



SLOVENSKI STANDARD

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Agregati za proizvodnjo izmeničnega toka, gnani z batnim motorjem z notranjim zgorevanjem - 8. del: Zahteve in preskusi za agregate majhnih moči

Reciprocating internal combustion engine driven alternating current generating sets - Part 8: Requirements and tests for low-power generating sets

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Groupes électrogènes à courant alternatif entraînés par moteurs alternatifs à combustion interne - Partie 8: Prescriptions et essais pour groupes électrogènes de faible puissance

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29.160.40	Električni agregati	Generating sets

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**Reciprocating internal combustion
engine driven alternating current
generating sets —**

Part 8:

**Requirements and tests for low-power
generating sets**

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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Regulations and additional requirements	3
5 General notes on tests	3
6 Mechanical and electrical design (requirements and tests)	3
6.1 General.....	3
6.2 Electrical equipment.....	4
6.2.1 Generator.....	4
6.2.2 Connection of electric loads.....	4
6.2.3 Screws and connections.....	4
6.3 Temperature rise.....	4
6.3.1 General.....	4
6.3.2 Generator.....	4
6.3.3 RIC engines and other components.....	5
6.4 Overload conditions.....	5
6.4.1 General.....	5
6.4.2 Uncontrolled generator.....	5
6.4.3 Controlled generator.....	5
6.5 Improper operation.....	5
7 Operating characteristics, power output, quality class and fuel consumption	6
7.1 Standard reference conditions.....	6
7.2 Start-up and operating conditions.....	6
7.3 Determination of performance class, quality class and fuel consumption.....	7
7.3.1 Performance class.....	7
7.3.2 Quality class.....	7
7.3.3 Fuel consumption.....	7
7.4 Radio interference suppression.....	7
Bibliography	8

ISO 8528-8:2016(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 70, *Internal combustion engines*.

This second edition cancels and replaces the first edition (ISO 8528-8:1995), which has been technically revised.

ISO 8528 consists of the following parts, under the general title, *Reciprocating internal combustion engine driven alternating current generating sets*:

- *Part 1: Application, ratings and performance*
- *Part 2: Engines*
- *Part 3: Alternating current generators for generating sets*
- *Part 4: Controlgear and switchgear*
- *Part 5: Generating sets*
- *Part 6: Test methods*
- *Part 7: Technical declarations for specification and design*
- *Part 8: Requirements and tests for low-power generating sets*
- *Part 9: Measurement and evaluation of mechanical vibrations*
- *Part 10: Measurement of airborne noise by the enveloping surface method*
- *Part 12: Emergency power supply to safety services*
- *Part 13: Safety*

Reciprocating internal combustion engine driven alternating current generating sets —

Part 8: Requirements and tests for low-power generating sets

1 Scope

This part of ISO 8528 defines design requirements, minimum performances and type tests for low-power generating sets driven by reciprocating internal combustion engines for land and marine use (domestic, recreational and industrial application), excluding generating sets used on aircraft.

It concerns mainly low-power generating sets driven by reciprocating internal combustion engines for the generation of single or multiphase alternating current or direct current up to 500 V. The generating sets are standard manufactured sets.

In this part of ISO 8528, “low-power” is taken to mean rated power of a magnitude up to approximately 10 kW/50 Hz, 12 kW/60 Hz. Low-power generating sets, for the purpose of this International Standard, are determined by the following special features:

- the users normally are laymen (for further details, see 3.1);
- the complete generating set is usually transportable or mobile;
- the electrical output is connected by means of plugs, sockets and screwed terminal except for extra low voltages;
- the generating set is ready for use without any additional installation work by the user.

Generating sets for special applications or of higher rated power conforming to the above special features may, by agreement between manufacturer and customer, be tested in accordance with this part of ISO 8528. If supplementary stipulations are required for certain applications, this is to be done taking this part of ISO 8528 as a basis.

This part of ISO 8528 deals with the special requirements of design and test which are observed in addition to the definitions and requirements laid down in ISO 8528-1, ISO 8528-2, ISO 8528-3, ISO 8528-4, ISO 8528-5 and ISO 8528-6, where applicable.

This part of ISO 8528 does not deal with safety requirements in order to protect the user from dangers which are laid down in ISO 8528-13.

NOTE This International Standard does not apply to arc welding equipment (IEC 60974 series).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3046-1, *Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use*

ISO 8528-1:2005, *Reciprocating internal combustion engine driven alternating current generating sets — Part 1: Application, ratings and performance*

ISO 8528-8:2016(E)

ISO 8528-5:2013, *Reciprocating internal combustion engine driven alternating current generating sets — Part 5: Generating sets*

ISO 8528-13:2016, *Reciprocating internal combustion engine driven alternating current generating sets — Part-13: Safety*

ISO 15550:2002, *Internal combustion engines — Determination and method for the measurement of engine power — General requirements*

IEC 60034-1:2010, *Rotating electrical machines — Part 1: Rating and performance*

IEC 60335-1:2013, *Household and similar electrical appliances — Safety — Part 1: General requirements*

IEC/TR 60083, *Plugs and socket-outlets for domestic and similar general use — Standardized in members countries of IEC*

CISPR 12, *Vehicles, boats and internal combustion engines — Radio disturbances characteristics — Limit*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 layman
person who does not necessarily recognize potential danger resulting from electricity, moving parts or hot parts

Note 1 to entry: The layman normally has a lack of training, knowledge and experience.

Note 2 to entry: See also [Clause 6](#).

3.2 power rating
electric power available at the outlets or sockets of the generating sets, expressed in kilowatts (kW) at the rated frequency and the rated power factor

3.3 rated power
continuous power (COP) according to ISO 8528-1:2005, 13.3.1, as assigned by the generating set manufacturer

Note 1 to entry: The output voltage at the rated power should be within $\pm 10\%$ of the nominal rated voltage (i.e. the value on label).

3.4 maximum power MAX
power given by multiplying the current and voltage that the generating set is capable of delivering for at least 5 min within the voltage and frequency limits

Note 1 to entry: Prescribed output voltage shall be within $\pm 10\%$ of the rated voltage and prescribed output frequency shall be within $\pm 8\%$ of the rated frequency.

Note 2 to entry: The protective device shall not be activated for a period of 5 min and the overload conditions shall meet the requirements of [6.4](#). The minimum ratio between the power rating (COP) and the maximum power (MAX) shall be $P_{\text{rated}}/P_{\text{max}} \geq 0,75$

3.5

thermal steady state condition

state reached when the temperature rise of the generator does not vary by more than 2 K over a period of 1 hr

Note 1 to entry: Under normal test conditions, the RIC engine has first reached a steady-state condition before a set of measurements is taken. If not, the permissible deviations for the steady-state conditions of the RIC engine according to ISO 3046-3 apply.

Note 2 to entry: For electrical parts, see IEC 60034-1:2010, 3.25; for RIC engines, see ISO 15550:2002, 6.2.4.3.2.

3.6

uncontrolled generator

generator on which there is no load- and speed-dependent adjustment of excitation by an automatic voltage regulator for control of terminal voltage

Note 1 to entry: This includes generators with directly acting load current-dependent excitation devices (compounding).

3.7

automatic voltage regulator-controlled generator

generator on which the terminal voltage is controlled by changing the excitation by means of an automatic voltage regulator as a function of load and speed alternatively, where the terminal voltage is controlled automatically by means of an inverter type of conversion system

4 Regulations and additional requirements

For low-power generating sets, additional regulations depending on the location of its operation shall exist. These shall refer to environmental and safety requirements defined in the laws and regulations of the legal authorities in the different countries where generating sets are used. The regulations are mainly in the following fields:

- noise emission limitation;
- exhaust gas emission limitation;
- electrical safety;
- fuel systems.

5 General notes on tests

Tests according to this part of ISO 8528 are type tests, unless otherwise specified, the tests are made on a single sample as delivered, which shall withstand all the relevant tests.

During the tests, the temperature of the ambient air shall be kept between 15°C and 30°C.

Generating sets built for more than one type of rated voltage, rated frequency or current shall be tested for all relevant operating parameters.

6 Mechanical and electrical design (requirements and tests)

6.1 General

The requirements and tests of this part of ISO 8528 cover mechanical and electrical performance.

Acceptability of the component parts of the generating set shall be judged on the mechanical and electrical strength and resistance to ignition and distortion.