

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Rotating electrical machines –
Part 1: Rating and performance**

**Machines électriques tournantes –
Partie 1: Caractéristiques assignées et caractéristiques de fonctionnement**





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**Rotating electrical machines –
Part 1: Rating and performance**

**Machines électriques tournantes –
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INTERNATIONAL
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COMMISSION

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CONTENTS

FOREWORD.....	6
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	10
4 Duty	15
4.1 Declaration of duty.....	15
4.2 Duty types	16
4.2.1 Duty type S1 – Continuous running duty	16
4.2.2 Duty type S2 – Short-time duty	17
4.2.3 Duty type S3 – Intermittent periodic duty	17
4.2.4 Duty type S4 – Intermittent periodic duty with starting.....	18
4.2.5 Duty type S5 – Intermittent periodic duty with electric braking.....	20
4.2.6 Duty type S6 – Continuous operation periodic duty	21
4.2.7 Duty type S7 – Continuous operation periodic duty with electric braking	22
4.2.8 Duty type S8 – Continuous operation periodic duty with related load/speed changes.....	22
4.2.9 Duty type S9 – Duty with non-periodic load and speed variations	24
4.2.10 Duty type S10 – Duty with discrete constant loads and speeds	24
5 Rating.....	26
5.1 Assignment of rating	26
5.2 Classes of rating.....	26
5.2.1 Rating for continuous running duty	26
5.2.2 Rating for short-time duty	26
5.2.3 Rating for periodic duty.....	26
5.2.4 Rating for non-periodic duty.....	27
5.2.5 Rating for duty with discrete constant loads and speeds	27
5.2.6 Rating for equivalent loading	27
5.3 Selection of a class of rating	27
5.4 Allocation of outputs to class of rating.....	28
5.5 Rated output	28
5.5.1 DC generators	28
5.5.2 AC generators	28
5.5.3 Motors	28
5.5.4 Synchronous condensers.....	28
5.6 Rated voltage	28
5.6.1 DC generators	28
5.6.2 AC generators	29
5.7 Co-ordination of voltages and outputs	29
5.8 Machines with more than one rating.....	29
6 Site conditions.....	29
6.1 General.....	29
6.2 Altitude	29
6.3 Maximum ambient air temperature	29
6.4 Minimum ambient air temperature	30
6.5 Water coolant temperature.....	30
6.6 Standstill, storage and transport	30

6.7	Purity of hydrogen coolant	30
7	Electrical operating conditions	30
7.1	Electrical supply.....	30
7.2	Form and symmetry of voltages and currents	31
7.2.1	AC motors	31
7.2.2	AC generators	32
7.2.3	Synchronous machines.....	32
7.2.4	DC motors supplied from static power converters	33
7.3	Voltage and frequency variations during operation	34
7.4	Three-phase a.c. machines operating on unearthed systems	36
7.5	Voltage (peak and gradient) withstand levels	36
8	Thermal performance and tests	37
8.1	Thermal class	37
8.2	Reference coolant.....	37
8.3	Conditions for thermal tests	38
8.3.1	Electrical supply	38
8.3.2	Temperature of machine before test	38
8.3.3	Temperature of coolant.....	38
8.3.4	Measurement of coolant temperature during test	38
8.4	Temperature rise of a part of a machine.....	39
8.5	Methods of measurement of temperature	39
8.5.1	General	39
8.5.2	Resistance method	39
8.5.3	Embedded temperature detector (ETD) method	39
8.5.4	Thermometer method.....	39
8.6	Determination of winding temperature	39
8.6.1	Choice of method	39
8.6.2	Determination by resistance method	40
8.6.3	Determination by ETD method.....	42
8.6.4	Determination by thermometer method	42
8.7	Duration of thermal tests.....	43
8.7.1	Rating for continuous running duty	43
8.7.2	Rating for short-time duty	43
8.7.3	Rating for periodic duty.....	43
8.7.4	Ratings for non-periodic duty and for duty with discrete constant loads	43
8.8	Determination of the thermal equivalent time constant for machines of duty type S9	43
8.9	Measurement of bearing temperature.....	43
8.10	Limits of temperature and of temperature rise	44
8.10.1	General	44
8.10.2	Indirect cooled windings	44
8.10.3	Direct cooled windings.....	49
8.10.4	Adjustments to take account of hydrogen purity on test	50
8.10.5	Permanently short-circuited windings, magnetic cores and all structural components (other than bearings) whether or not in contact with insulation	50
8.10.6	Commutators and sliprings, open or enclosed and their brushes and brushgear	50
9	Other performance and tests	52

9.1	Routine tests.....	52
9.2	Withstand voltage test.....	53
9.3	Occasional excess current	55
9.3.1	General	55
9.3.2	Generators	56
9.3.3	Motors (except commutator motors and permanent magnet motors)	56
9.3.4	Commutator machines	56
9.4	Momentary excess torque for motors	56
9.4.1	Polyphase induction motors and d.c. motors	56
9.4.2	Polyphase synchronous motors	57
9.4.3	Other motors	57
9.5	Pull-up torque	57
9.6	Safe operating speed of cage induction motors	57
9.7	Overspeed	58
9.8	Short-circuit current for synchronous machines.....	59
9.9	Short-circuit withstand test for synchronous machines	59
9.10	Commutation test for commutator machines.....	60
9.11	Total harmonic distortion (<i>THD</i>) for synchronous machines.....	60
9.11.1	General	60
9.11.2	Limits	60
9.11.3	Tests	60
10	Rating plates	60
10.1	General.....	60
10.2	Marking.....	61
11	Miscellaneous requirements	62
11.1	Protective earthing of machines	62
11.2	Shaft-end key(s)	64
12	Tolerances	64
12.1	General.....	64
12.2	Tolerances on values of quantities	64
13	Electromagnetic compatibility (EMC)	66
13.1	General.....	66
13.2	Immunity.....	66
13.2.1	Machines not incorporating electronic circuits.....	66
13.2.2	Machines incorporating electronic circuits.....	67
13.3	Emission.....	67
13.4	Immunity tests	67
13.5	Emission measurements	67
14	Safety.....	67
	Annex A (informative) Guidance for the application of duty type S10 and for establishing the value of relative thermal life expectancy <i>TL</i>	69
	Annex B (informative) Electromagnetic compatibility (EMC) limits	70
	Bibliography.....	71
	Figure 1 – Continuous running duty – Duty type S1.....	16
	Figure 2 – Short-time duty – Duty type S2.....	17
	Figure 3 – Intermittent periodic duty – Duty type S3.....	18
	Figure 4 – Intermittent periodic duty with starting – Duty type S4	19

Figure 5 – Intermittent periodic duty with electric braking – Duty type S5	20
Figure 6 – Continuous operation periodic duty – Duty type S6	21
Figure 7 – Continuous operation periodic duty with electric braking – Duty type S7	22
Figure 8 – Continuous operation periodic duty with related load/speed changes – Duty type S8	23
Figure 9 – Duty with non-periodic load and speed variations – Duty type S9	24
Figure 10 – Duty with discrete constant loads – Duty type S10	26
Figure 11 – Voltage and frequency limits for generators.....	36
Figure 12 – Voltage and frequency limits for motors.....	36
Table 1 – Preferred voltage ratings	29
Table 2 – Unbalanced operating conditions for synchronous machines	33
Table 3 – CCC symbol designation.....	34
Table 4 – Primary functions of machines.....	35
Table 5 – Reference coolant (see also Table 11)	37
Table 6 – Time interval	41
Table 7 – Measuring points.....	44
Table 8 – Limits of temperature rise of windings indirectly cooled by air.....	46
Table 9 – Limits of temperature rise of windings indirectly cooled by hydrogen	47
Table 10 – Adjustments to limits of temperature rise at the operating site of indirect cooled windings to take account of non-reference operating conditions and ratings	48
Table 11 – Assumed maximum ambient temperature	49
Table 12 – Adjusted limits of temperature rise at the test site ($\Delta\theta_T$) for windings indirectly cooled by air to take account of test site operating conditions	50
Table 13 – Limits of temperature of directly cooled windings and their coolants	51
Table 14 – Adjustments to limits of temperature at the operating site for windings directly cooled by air or hydrogen to take account of non-reference operating conditions and ratings	51
Table 15 – Adjusted limits of temperature at the test site θ_T for windings directly cooled by air to take account of test site operating conditions	52
Table 16 – Minimum routine tests for machines assembled and tested in the factory of the manufacturer.....	53
Table 17 – Withstand voltage tests	54
Table 18 – Maximum safe operating speed (min^{-1}) of three-phase single-speed cage induction motors for voltages up to and including 1 000 V.....	58
Table 19 – Overspeeds	59
Table 20 – Cross-sectional areas of earthing conductors	64
Table 21 – Schedule of tolerances on values of quantities	65
Table B.1 – Electromagnetic emission limits per CISPR 11 Class B Group 1.....	70
Table B.2 – Electromagnetic emission limits per CISPR 11 Class A Group 1.....	70

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

Part 1: Rating and performance

FOREWORD

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International Standard IEC 60034-1 has been prepared by IEC technical committee 2: Rotating machinery.

This thirteenth edition cancels and replaces the twelfth edition published in 2010. It constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

Clause or subclause	Change
3.25	Shorter time to thermal equilibrium
5.5.2	Note on P-Q capability diagram for synchronous generators
6.4	Clarification added that other conditions can be agreed on
6.6	Clarification added that standstill is explicitly included; note added
7.1	Clarification on bus transfer or fast reclosing Capability to withstand impulse voltages in case of machines connected to a U converter
7.2.4	New Table 3 for identification code
7.3	Table 4 corrected to reflect current scope of IEC 60034-3
7.5	Voltage withstand level for machines connected to a converter
8.3.4	Measurement of ambient air temperature in case of open machines
8.6.3.4	Notes on ETD in the end windings of high voltage machines and on ETD use to monitor strand blockage in case of directly liquid cooled windings
8.10	Clarification on temperature limit Clarification on temperature difference between method R and method ETD Clarification that temperature limit acc. to method R must always be kept Note on measured temperature limits between methods R and ETD Table 8 and Table 11 extended incorporating thermal class 200 (N) Line 4c) of Table 8 restricted to field windings of DC machines Temperature limits in Table 8 changed according to 2/1737/DC and the comments received on this document Physically correct formula in Table 10, item 1b
9.1	Clarification on machines that are subject to routine testing
9.2	Separate withstand voltage testing of phases Clarification on frequency and time instant for withstand voltage test Note on leakage current during withstand voltage test Note referring to IEC 60027
10.2	Information on IVIC on rating plate or in documentation Clarification added to item f IC code and design letter for locked-rotor apparent power on rating plate
11.1	Clarification on cross-sectional area of earthing conductor for generators Note on grounding for small machines added
12.2	Tolerance on field current of synchronous machines added Tolerance on power factor applies also for PM synchronous machines operated directly at the lines Contradiction between tolerances on efficiency and on losses clarified
13.1	Changed as proposed by ACEC Note for large generators added
13.3	Changed as proposed by ACEC
13.5	Changed as proposed by ACEC
Annex B	DC power supply added

The text of this standard is based on the following documents:

FDIS	Report on voting
2/1857/FDIS	2/1863/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60034 series, published under the general title *Rotating electrical machines*, can be found on the IEC website.

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ROTATING ELECTRICAL MACHINES –

Part 1: Rating and performance

1 Scope

This part of IEC 60034 is applicable to all rotating electrical machines except those covered by other IEC standards, for example, IEC 60349.

Machines within the scope of this document may also be subject to superseding, modifying or additional requirements in other standards, for example, IEC 60079 and IEC 60092.

NOTE If particular clauses of this document are modified to meet special applications, for example machines subject to radioactivity or machines for aerospace, all other clauses apply insofar as they are compatible.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60027-1, *Letter symbols to be used in electrical technology – Part 1: General*

IEC 60027-4, *Letter symbols to be used in electrical technology – Part 4: Rotating electric machines*

IEC 60034-2 (all parts), *Rotating electrical machines – Part 2: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)*

IEC 60034-3, *Rotating electrical machines – Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines*

IEC 60034-5, *Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification*

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

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

IEC 60034-12:2016, *Rotating electrical machines – Part 12: Starting performance of single-speed three-phase cage induction motors*

IEC 60034-15, *Rotating electrical machines – Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines*

IEC 60034-18 (all parts), *Rotating electrical machines – Part 18: Functional evaluation of insulation systems*

IEC 60034-18-41, *Rotating electrical machines – Part 18-41: Partial discharge free electrical insulation systems (Type I) used in rotating electrical machines fed from voltage converters – Qualification and quality control tests*