

**Electric traction - Rotating electrical machines for
rail and road vehicles - Part 1: Machines other than
electronic convertor-fed alternating current motors**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60349-1:2010 sisaldab Euroopa standardi EN 60349-1:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.12.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

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This Estonian standard EVS-EN 60349-1:2010 consists of the English text of the European standard EN 60349-1:2010.

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English version

**Electric traction -
Rotating electrical machines for rail and road vehicles -
Part 1: Machines other than electronic converter-fed alternating current
motors
(IEC 60349-1:2010)**

Traction électrique -
Machines électriques tournantes des
véhicules ferroviaires et routiers -
Partie 1: Machines autres que les moteurs
à courant alternatif alimentés par
convertisseur électronique
(CEI 60349-1:2010)

Elektrische Zugförderung -
Drehende elektrische Maschinen für
Bahn- und Straßenfahrzeuge -
Teil 1: Elektrische Maschinen
ausgenommen umrichter gespeiste
Wechselstrommotoren
(IEC 60349-1:2010)

This European Standard was approved by CENELEC on 2010-11-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 9/1415/FDIS, future edition 2 of IEC 60349-1, prepared by IEC TC 9, Electrical equipment and systems for railways, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60349-1 on 2010-11-01.

This European Standard supersedes EN 60349-1:2000 + A1:2002.

The main technical changes with regard to EN 60349-1:2000 + A1:2002 are as follows:

- As the limits of vibration velocities have been changed in EN 60034-14, the limits valid for traction motors are now directly stated in this standard.
- In addition to the existing method for measuring and calculating the sound power level, the methods described in EN ISO 3741, EN ISO 3743 (all parts), EN ISO 3744, EN ISO 3745 and EN ISO 9614 (all parts) are also allowed. However the maximum sound power levels and the correction for pure tones remain unchanged in C.7 and C.8.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2011-08-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2013-11-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60349-1:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60034-2-1	NOTE Harmonized as EN 60034-2-1.
IEC 60034-9	NOTE Harmonized as EN 60034-9.
IEC 60034-14	NOTE Harmonized as EN 60034-14.
IEC 61260	NOTE Harmonized as EN 61260.
IEC 61287 series	NOTE Harmonized in EN 61287 series (not modified).
IEC 61373	NOTE Harmonized as EN 61373.
IEC 61377-2	NOTE Harmonized as EN 61377-2.
IEC 61672	NOTE Harmonized as EN 61672.
ISO 3741	NOTE Harmonized as EN ISO 3741.
ISO 3743-1	NOTE Harmonized as EN ISO 3743-1.
ISO 3743-2	NOTE Harmonized as EN ISO 3743-2.

ISO 3744	NOTE Harmonized as EN ISO 3744.
ISO 3745	NOTE Harmonized as EN ISO 3745.
ISO 3746	NOTE Harmonized as EN ISO 3746.
ISO 3747	NOTE Harmonized as EN ISO 3747.
ISO 9614-1	NOTE Harmonized as EN ISO 9614-1.
ISO 9614-2	NOTE Harmonized as EN ISO 9614-2.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034-1 (mod)	-	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1	-
IEC 60034-8	-	Rotating electrical machines - Part 8: Terminal markings and direction of rotation	EN 60034-8	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60638	-	Criteria for assessing and coding of the commutation of rotating electrical machines for traction	-	-
IEC 62498-1	-	Railway applications - Environmental conditions for equipment - Part 1: Equipment on board rolling stock	-	-

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ELECTRIC TRACTION – ROTATING ELECTRICAL MACHINES FOR RAIL AND ROAD VEHICLES –

Part 1: Machines other than electronic converter-fed alternating current motors

1 Scope and object

This part of IEC 60349 is applicable to rotating electrical machines, other than electronic converter-fed alternating current motors, forming part of the equipment of electrically propelled rail and road vehicles. The vehicles may obtain power either from an external supply or from an internal source.

The object of this standard is to enable the performance of a machine to be confirmed by tests and to provide a basis for assessment of its suitability for a specified duty and for comparison with other machines.

Where further testing is to be undertaken in accordance with IEC 61377-2, it may be preferable, to avoid duplication, that some type and investigation tests be carried out on the combined test bed.

NOTE 1 This standard also applies to machines installed on trailers hauled by electrically propelled vehicles.

NOTE 2 The basic requirements of this standard may be applied to rotating electrical machines for special purpose vehicles such as mine locomotives, but it does not cover flameproof or other special features that may be required.

NOTE 3 It is not intended that this standard should apply to machines on small road vehicles such as battery-fed delivery vehicles, works trucks, etc. Neither does it apply to minor machines such as windscreen wiper motors, etc. that may be used on all types of vehicles.

NOTE 4 Industrial type machines complying with the IEC 60034 series may be suitable for certain auxiliary applications.

Electrical inputs or outputs of machines covered by this standard may be as follows:

- a) direct current (including rectified polyphase alternating current);
- b) pulsating current (rectified single-phase alternating current);
- c) unidirectional chopper-controlled current;
- d) single-phase alternating current;
- e) polyphase alternating current (in general three-phase).

In this standard, the electrical machines concerned are classified as follows.

- 1) Traction motors – Motors for propelling rail or road vehicles.
- 2) Engine-driven main generators – Generators for supplying power to traction motors on the same vehicle or train.
- 3) Main motor-generator sets – Machines obtaining power from a line or battery, and supplying power to traction motors on the same vehicle or train.
- 4) Auxiliary motors – Motors for driving compressors, fans, auxiliary generators or other auxiliary machines.
- 5) Auxiliary generators – Generators for supplying power for auxiliary services such as air conditioning, heating, lighting, battery charging, etc.

- 6) Auxiliary motor-generator sets and auxiliary rotary converters – Machines which obtain their power from the line or other source to provide an electrical supply for auxiliary services.

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 60034-8, *Rotating electrical machines – Part 8: Terminal markings and direction of rotation*

IEC 60085, *Thermal evaluation and designation*

IEC 60638, *Criteria for assessing and coding of the commutation of rotating electrical machines for traction*

IEC 62498-1, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-131, IEC 60050-151, IEC 60050-411 and IEC 60050-811, as well as the following apply.

3.1

rating of a machine

combination of simultaneous values of electrical and mechanical quantities, with their duration and sequence, assigned to a machine by the manufacturer

3.1.1

rated value

numerical value of any quantity included in a rating

NOTE For traction machines, certain special quantities are often included such as current ripple factor for a pulsating current motor, excitation condition for a variable field motor, etc.

3.1.2

continuous rating

electrical load the machine can withstand on the test bed for an unlimited period under the conditions specified in 8.1 without exceeding the limits of temperature rise given in Table 2, all other appropriate requirements in this standard also being satisfied

3.1.2.1

continuous ratings of an engine-driven main generator

an engine-driven main generator normally has two continuous ratings which are defined below:

- a) continuous rating "at lower voltage"

continuous rating determined by the temperature rise of the windings through which the load current flows (higher value of load current and lower voltage)

- b) continuous rating "at higher voltage"