SLOVENSKI STANDARD
SIST EN 60034-6:1999

01-april-1999

Rotating electrical machines - Part 6: Methods of cooling (IC Code) (IEC 60034-6:1991)

Rotating electrical machines -- Part 6: Methods of cooling (IC Code)

Drehende elektrische Maschinen -- Teil 6: Einleitung der Külverfahren (IC-Code)

Machines électriques tournantes -- Partie 6: Modes de refroidissement (Code IC)

Ta slovenski standard je istoveten z: **EN 60034-6:1993**

ICS:

29.160.01	Rotacijski stroji na splošno	Rotating machinery in general

SIST EN 60034-6:1999 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60034-6

November 1993

UDC 621.313-71

Supersedes HD 53.6 S1:1977

Descriptors: Rotating electrical machines, cooling unit, cooling, coolant circuit, classification, designation, code

English version

Rotating electrical machines
Part 6: Methods of cooling (IC Code)
(IEC 34-6:1991)

Machines électriques tournantes
Partie 6: Modes de refroidissement
(Code IC)
(CEI 34-6:1991)

Umlaufende elektrische Maschinen
Teil 6: Einteilung der Kühlmethoden
(IC-Code)
(IEC 34-6:1991)

This European Standard was approved by CENELEC on 1993-09-22. CENELEC members are bound to comply with the requirements of 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.

This European Standard exists in three official versions (English, French and German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

At the request of CENELEC Technical Committee TC 2, Rotating machinery, the text of the International Standard IEC 34-6:1991 was submitted to the CENELEC formal vote for acceptance as a Harmonization Document.

The draft was approved by CENELEC as HD 53.6 S2 on 1993-07-06 and was immediately submitted to a new vote for acceptance as a European Standard.

The document, with some editorial modifications prepared by TC 2, was approved by CENELEC as EN 60034-6 on 1993-09-22.

This European Standard supersedes HD 53.6 S1:1977.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1994-09-01
- latest date of withdrawal of conflicting standards	(dow)	1994-09-01

For products which have complied with HD 53.6 S1:1977 before 1994-09-01 as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1999-09-01.

Endorsement notice

The text of the International Standard IEC 34-6:1991 was approved by CENELEC as a European Standard without any modification.

Editorial modification to the English version of IEC 34-6:

Page 21, subclause 3.4, replace the example by:

Example: Generator IC81W / Exciter IC75W ..... (simplified)
Generator IC8A1W7 / Exciter IC7A5W7 ..... (complete)

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
34-6

Deuxième édition
Second edition
1991-10

Machines électriques tournantes

Partie 6:
Modes de refroidissement (Code IC)

Rotating electrical machines

Part 6:
Methods of cooling (IC Code)

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

IEC
Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE R

Pour prix, voir catalogue en vigueur
For price, see current catalogue

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES

Part 6: Methods of cooling (IC Code)

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This part of International Standard IEC 34 has been prepared by Sub-Committee 2H: Degrees of protection, methods of cooling and mounting arrangements, of IEC Technical Committee No. 2: Rotating machinery.

It constitutes the second edition of IEC 34-6 and replaces the first edition, issued in 1969.

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

DIS	Report on Voting
2H(CO)23	2H(CO)25

Full information on the voting for the approval of this part can be found in the Voting Report indicated in the above table.

This part belongs to a series of publications dealing with rotating electrical machinery, the other parts being:

Part 1: Rating and performance, issued as IEC 34-1.

Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles), issued as IEC 34-2.

Part 3: Specific requirements for turbine-type synchronous machines, issued as IEC 34-3.

Part 4: Methods for determining synchronous machine quantities from tests, issued as IEC 34-4.

Part 5: Classification of degrees of protection provided by enclosures of rotating electrical machines (IP code), issued as IEC 34-5.

Part 7: Symbols for types of construction and mounting arrangements of rotating electrical machinery, issued as IEC 34-7.

Part 8: Terminal markings and direction of rotation of rotating machines, issued as IEC 34-8.

Part 9: Noise limits, issued as IEC 34-9.

Part 10: Conventions for description of synchronous machines, issued as IEC 34-10.

Part 11: Built-in thermal protection. Chapter 1: Rules for protection of rotating electrical machines, issued as IEC 34-11.

Part 11-2: Built-in thermal protection. Chapter 2: Thermal detectors and control units used in thermal protection systems, issued as IEC 34-11-2.

Part 11-3: Built-in thermal protection. Chapter 3: General rules for thermal protectors used in thermal protection systems, issued as IEC 34-11-3.

Part 12: Starting performance of single-speed three-phase cage induction motors for voltages up to and including 660 V, issued as IEC 34-12.

Part 13: Specification for mill auxiliary motors, issued as IEC 34-13.

Part 14: Mechanical vibration of certain machines with shaft heights, 56 mm and higher - Measurement, evaluation and limits of the vibration severity, issued as IEC 34-14.

Part 15: Impulse voltage withstand levels of rotating a.c. machines with form-wound stator coils, issued as IEC 34-15.

Part 16: Excitation systems for synchronous machines.

Part 16-1: Excitation systems for synchronous machines. Chapter 1: Definitions.

Part 16-2: Excitation systems for synchronous machines. Chapter 2: Models for system studies, issued as IEC 34-16-2.

Annexes A and B are for information only.

INTRODUCTION

In this edition of IEC 34-6, the sequence of numerals and letters following the Code letters IC is changed.

a) New designation system:

i) A numeral is placed first, indicating the cooling circuit arrangement, being valid for both primary and secondary circuits.

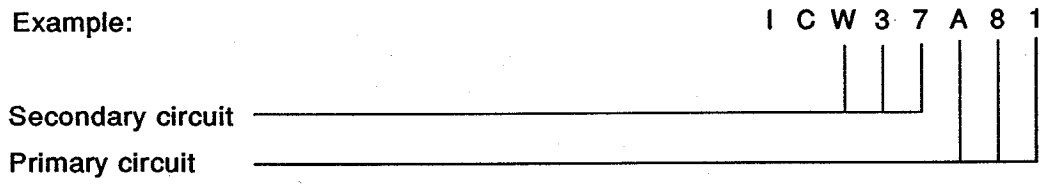
ii) Each circuit is designated by a letter, indicating the coolant, followed by a numeral indicating the method of movement of the coolant.

iii) The letter and numeral for the primary coolant are placed first, then those for the secondary coolant.

b) Previous designation system:

i) The secondary cooling circuit was designated first, then the primary circuit.

ii) Each circuit was designated by a letter, indicating the coolant followed by a numeral, indicating the circuit arrangement, and then another numeral indicating the method of movement of the coolant.



This edition also provides for the designation to be simplified, where possible, by the omission of the letter A and of the numeral 7 for movement of secondary coolant under certain conditions.

In addition, new letters F, S, X and Y are provided and defined; the previous letter E, indicating cooling by evaporation of a liquid, has been omitted.

With the introduction of the new designation system, clarifications are required to definitions of open and closed circuit cooling and of dependent and independent components (see clause 2).

The mode of connecting the supply and the delivery of the appropriate control equipment for circulation components, which were specified in the first edition are no longer taken into account in this second edition.

Where the two systems differ, they can be distinguished both in the complete and the simplified code.

Examples of cooling according to the first and the second editions are compared in annex B.

ROTATING ELECTRICAL MACHINES

Part 6: Methods of cooling (IC Code)

1 Scope

This part of IEC 34 identifies the circuit arrangements and the methods of movement of the coolant in rotating electrical machines, classifies the methods of cooling and gives a designation system for them.

The designation of the method of cooling consists of the letters "IC", followed by numerals and letters representing the circuit arrangement, the coolant and the method of movement of the coolant.

A complete designation and a simplified designation are defined. The complete designation system is intended for use mainly when the simplified system is not applicable.

The complete designations, as well as the simplified designations, are illustrated in the tables of annex A for some of the most frequently used types of rotating machines, together with sketches of particular examples.

2 Definitions

For the purpose of this part, the following definitions apply.

2.1 **cooling:** A procedure by means of which heat resulting from losses occurring in a machine is given up to a primary coolant which may be continuously replaced or may itself be cooled by a secondary coolant in a heat exchanger.

2.2 **coolant:** A medium, liquid or gas, by means of which heat is transferred.

2.3 **primary coolant:** A medium, liquid or gas which, being at a lower temperature than a part of a machine and in contact with it, removes heat from that part.

NOTE - A machine may have more than one primary coolant.

2.4 **secondary coolant:** A medium, liquid or gas which, being at a lower temperature than the primary coolant, removes the heat given up by this primary coolant by means of a heat exchanger or through the external surface of the machine.

NOTE - Each primary coolant in a machine may have its own secondary coolant.