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Reciprocating internal combustion engines — Handle starting equipment —

Part 1: Safety requirements and tests

Moteurs alternatifs à combustion interne — Dispositifs de démarrage à la manivelle —

Partie 1: Exigences de sécurité et essais

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Foreword

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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. www.iso.org/directives

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This document was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 270, *Internal combustion engines*, in collaboration with ISO Technical Committee ISO/TC 70, *Internal combustion engines*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 11102-1:1997), which has been technically revised.

The main changes compared to the previous edition are as follows:

— test reference to the manufacturer's design data in 6.1 has been deleted;

— automatic disengagement device test has been added in Clause 7.

A list of all parts in ISO 11102 series can be found on ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Reciprocating internal combustion engines — Handle starting equipment —

Part 1: Safety requirements and tests

1 Scope

This document specifies requirements for handle starting equipment used on reciprocating internal combustion engines for land, rail and marine use, excluding engines used to propel road vehicle and aircraft. It can be applied to engines used to propel road construction, earth moving machines and other applications where no suitable International Standards exist.

In addition to the technical safety requirements, this document describes procedures for checking adherence to these requirements.

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.

ISO 11102-2, *Reciprocating internal combustion engines — Handle starting equipment — Part 2: Method of testing the angle of disengagement*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
handle starting system
starting system using a crank handle to rotate the engine up to the required firing speed

3.2
automatic disengagement device
device which automatically releases the connection between the engine and the starting handle once the engine is running, thus preventing the handle from being turned by the engine

3.3
guide
part of the *handle starting system* (3.1) which guides the starting handle during starting and prevents its being thrown out after disengagement

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3.4
kick back limiter
part of the *handle starting system* (3.1) which, when used in accordance with the instructions and when maintained correctly, prevents or limits the *kick back travel* (3.8) to such an extent as to avoid the risk of injury

3.5
kick back
sudden change of direction of rotation of the starting handle, caused by compression or combustion pressure of the engine during starting procedure

3.6
disengagement travel
circumferential distance which the grip of the starting handle travels from the point of its change of rotational direction to its disengagement from the starting shaft, measured at the centre of the grip

3.7
angle of disengagement
angle through which the shank of the starting handle turns from the point of change of rotational direction to its disengagement from the starting shaft

3.8
kick back travel
distance which the grip of the handle travels from the point of its change of rotational direction until it comes to rest, measured at the centre of the grip

3.9
kick back angle
angle through which the shank of the starting handle turns from the point of its change of rotational direction until it comes to rest

4 Other regulations and requirements

4.1 For engines used on board ships and offshore installations which have to comply with rules of a classification society, it is presupposed that the additional requirements of the classification society are observed. If this applies the name of the classification society shall be stated by the customer prior to placing the order.

For engines which do not require such classification, any additional requirements shall in each case be subject to the agreement between the manufacturer, supplier and customer.

4.2 If special requirements from regulations of any other authority, e.g. inspecting and/or legislative authorities, have to be met, the authority shall be stated by the customer prior to placing the order.

4.3 Any further additional requirements shall be subject to the agreement between the manufacturer, supplier and customer.

5 Technical safety requirements

5.1 General

When a reciprocating internal combustion engine, which is being manually started using a starting handle, suddenly changes its direction of rotation, the handle is subject to an acceleration in the opposite direction to the start of rotation (see Figure 1).

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