equipment and systems with the voltage range of AC voltage 1000 V and below, as well as DC voltage 1500 V and below;

--- Environmental safety in electrical places;

--- Safety of personnel in electrical places;

--- Interaction between electrical equipment (systems), environment, and personnel.

4.1.2 The following should be considered for the safety ecology in electrical places:

--- The influencing factors in 4.1.1;

--- The functional objectives of the safety ecology, which are determined based on the functions of electrical equipment and systems;

--- The electrical safety objectives of the safety ecology for ensuring personal and

5 Safety coordination of electrical equipment and systems

5.1 Classification of electrical equipment

Usually, electrical equipment is classified according to the measures of protection against electric shock. According to the provisions of GB/T 17045, electrical equipment can be divided into Class-0 electrical equipment, Class-I electrical equipment, Class-II electrical equipment, and Class-III electrical equipment.

--- Class-0 electrical equipment: The basic insulation is used as the basic protective measure, and there are no fault protection measures;

--- Class-I electrical equipment: The basic insulation is used as the basic protective measure, and the protective bonding is used as a fault protection measure;

--- Class-II electrical equipment: The basic insulation is used as the basic protective measure, and the supplementary insulation is used as a fault protection measure; or reinforced insulation is adopted for basic protection and fault protection functions;

--- Class III electrical equipment: The protection against electric shock depends on the power supply of safety extra-low voltage (SELV), and the electrical equipment does not generate a voltage that is higher than the extra-low voltage.

In addition, the requirements for safety levels will be different due to some differences, such as the different use of the electrical equipment, whether the electrical equipment is mobile or not, and the different operation methods of the electrical equipment; those should be considered when building a safety ecology.

According to the use, electrical equipment can be divided into:

--- Production equipment;

--- Monitoring equipment;

--- Control equipment;

--- Protection equipment, etc.

According to whether it is mobile or not, electrical equipment can be divided into:

--- Fixed electrical equipment (also including stationary electrical equipment);

--- Mobile electrical equipment, which can include electrical equipment that moves by autonomous power and handheld electrical equipment.

--- Dry tropics;

--- Plateau;

--- Rain (it should be considered for the outdoor electrical equipment and systems), etc.

6.3 Safety factors of the operating environment

The safety factors of the operating environment shall be considered according to the different classifications of electrical places.

The classification of electrical places may include:

--- Unattended and manned electrical places;

--- Enclosed electrical places and uncontrolled electrical places, which can be further divided into accessible and inaccessible electrical places;

--- Electrical places with explosion hazard;

--- Electrical places with mixed main bodies (many types of electrical equipment and systems), etc.

For the safety factors of the operating environment, the following factors should be considered:

--- Whether flammable substances are stored;

--- Whether there is electrostatic danger;

--- Whether there is a danger of explosion;

--- Whether there is a risk of corrosion;

--- Whether there is a mass of conductive dust, etc.

6.4 Coordination of the environment

For the coordination of the environment, the coordination between the environment and electrical equipment (systems), between the environment and personnel should be considered.

The coordination between the environment and electrical equipment (systems) is based on obedience and intervention factors (see 5.3), and the following should be considered:

a) The relationship of mutual influence (or the relationship of action and reaction)

- When the electrical equipment obeys the environment, the environmental factors change within an acceptable range, and the safety ecology among electrical equipment and systems changes;

- When the electrical equipment intervenes in the environment, the incompatibility of other electrical equipment and systems increases due to changes in environmental factors.

b) The relationship of mutual constraint

- When the electrical equipment obeys the environment, the limit of changes in environmental factors that electrical equipment and systems can withstand shall be considered;

- When the electrical equipment intervenes in the environment, the limits of changes in electrical equipment and system parameters that can be accommodated by the environment shall be considered.

c) The relationship of mutual balance

- When the electrical equipment obeys the environment, the limit of surpassing expectations by environmental factors for a short time that can be accepted by the electrical equipment and systems shall be considered;

- When the electrical equipment intervenes in the environment, the bearable impacts by the environment when the recoverable failure of the electrical equipment occurs shall be considered.

d) Open and circular relationships

- When the electrical equipment obeys the environment, the cycle of environmental ecology shall ensure the safety ecology in electrical places;

- When the electrical equipment intervenes in the environment, the removal and connection of electrical equipment shall ensure the safety ecology in electrical places.

Factors that should be considered in the coordination between the environment and personnel:

--- The influence of environmental factors on ergonomics, such as the physical and psychological effects on personnel caused by noise, vibration, dust, harmful gases, radiation, etc.;

--- The ability of personnel to accurately perceive and judge environmental changes and adjustments, etc.

equipment and systems through the construction of the safety ecology in electrical places;

--- Ensure the safety level of electrical equipment and systems through maintenance and repairs to maintain the safety ecology in electrical places;

--- Provide monitoring and control for changes in environmental factors through the construction of safety ecology in electrical places;

--- Through monitoring and control of environmental factors, avoid the impact on electrical equipment, systems, and personnel due to changes in environmental factors to maintain the safety ecology in electrical places;

--- Through the construction of the safety ecology in electrical places, provide personnel with more ergonomic environmental factors; avoid unsafe behaviors and unsafe states caused by changes in physical and/or psychological states to a greater extent State;

--- Reduce the accident rate by avoiding unsafe behavior and unsafe state of personnel, so as to maintain the safety ecology in electrical places.

8.3 Information extraction

The safety ecology in electrical places contains a lot of information for extraction, for example:

--- Electrical information;

--- Mechanical information;

--- Monitoring information;

--- Detection information;

--- Historical record information, etc.

9 Management of the safety ecology in electrical places

9.1 Management goal

The management goal of the safety ecology in the electrical place is to maintain a continuous and stable safety state of electrical equipment (systems), the environment, and personnel within the expected period, so that the safety level in the electrical place is maintained at an acceptable level.

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. https://www.ChineseStandard.us

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. https://www.ChineseStandard.net

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - https://www.ChineseStandard.us).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading…): https://www.chinesestandard.net/AboutUs.aspx

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: https://www.linkedin.com/in/waynezhengwenrui/

------ The End ------