IS 6362 (1995): Designation of Methods of Cooling of Rotating Electrical Machines [ETD 15: Rotating Machinery]

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(Reaffirmed 2002)

भारतीय मानक

विद्युतीय घूर्णी मशीनों के शीतल की पदनाम पद्धतियां

(पहला पुनरीक्षण)

Indian Standard

DESIGNATION OF METHODS OF COOLING OF ROTATING ELECTRICAL MACHINES

(First Revision)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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NATIONAL FOREWORD

This Indian Standard which is identical with IEC Pub 34-6 (1991) issued by the International Electrotechnical Commission (IEC), was adopted by the Bureau of Indian Standards on the recommendation of the Rotating Machinery Sectional Committee (ET 15) and approval of the Electrotechnical Division Council.

The text of IEC Standard has been approved as suitable for publication as Indian Standard without deviations.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalency*
IEC Pub 34-1 (1983)	IS 325 : 1978 Three phase induction motors (*fourth revision*)	Not fully equivalent
	IS 996 : 1979 Single phase small ac universal electric motors	
	IS 7538 : 1975 Three-phase squirrel cage induction motors for centrifugal pumps for agricultural applications	
IEC Pub 34-3 (1988)	IS 5422 : 1969 Turbine type generators	
IEC Pub 34-4 (1985)	IS 7306 : 1974 Method for determining synchronous machine quantities from tests	
IEC Pub 34-5 (1991)	IS 4691 : 1985 Degree of protection provided by enclosure for rotating electrical machinery	Technically equivalent
IEC Pub 34-8 (1972)	IS 4728 : 1975 Terminal markings and direction of rotation of rotating machines	Technically equivalent
IEC Pub 34-9 (1990)	IS 12065 : 1987 Permissible limits of noise level for rotating electrical machines	Not fully equivalent
IEC Pub 34-14 (1982)	IS 12075 : 1986 Mechanical vibration of certain machines with shaft heights, 56 mm and higher — Measurement, evaluation and limits of the vibration severity	Technically equivalent
IEC Pub 34-15 (1990)	IS 14222 : 1995 Impulse voltage withstand levels of rotating a.c. machines with form-wound stator coils	Identical

The concerned technical committee has reviewed the provisions of following IEC Publications referred to in this adopted standard and has decided that these are acceptable for use in conjunction with this standard:

IEC Pub 34-2 (1972)
IEC Pub 34-7 (1972)
IEC Pub 34-10 (1975)
IEC Pub 34-12 (1980)
IEC Pub 34-13 (1980)
IEC Pub 34-16

(Continued on third cover)

IS 6362 : 1995
IEC Pub 34-6 : 1991

Indian Standard

DESIGNATION OF METHODS OF COOLING OF ROTATING ELECTRICAL MACHINES

(First Revision)

INTRODUCTION

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

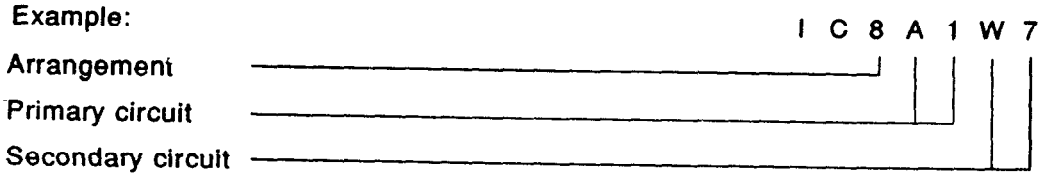
a) New designation system:

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.

Example:



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.

Example:

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.

2.5 **final coolant:** The last coolant to which the heat is transferred.

NOTE - In some machines the final coolant is also the primary coolant.

2.6 **surrounding medium:** The medium, liquid or gas, in the environment surrounding the machine.

NOTE - The coolant may be drawn from and/or be discharged to this environment.

2.7 **remote medium:** A medium, liquid or gas, in an environment remote from the machine and from which a coolant is drawn and/or to which it is discharged through inlet and/or outlet pipe or duct, or in which a separate heat exchanger may be installed.

2.8 **direct cooled winding (inner cooled winding):** A winding in which the coolant flows through hollow conductors, tubes or channels which form an integral part of the winding inside the main insulation.

2.9 **indirect cooled winding:** A winding cooled by any method other than that of 2.8.

NOTE - In all cases when "indirect" or "direct" is not stated, an indirect cooled winding is implied.

2.10 **heat exchanger:** A component intended to transfer heat from one coolant to another while keeping the two coolants separate.

2.11 **pipe, duct:** A passage provided to guide the coolant.

NOTE - The term duct is generally used when a channel passes directly through the floor on which the machine is mounted. The term pipe is used in all other cases where a coolant is guided outside the machine or heat exchanger.

2.12 **open circuit:** A circuit in which the final coolant is drawn directly from the surrounding medium or is drawn from a remote medium, passes over or through the machine or through a heat exchanger, and then returns directly to the surrounding medium or is discharged to a remote medium.

NOTE - The final coolant will always flow in an open circuit (see also 2.13).

2.13 **closed circuit:** A circuit in which a coolant is circulated in a closed loop in or through the machine and possibly through a heat exchanger, while heat is transferred from this coolant to the next coolant through the surface of the machine or in the heat exchanger.

NOTES

1 A general cooling system of a machine may consist of one or more successively acting closed circuits and always a final open circuit. Each of the primary, secondary and/or final coolants may have its own appropriate circuit.

2 The different kinds of circuits are stated in clause 4 and in the tables of annex A.

2.14 **piped or ducted circuit:** A circuit in which the coolant is guided either by inlet or outlet pipe or duct, or by both inlet and outlet pipe or duct, these serving as separators between the coolant and the surrounding medium.

NOTE - The circuit may be an open or a closed circuit (see 2.12 and 2.13).

2.15 **stand-by or emergency cooling system:** A cooling system which is provided in addition to the normal cooling system and which is intended to be used when the normal cooling system is not available.

2.16 **integral component:** A component in the coolant circuit which is built into the machine and which can only be replaced by partially dismantling the machine.

2.17 **machine-mounted component:** A component in the coolant circuit which is mounted on the machine and forms part of it but which can be replaced without disturbing the main machine.

2.18 **separate component:** A component in the coolant circuit which is associated with a machine but which is not mounted on or integral with the machine.

NOTE - This component may be located in the surrounding or a remote medium.

2.19 **dependent circulation component:** A component in the coolant circuit which for its operation is dependent on (linked with) the rotational speed of the rotor of the main machine, e.g. fan or pump on the shaft of the main machine or fan unit or pump unit driven by the main machine.

2.20 **independent circulation component:** A component in the coolant circuit which for its operation is independent of (not linked with) the rotational speed of the rotor of the main machine, e.g. design with its own drive motor.

3 Designation system

The designation used for the method of cooling of a machine consists of letters and numerals as stated below:

3.1 *Arrangement of the IC Code*

The designation system is made up as follows, using the examples IC8A1W7 for complete designation and IC81W for simplified designation:

Complete designation	IC	8	A	1	W	7
Simplified designation	IC	8		1	W	

3.1.1 CODE LETTERS
(International Cooling)

3.1.2 CIRCUIT ARRANGEMENT
designated by a characteristic numeral
in accordance with clause 4

3.1.3 PRIMARY COOLANT
designated by a characteristic letter
in accordance with clause 5
Omitted for simplified designation
if it is A for air

3.1.4 METHOD OF MOVEMENT OF PRIMARY COOLANT
(higher temperature)
designated by a characteristic numeral
in accordance with clause 6

3.1.5 SECONDARY COOLANT
if applicable, designated by a characteristic
letter in accordance with clause 5
Omitted for simplified designation
if it is A for air

3.1.6 METHOD OF MOVEMENT OF SECONDARY COOLANT
(lower temperature)
if applicable, designated by a characteristic
numeral in accordance with clause 6
Omitted in case of the simplified designation
if it is 7 with water (W) for secondary coolant.

NOTE - The following rule may be applied to distinguish between complete and simplified designations:

a complete designation can be recognized by the presence (after the letters IC) of three or five numerals and letters in the regular sequence = numeral, letter, numeral (letter, numeral).
Examples: IC3A1, IC4A1A1 or IC7A1W7;

a simplified designation has two or three consecutive numerals, or a letter in the final position.
Examples: IC31, IC411 or IC71W.

3.2 *Application of designations*

The simplified designation should preferably be used, i.e. the complete designation system is intended for use mainly when the simplified system is not applicable.

3.3 *Designation of same circuit arrangements for different parts of a machine*

Different coolants or methods of movement may be used in different parts of a machine. These shall be designated by stating the designations as appropriate after each part of the machine.

Example for different circuits in rotor and stator:
Rotor IC7H1W Stator IC7W5W ..... (simplified)
Rotor IC7H1W7 Stator IC7W5W7 ..... (complete)

Example for different circuits in a machine:
Generator IC7H1W Exciter IC75W ..... (simplified)
Generator IC7H1W7 Exciter IC7A5W7 ..... (complete)

3.4 *Designation of different circuit arrangements for different parts of a machine*

Different circuit arrangements may be used on different parts of a machine. These shall be designated by stating the designations as appropriate after each part of the machine, separated by a stroke.

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

3.5 *Designation of direct cooled winding*

In the case of machines with direct cooled (inner cooled) windings, the part of the designation related to this circuit shall be put between brackets.

Example: Rotor IC7H1W Stator IC7(W5)W ..... (simplified)
Rotor IC7H1W7 Stator IC7(W5)W7 ..... (complete)

3.6 *Designation of stand-by or emergency cooling conditions*

Different circuit arrangements may be used depending on stand-by or emergency cooling conditions. These shall be designated by the designation for the normal method of cooling, followed by the designation of the special cooling system enclosed in brackets, including the words "Emergency" or "Stand-by" and the code letters IC.

Example: IC71W (Emergency IC01) ..... (simplified)
IC7A1W7 (Emergency IC0A1) ..... (complete)

3.7 *Combined designations*

When two or more of the conditions of 3.3 to 3.6 are combined, the appropriate designations described above can be applied together.

3.8 *Replacement of characteristic numerals*

When a characteristic numeral has not yet been determined or is not required to be specified for certain application, the omitted numeral shall be replaced by the letter "X".

Examples: IC3X, IC4XX.

3.9 *Examples of designations and sketches*

In annex A, the different designations, together with appropriate sketches, are given for some of the most commonly used types of rotating machines.

4 Characteristic numeral for circuit arrangement

The characteristic numeral following the basic symbol "IC" designates the circuit arrangement (see 3.1.2) for circulating the coolant(s) and for removing heat from the machine in accordance with table 1.

Table 1 - Circuit arrangement

Characteristic numeral	Brief description	Definition
0 (see note 1)*	Free circulation	The coolant is freely drawn directly from the surrounding medium, cools the machine, and then freely returns directly to the surrounding medium (open circuit)
1 (see note 1)	Inlet pipe or inlet duct circulated	The coolant is drawn from a medium remote from the machine, is guided to the machine through an inlet pipe or duct, passes through the machine and returns directly to the surrounding medium (open circuit)
2 (see note 1)	Outlet pipe or outlet duct circulated	The coolant is drawn directly from the surrounding medium, passes through the machine and is then discharged from the machine through an outlet pipe or duct to a medium remote from the machine (open circuit)
3 (see note 1)	Inlet and outlet pipe or duct circulated	The coolant is drawn from a medium remote from the machine, is guided to the machine through an inlet pipe or duct, passes through the machine and is then discharged from the machine through an outlet pipe or duct to a medium remote from the machine (open circuit)
4	Frame surface cooled	The primary coolant is circulated in a closed circuit in the machine and gives its heat through the external surface of the machine (in addition to the heat transfer via the stator core and other heat conducting parts) to the final coolant which is the surrounding medium. The surface may be plain or ribbed, with or without an outer shell to improve the heat transfer
5 (see note 2)	Integral heat exchanger (using surrounding medium)	The primary coolant is circulated in a closed circuit and gives its heat via a heat exchanger, which is built into and forms an integral part of the machine, to the final coolant which is the surrounding medium
6 (see note 2)	Machine-mounted heat exchanger (using surrounding medium)	The primary coolant is circulated in a closed circuit and gives its heat via a heat exchanger, which is mounted directly on the machine, to the final coolant which is the surrounding medium
7 (see note 2)	Integral heat exchanger (using remote medium)	The primary coolant is circulated in a closed circuit and gives its heat via a heat exchanger, which is built into and forms an integral part of the machine, to the secondary coolant which is the remote medium
8 (see note 2)	Machine-mounted heat exchanger (using remote medium)	The primary coolant is circulated in a closed circuit and gives its heat via a heat exchanger, which is mounted directly on the machine, to the secondary coolant which is the remote medium
9 (see notes 2 and 3)	Separate heat exchanger (using surrounding or remote medium)	The primary coolant is circulated in a closed circuit and gives its heat via a heat exchanger, which is separate from the machine, to the secondary coolant which is either the surrounding or the remote medium

* See notes on page 25.

NOTES

1 Filters or labyrinths for separating dust, suppressing noise, etc., may be mounted in the frame or ducts.
Characteristic numerals 0 to 3 also apply to machines where the cooling medium is drawn from the surrounding medium through a heat exchanger in order to provide cooler medium than the surrounding medium, or blown out through a heat exchanger to keep the ambient temperature lower.

2 The nature of the heat exchanger is not specified (ribbed or plain tubes, etc.).

3 A separate heat exchanger may be installed beside the machine or in a location remote from the machine. A gaseous secondary coolant may be the surrounding medium or a remote medium (see also annex A, table A.3).

5 Characteristic letter for coolant

5.1 The coolant (see 3.1.3 and 3.1.5) is designated by one of the characteristic letters in accordance with table 2.

Table 2 - Coolant

Characteristic letter	Coolant
A (see 5.2)	Air
F	Freon
H	Hydrogen
N	Nitrogen
C	Carbon dioxide
W	Water
U	Oil
S (see 5.3)	Any other coolant
Y (see 5.4)	Coolant not yet selected

5.2 When the single coolant is air or when in case of two coolants either one or both are air, these letter(s) "A" stating the coolant are omitted in the simplified designation.

5.3 For the characteristic letter "S", the coolant shall be identified elsewhere, e.g. in the technical or the commercial documentation.

Example: IC3S7, "S" being identified in the documentation.

5.4 When the coolant is finally selected, the temporarily used letter "Y" shall be replaced by the appropriate final characteristic letter.

6 Characteristic numeral for method of movement

The characteristic numeral following (in the complete designation) each of the letters stating the coolant designates the method of movement of this appropriate coolant (see 3.1.4 and 3.1.6) in accordance with table 3.

Table 3 - Method of movement

Charac-teristic numeral	Brief description	Definition
0	Free convection	The coolant is moved by temperature differences. The fanning action of the rotor is negligible
1	Self-circulation	The coolant is moved dependent on the rotational speed of the main machine, either by the action of the rotor alone or by means of a component designed for this purpose and mounted directly on the rotor of the main machine, or by a fan or pump unit mechanically driven by the rotor or the main machine
2, 3, 4		Reserved for future use
5 (see note)	Integral independent component	The coolant is moved by an integral component, the power of which is obtained in such a way that it is independent of the rotational speed of the main machine, e.g. an internal fan or pump unit driven by its own electric motor
6 (see note)	Machine-mounted independent component	The coolant is moved by a component mounted on the machine, the power of which is obtained in such a way that it is independent of the rotational speed of the main machine, e.g. a machine-mounted fan unit or pump unit driven by its own electric motor
7 (see note	Separate and independent component or coolant system pressure	The coolant is moved by a separate electrical or mechanical component not mounted on the machine and independent of it or is produced by the pressure in the coolant circulating system, e.g. supplied from a water distribution system, or a gas main under pressure
8 (see note)	Relative displacement	The movement of the coolant results from relative movement between the machine and the coolant, either by moving the machine through the coolant or by flow of the surrounding coolant (air or liquid)
9	All other components	The movement of the coolant is produced by a method other than defined above and shall be fully described

NOTE - The use of an independent component as a principal source for movement does not exclude the fanning action of the rotor or the existence of a supplementary fan mounted directly on the rotor of the main machine.

Annex A
(informative)

Commonly used designations

This annex illustrates the simplified and complete designations for some of the most commonly used types of rotating electrical machines.

Circuit arrangement — *Table*

Characteristic numerals 0, 1, 2, 3 (open circuits using surrounding medium or remote medium) — A.1

Characteristic numerals 4, 5, 6 (primary circuit closed, secondary circuit open using surrounding medium) — A.2

Characteristic numerals 7, 8, 9 (primary circuit closed, secondary circuit open using remote or surrounding medium) — A.3

General information on the tables

In the tables A.1, A.2 and A.3 the columns show the characteristic numerals for circuit arrangements and the rows show the characteristic numerals for the method of movement of the coolant.

The sketches show examples with cooling air flowing from non-drive end to drive-end. The air flow may be in the opposite direction, or the air inlet may be at both ends with discharge at the centre, depending on the design of the machine, the arrangement and number of fans, fan units, inlet and outlet pipes or ducts.

The top line of each box gives the simplified designation on the left and the complete designation on the right with air and/or water as coolant (see 3.2 and 5.1).

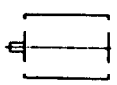
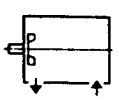
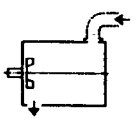
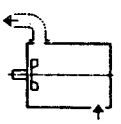
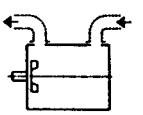
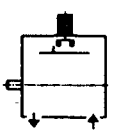
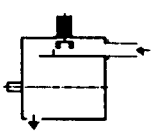
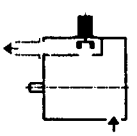
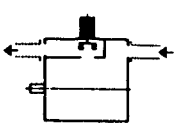
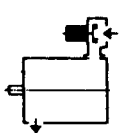
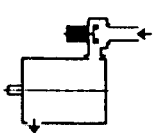
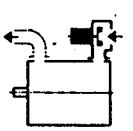
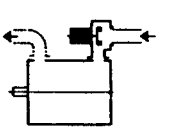
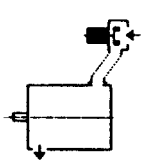
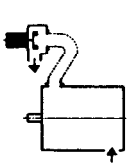
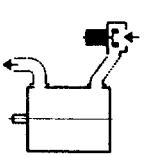
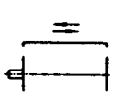
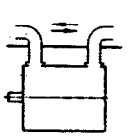
Symbols used in sketches

Integral or machine-mounted dependent fan

Independent circulation component

Duct or pipe, not part of the machine

Table A.1 - Examples of open circuits using surrounding or remote medium*

Characteristic numeral for circuit arrangement (see clause 4)				Characteristic numeral for method of movement of coolant (see clause 6)
0 Free circulation (using surrounding medium)	**1** Inlet pipe or inlet duct circulated (using remote medium)	**2** Outlet pipe or outlet duct circulated (using surrounding medium)	**3** Inlet and outlet pipe or duct circulated (using remote medium)	
IC00 IC0A0 				**0** Free convection
IC01 IC0A1 	IC11 IC1A1 	IC21 IC2A1 	IC31 IC3A1 	**1** Self-circulation
IC05 IC0A5 	IC15 IC1A5 	IC25 IC2A5 	IC35 IC3A5 	**5** Circulation by integral independent component
IC06 IC0A6 	IC16 IC1A6 	IC26 IC2A6 	IC36 IC3A6 	**6** Circulation by machine-mounted independent component
	IC17 IC1A7 	IC27 IC2A7 	IC37 IC3A7 	**7** Circulation by separate and independent component or by coolant pressure system
IC08 IC0A8 			IC38 IC3A8 	**8** Circulation by relative displacement

* For arrangement of the IC Code, see 3.1.

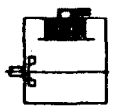
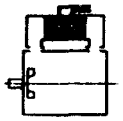
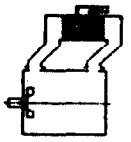
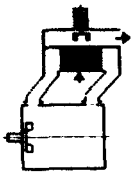
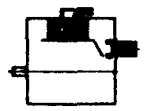
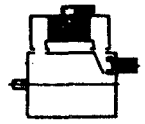
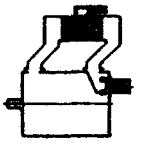
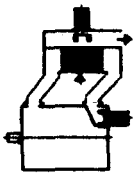
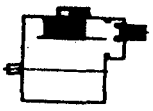
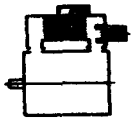
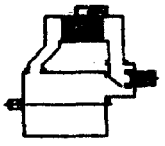
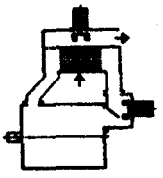
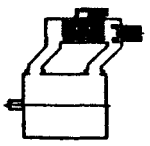
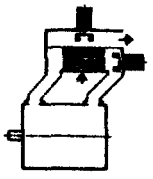
Table A.2 - Examples of primary circuits closed, secondary circuits open using surrounding medium*

Characteristic numeral for circuit arrangement (see clause 4)			Characteristic numeral for method of movement (see clause 6)	
4 Frame surface cooled (using surrounding medium)	5 Integral heat exchanger (using surrounding medium)	6 Machine-mounted heat exchanger (using surrounding medium)	of primary coolant (see note)	of secondary coolant
IC410 IC4A1A0	IC510 IC5A1A0	IC610 IC6A1A0		0 Free convection
IC411 IC4A1A1	IC511 IC5A1A1	IC611 IC6A1A1		1 Self-circulation
				5 Circulation by integral independent component
IC416 IC4A1A6	IC516 IC5A1A6	IC616 IC6A1A6		6 Circulation by machine-mounted independent component
				7 Circulation by separate and independent component or by coolant pressure system
IC418 IC4A1A8	IC518 IC5A1A8	IC618 IC6A1A8		8 Circulation by relative displacement

* For arrangement of the IC Code, see 3.1.

NOTE - The shown examples in this table are related to the movement of the secondary coolant. The characteristic numeral for the movement of the primary coolant in this table is assumed to be "1". Obviously other designs not shown can also be specified by means of the IC Code, e.g. design with machine-mounted independent fan unit for primary coolant: IC666 (IC6A6A6) instead of IC616 (IC6A1A6).

Table A.3 - Examples of primary circuits closed, secondary circuits open using remote or surrounding medium*

Characteristic numeral for circuit arrangement (see clause 4)				Characteristic numeral for method of movement (see clause 6)	
7	8	9			
Integral heat exchanger (using remote medium)	Machine-mounted heat exchanger (using remote medium)	Separate heat exchanger (secondary coolant: liquid, remote medium)	Separate heat exchanger (secondary coolant: gas, remote medium or surrounding medium)	of primary coolant	of secondary coolant (see note)
IC70W IC7A0W7 				0 Free convection	
IC71W IC7A1W7 	IC81W IC8A1W7 	IC91W IC9A1W7 	IC917 IC9A1A7 	1 Self-circulation	
IC75W IC7A5W7 	IC85W IC8A5W7 	IC95W IC9A5W7 	IC957 IC9A5A7 	5 Circulation by integral independent component	
IC76W IC7A6W7 	IC86W IC8A6W7 	IC96W IC9A6W7 	IC967 IC9A6A7 	6 Circulation by machine-mounted independent component	
		IC97W IC9A7W7 	IC977 IC9A7A7 	7 Circulation by separate and independent component or by coolant pressure system	
				8 Circulation by relative displacement	

* For arrangement of the IC Code, see 9.1.

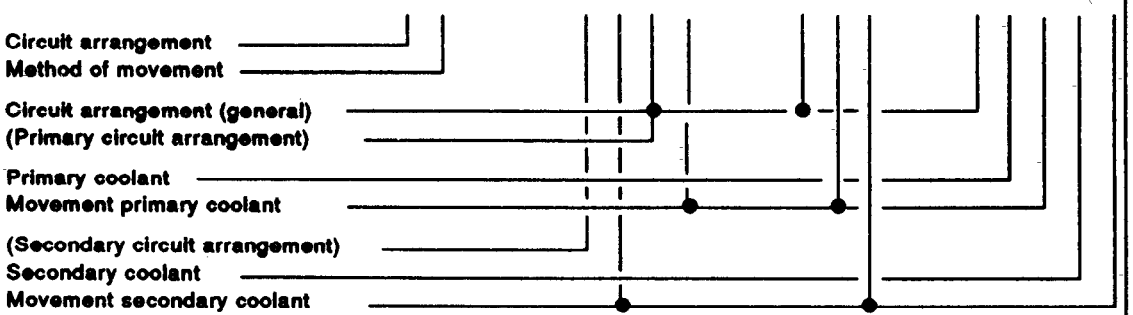
NOTE - The shown examples in this table are related to the movement of the primary coolant. The characteristic numeral for the movement of the secondary coolant is assumed to be "7". Obviously other designs not shown can also be specified by means of the IC Code, e.g. design with machine-mounted independent pump unit for secondary coolant: IC71W6 (IC7A1W6) instead of IC71W (IC7A1W7).

Annex B
(informative)

Comparison of examples from the first and second editions of IEC 34-6

Table B.1 - Comparison of examples shown in first edition of IEC 34-6 with those in second edition

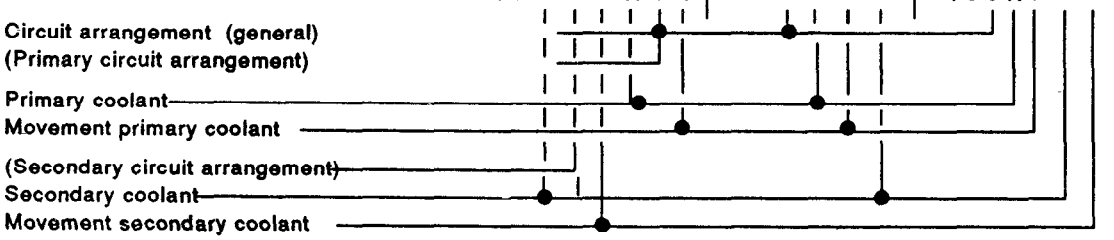
Items	IEC 34-6 first edition		IEC 34-6 second edition	
	Chapter I Table I	Chapter II Appendix A	Tables A.1, A.2, A.3 Simplified	Complete
1	IC 0 0	-	IC 0 0	IC 0 A 0
2	IC 0 1	IC 0 1	IC 0 1	IC 0 A 1
3	-	IC 0 3	*)	*)
4	IC 0 5	-	IC 0 5	IC 0 A 5
5	IC 1 1	IC 1 1	IC 1 1	IC 1 A 1
6	-	IC 1 3	*)	*)
7	IC 1 6	-	IC 1 6	IC 1 A 6
8	IC 1 7	-	IC 1 7	IC 1 A 7
9	IC 2 1	IC 2 1	IC 2 1	IC 2 A 1
10	-	IC 2 6	IC 2 6	IC 2 A 6
11	IC 3 1	-	IC 3 1	IC 3 A 1
12	IC 3 7	IC 3 7	IC 3 7	IC 3 A 7
13	-	IC 0 0 4 1	IC 4 1 0	IC 4 A 1 A 0
14	IC 4 1	IC 0 1 4 1	IC 4 1 1	IC 4 A 1 A 1
15	IC 4 8	-	IC 4 1 8	IC 4 A 1 A 8
16	IC 5 1	IC 0 1 5 1	IC 5 1 1	IC 5 A 1 A 1
17	IC 6 1	-	IC 6 1 1	IC 6 A 1 A 1



*) Characteristic numeral "3" for method of movement is included in characteristic numeral "6" in the second edition.

Table B.2 - Comparison of examples shown in the first edition of IEC 34-6 (Annex A, page 24) with those in the second edition of IEC 34-6

Items	IEC 34-6 First edition	IEC 34-6 second edition	
	Annex A page 24	Simplified	Complete
1	I C W 3 7 A 7 1	I C 7 1 W	I C 7 A 1 W 7
2	I C W 3 7 H 7 1	I C 7 H 1 W	I C 7 H 1 W 7
3	I C W 0 8 U 4 0		I C 4 U 0 W 8
4	I C N 3 7		I C 3 N 7



5

IEC 34-6 (first edition)

The machine coded IC37 Stator (W37) Rotor H71 was incompletely described and wrongly coded. Hence comparison is not possible.

IEC 34-6 (second edition)

The example below of a similar machine is completely described and coded according to the second edition.

Description for "Stator IC7(W5)W7 / Rotor IC6H1A6":

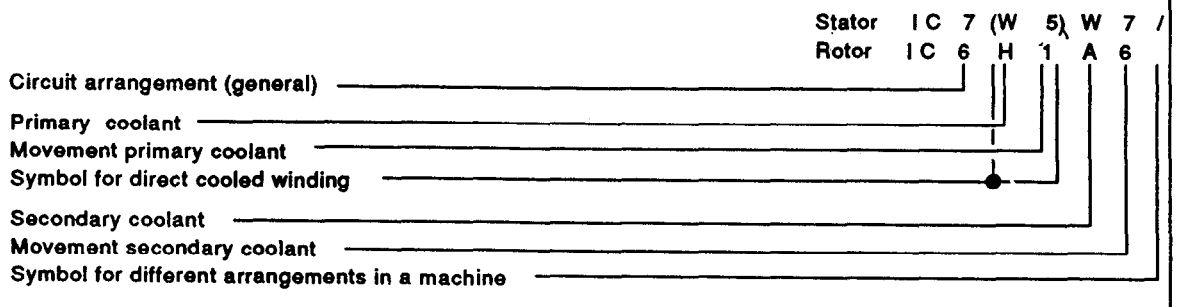
Stator circuit arrangement with integral heat exchanger < Stator IC7 >

- with direct cooled stator winding, primary coolant water moved by integral independent pump < (W5) >,
- secondary coolant water moved e.g. by coolant pressure system < W7 >,

combined with: < / >

Rotor circuit arrangement with machine-mounted heat exchanger, using surrounding medium < Rotor IC6 >,

- primary coolant hydrogen moved by self-circulation < H1 >
- secondary coolant (surrounding medium) moved by machine-mounted independent fan unit < A6 >.



(*Continued from second cover)*

IEC Pub 34-11 (1978)	IEC Pub 34-16-1 (1991)
IEC Pub 34-11-2 (1984)	IEC Pub 34-16-2 (1991)
IEC Pub 34-11-3 (1984)	

Only the English language text given in the International Standard has been retained while adopting it as Indian Standard, and as such the page numbers given here are not the same as in IEC Publication.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.