SLOVENSKI STANDARD
SIST EN 61064:2000

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Acceptance tests for steam turbine speed control systems

Acceptance tests for steam turbine speed control systems

Abnahmeprüfungen für Dampfturbinen-Regelsysteme

Essais de réception des systèmes de régulation de vitesse des turbines à vapeur

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ENGLISH VERSION

Acceptance tests for steam turbine speed control systems
(IEC 1064:1991)

Essais de réception des systèmes de régulation de vitesse des turbines à vapeur
(CEI 1064:1991)

Abnahmeprüfungen für Dampfturbinen-Regelsysteme
(IEC 1064:1991)

This European Standard was approved by CENELEC on 1992-12-09. 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.

This European Standard exists in three official versions (English, French, 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

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 1064:1991 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 61064 on 9 December 1992.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1993-12-01
- latest date of withdrawal of conflicting national standards	(dow)	1993-12-01

For products which have complied with the relevant national standard before 1993-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1998-12-01.

Annexes designated "normative" are part of the body of the standard. In this standard, annexes A and ZA are normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 1064:1991 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

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

IEC Publication	Date	Title	EN/HD	Date
45-1	1991	Steam turbines - Part 1: Specifications	EN 60045-1	1993

NORME INTERNATIONALE

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Acceptance tests for steam turbine speed control systems

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ACCEPTANCE TESTS FOR STEAM TURBINE SPEED CONTROL SYSTEMS

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 International Standard has been prepared by IEC Technical Committee No. 5: Steam turbines.

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

Six Months' Rule	Report on Voting
5(CO)30	5(CO)33

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

Annex A forms an integral part of this International Standard.

ACCEPTANCE TESTS FOR STEAM TURBINE SPEED CONTROL SYSTEMS

1 Scope and object

This International Standard applies primarily to constant-speed steam turbines driving a.c. generators at power stations, for testing speed control systems consisting of speed governing and overspeed protection systems. It may also be used, where appropriate, for other types of steam turbines.

The purpose of acceptance tests of steam-turbine speed governing and overspeed protection systems is to verify any criteria quoted in the manufacturer's guarantees. Such tests will generally be carried out to check compliance with IEC 45-1. The criteria may include:

a) steady-state speed regulation (speed governing droop);

b) steady-state incremental speed regulation (incremental speed governing droop);

c) range of speed at no-load corresponding to the extreme settings of the speed changer;

d) dead band of the speed governing system;

e) stability of the speed governing system;

f) maximum transient increase of speed following full load rejection and any partial load rejections, with the speed governing system in operation;

g) overspeed trip setting;

h) maximum transient overspeed following full load rejection on the failure of the speed governing system.

Selection of the tests to be carried out and procedures for other tests not covered by this specification shall be agreed upon between the manufacturer and the purchaser.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 45: 1991, *Steam turbines. Part 1: Specifications.*

3 Terms, symbols, definitions and units

Using these rules it is recommended to employ the symbols, definitions and units that are given in tables 1 and 2 and in figure 1. Table 1 lists basic terms, symbols, and units, while Table 2 presents terms, symbols, definitions, and units of parameters specific to this standard. IEC 45-1 definitions are also applicable.

Table 1

No.	Term	Symbol	Unit
1	Power or load	*L*	MW or kW
2	Pressure	*p*	MPa or bar
3	Temperature	*e*	K or °C
4	Angular speed	ω	rad/s
5	Rotational speed	*n*	Hz, rev/s (rev/min)
6	Voltage	*U*	V
7	Current	*I*	A
8	Position or stroke of servomotors	*s*	mm, rad or (°)
9	Position or stroke of valves	*h*	mm, rad or (°)
10	Position or stroke of pilots	*x*	mm, rad or (°)
11	Time constant, characteristic time of element	*T*	s
12	Time as independent variable	*t*	s
13	Speed or load setting point	*y*	% or other

Table 2

No.	Term	Symbol	Definition	Unit
1	Rated speed	n_o	The speed at which the turbine is specified to operate at its rated output	Hz rev/s rev/min
2	Minimum controlled speed at no-load	n_1	The speed at no-load corresponding to the lower setting of the speed changer	Hz rev/s rev/min
3	Maximum controlled speed at no-load	n_2	The speed at no-load corresponding to the upper setting of the speed changer	Hz rev/s rev/min
4	Temporary speed rise		The transient increase in turbine speed following a load rejection, with the speed governing system in operation. The rated temporary speed rise applies if the rated output is rejected at rated speed	Hz rev/s rev/min
5	Maximum speed rise		The maximum transient increase in turbine speed following a load rejection, with the speed governing system inoperative. The rated maximum speed rise applies if the rated output is rejected at rated speed	Hz rev/s rev/min
6	Maximum transient speed	n_m	The maximum transient increase in turbine speed following rejection of maximum capability by disconnecting the generator from the electrical system (with auxiliary supplies previously disconnected) and the speed governing system in operation	Hz rev/s rev/min
7	Maximum transient overspeed	n_{ops}	The maximum rotational speed following rejection of maximum capability by disconnecting the generator from the electrical system (with auxiliary supplies previously disconnected) and the speed governing system inoperative	Hz rev/s rev/min
8	Overspeed trip setting	n_s	The speed at which the overspeed trip is set to operate	Hz rev/s rev/min
9	Maximum continuous rating (MCR) (electrical generating set)	L_o	The power output assigned to the turbine-generator by the supplier, at which the unit may be operated for an unlimited time, not exceeding the specified life, at the specified terminal conditions. This is the rating which will normally carry a guarantee of heat rate. The governing valves will not necessarily be fully open. (Also referred to as rated output, rated power or rated load)	MW or kW
10	Maximum capability	L_{max}	The maximum power output that the turbine can produce with the governing valves fully open and at the specified initial steam conditions. (Also referred to as valves-wide-open capability or maximum load)	MW or kW

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