

Subject 60034-5

October 26, 2018

SUMMARY OF TOPICS

The following new standard is proposed:

1. UL proposes the First Edition of the Standard for Rotating Electrical Machines - Part 5: Degrees of Protection Provided by the Integral Design of Rotating Electrical Machines (IP code) - Classification, UL 60034-5, which is a UL-only identical adoption of IEC 60034-5: 2006 (Edition 4.1)

STP BALLOTS AND ALL COMMENTS DUE: DECEMBER 10, 2018

1. UL proposes the First Edition of the Standard for Rotating Electrical Machines - Part 5: Degrees of Protection Provided by the Integral Design of Rotating Electrical Machines (IP code) - Classification, UL 60034-5, which is a UL-only identical adoption of IEC 60034-5: 2006 (Edition 4.1)

RATIONALE

Proposal submitted by: Tim Evans, ULC

UL proposes the identical adoption of IEC 60034-5: 2006 (Edition 4.1), the Standard for Rotating Electrical Machines - Part 5: Degrees of Protection Provided by the Integral Design of Rotating Electrical Machines (IP code) - Classification, as the first edition of UL 60034-5.

The IEC Foreword has been provided for your reference in reviewing this document. However, it is not considered to be part of the ANSI balloted material.

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Preface (UL)

This UL Standard is based on IEC Publication 60034-5: fourth edition, Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification, as revised by Amendment 1. IEC publication 60034-5 is copyrighted by the IEC.

This UL Standard 60034-5, Standard for Safety for Rotating Electrical Machines - Part 5: Degrees of Protection Provided by the Integral Design of Rotating Electrical Machines (IP code) - Classification, is to be used in conjunction with the second edition of UL 60034-1, Rotating Electrical Machines - Part 1: Rating and Performance. The requirements of UL 60034-5 where stated, amend the requirements of UL 60034-1.

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Note – Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification

FOREWORD

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International Standard IEC 60034-5 has been prepared by IEC technical committee 2: Rotating machinery.

This consolidated version of IEC 60034-5 consists of the fourth edition (2000) [documents 2/1098/FDIS and 2/1114/RVD], its amendment 1 (2006) [documents 2/1378/CDV and 2/1400A/RVC] and its corrigendum of June 2001.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 4.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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ROTATING ELECTRICAL MACHINES – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification

1 Scope and object

This International Standard 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 standard are maintained under normal conditions of use.

This standard does not specify:

- degrees of protection against mechanical damage of the machine, or conditions such as moisture (produced for example by condensation), corrosive dust and vapour, fungus or vermin;
- types of protection of machines for use in a potentially explosive (dust, vapour) environment.

In certain applications (such as agricultural or domestic appliances), more extensive precautions against accidental or deliberate contact may be specified.

This standard gives definitions for standard degrees of protection provided by enclosures applicable to rotating electrical machines as regards the:

- a) protection of persons against contacts with or approach to live parts and against contact with moving parts (other than smooth rotating shafts and the like) inside the enclosure and protection of the machine against ingress of solid foreign objects;
- b) protection of machines against the harmful effects due to ingress of water.

It gives designations for these protective degrees and tests to be performed to check that the machines meet the requirements of this standard.

2 Normative references

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

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-6, *Rotating electrical machines – Part 6: Methods of cooling (IC code)*

3 Designation

The designation used for the degree of protection consists of the letters IP followed by two characteristic numerals signifying conformity with the conditions indicated in the tables of clauses 4 and 5 respectively.

3.1 Single characteristic numeral

When it is required to indicate a degree of protection by only one characteristic numeral, the omitted numeral shall be replaced by the letter X, for example IPX5 or IP2X.

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3.2 Supplementary letters

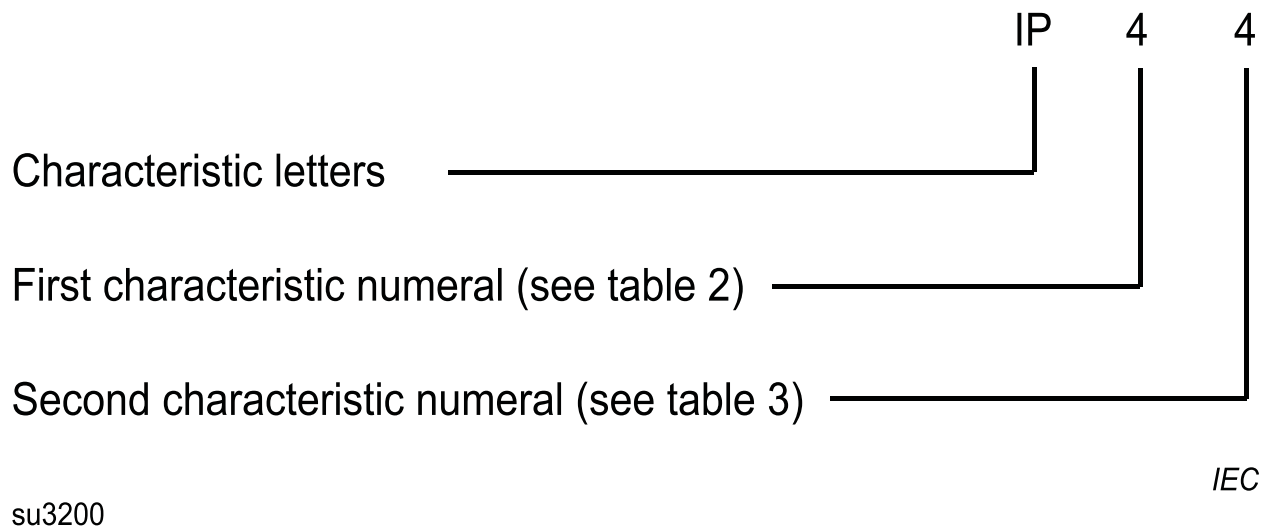
Additional information may be indicated by a supplementary letter following the second characteristic numeral. If more than one letter is used, the alphabetic sequence shall apply.

3.2.1 In special applications (such as machines with open circuit cooling for ship deck installation with air inlet and outlet openings closed during standstill), numerals may be followed by a letter indicating whether the protection against harmful effects due to ingress of water was verified or tested for the machine not running (letter S) or the machine running (letter M). 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.

3.2.2 For air-cooled open machines suitable for specific weather conditions and provided with additional protective features or processes (as specified in clause 10), the letter W may be used.

3.3 Example of designation



4 Degrees of protection – First characteristic numeral

4.1 Indication of degree of protection

The first characteristic numeral indicates the degree of protection provided by the enclosure to persons and to the parts of the machine inside the enclosure.

Table 2 gives, in the third column, brief details of objects which will be 'excluded' from the enclosure for each of the degrees of protection represented by the 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 third column of table 2 also indicates the minimum size of solid foreign objects which will be excluded.

4.2 Compliance to indicated degree of protection

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

4.3 External fans

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

Table 1 – Test requirements for guards

Protection of machine	Test
IP1X	50 mm sphere test
IP2X to IP6X	Finger test

For the test, the rotor shall be slowly rotated, for example by hand when possible.

Smooth rotating shafts and similar parts are not considered dangerous.

4.4 Drain holes

If the machine is provided with drain holes, the following shall apply:

- drain holes intended normally to be open on site shall be kept open during testing;
- drain holes intended normally to be closed on site shall be kept closed during testing;
- if machines with protection IP3X or IP4X are intended to be run with open drain holes, the drain holes may comply with protection IP2X;
- if machines with protection IP5X are intended to be run with open drain holes, the drain holes shall comply with protection IP4X.