



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

GB/T 4942-2021

**Degrees of protection provided by the integral design of
rotating electrical machines (IP code) - Classification**

Issued on: October 11, 2021

Implemented on: May 1, 2022

Issued by: SAMR; SAC

Table of Contents

Foreword...	3
1 Scope...	6
2 Normative references...	6
3 Terms and definitions...	7
4 Designation...	7
5 Degrees of protection - First characteristic numeral...	8
6 Degrees of protection - Second characteristic numeral...	11
7 Marking...	12
8 General requirements for tests...	13
9 Tests for first characteristic numeral...	14
10 Tests for second characteristic numeral...	18
11 Requirements and tests for open weather-protected machines...	29
References...	31

Foreword

This document 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 document replaces GB/T 4942.1-2006 Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification. Compared with GB/T 4942.1-2006, except for structural adjustment and editorial changes, the main technical changes are as follows.

- a) The specified standards for the protection of machine enclosures from dust are added in the "Scope" (see Chapter 1);
- b) The definitions of closed machines and open machines are added (see 3.1 and 3.2);
- c) The requirements for machines equipped with drain holes are modified in Chapter 5 (see 5.4; see 4.4 of the 2006 edition);

d) The protection degree of IPX9 "machine protected against high temperature and high-pressure water jet" is added (see 6.2);

e) The test and acceptance conditions for the dustproof test in the first characteristic numeral test are modified (see Chapter 9; see Chapter 8 of the

2006 edition);

f) The test and acceptance conditions for the second characteristic numeral test of IPX9 are added (see 10.1);

g) Figure 7 "Geometry of the fan jet nozzle" is added (see 10.1).

This document is identical to IEC 60034-5:2020 Rotating electrical machines - Part 5. Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification.

The Chinese documents that have consistent correspondence with the international documents cited in this document are as follows.

-- GB/T 1993-1993 Cooling methods for rotating electrical machines (eqv IEC 60034-6:1991);

-- GB/T 3836 (all parts) Explosive atmospheres [IEC 60079 (all parts)].

The following editorial changes were made to this document.

-- In order to be consistent with the technical standard system of China, the name of the standard is changed to Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification;

-- The normative reference IEC 60079 (all parts) is added in Chapter 2;

-- For ease of understanding, the note in 10.2.3 a) is added;

-- "References" is added.

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

This document was proposed by China Electrical Equipment Industry Association.

This document shall be under the jurisdiction of the National Technical Committee on Rotating Machinery of Standardization Administration of China (SAC/TC26).

Drafting organizations of this document. Shanghai Electrical Apparatus Research Institute (Group) Co., Ltd., Nanfang Pump Industry Co., Ltd., Jiamusi Electric Machine Co., Ltd., Shanghai Engineering Research Center for Motor System Energy Saving Co., Ltd., Xi'an Tech. Full Simo Motor Co., Ltd., Jiangsu Xi'anda Explosion-proof Co., Ltd., Hangzhou Jiangchao Motor Co., Ltd., Shandong Huali Electric Motor Group Co., Ltd., CRRC Yongji Electric Co., Ltd., Zhejiang Jinlong Electrical Machinery STOCK Co., Ltd., Fuzhou Wonder Electric Co., Ltd., Nanyang Explosion Prevention Weite Co., Ltd., Shanxi Electric Motor Manufacturing Co., Ltd., Jiangsu Magnet Valley Technologies Co., Ltd., Shanghai Testing & Inspection Institute for Electrical Equipment Co., Ltd., Suzhou Torin Drive Equipment Co., Ltd., Xiangtan Electric Manufacturing Group Co., Ltd., Zhuhai Kaibang Motor Manufacture Co., Ltd., Dongfang Electric Machinery Co., Ltd., Jiangsu Aerospace Power Electromechanical Co., Ltd., Anhui Weineng Electric Machinery Co., Ltd., Jiangmen Jiangsheng Electric Machine Works Co., Ltd., Siemens Standard Motors (China) Co., Ltd., Xuzhou Keya Electromechanical Co., Ltd., Shaoxing Motai Mechanical and Electrical Technology Co., Ltd., Kangfu Sci-tech Co., Ltd., Rongcheng Rongjia Power Co., Ltd.

1 Scope

This document applies to the classification of degrees of protection provided by enclosures for rotating electrical machines. It defines the requirements for protective enclosures that are in all other respects suitable for their intended use and which, from the point of view of materials and workmanship, ensure that the properties dealt with in this document are maintained under normal conditions of use.

2 Normative references

The following documents contain the provisions which, through normative reference in this document, constitute the essential provisions of this document. For the dated referenced documents, only the versions with the indicated dates are applicable to this document; for the undated referenced documents, only the latest version (including all the amendments) is applicable to this document.

IEC 60034-6 Rotating electrical machines - Part 6.Methods of cooling (IC code)

IEC 60079(all parts) Explosive atmospheres

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

A machine where no medium from the surrounding medium, for the purpose of cooling, passes through the machine.

A machine with an open cooling circuit in which the coolant is drawn directly from the surrounding medium passing through the machine and then returning directly to the surrounding medium.

4 Designation

In this case, the degree of protection in either state of the machine shall be indicated, for example IP55S/IP20M.

The absence of the letters S and M shall imply that the intended degree of protection will be provided under all normal conditions of use.

5 Degrees of protection - First characteristic numeral

The term 'excluded' implies that a part of the body, a tool or a wire held by a person, either will not enter the machine or, if it enters, that adequate clearance will be maintained between it and the live parts or dangerous moving parts (smooth rotating shafts and the like are not considered dangerous).

The blades and spokes of fans external to the enclosure shall be protected against contact by means of guards complying with Table 1.

6 Degrees of protection - Second characteristic numeral

For second characteristic numerals up to and including 6, compliance of an enclosure with an indicated degree of protection implies that the enclosure will also comply with all lower degrees of protection in Table 3.

In consequence, the tests establishing these lower degrees of protection are not required, except in case of doubt.