



**SLOVENSKI STANDARD**  
**SIST EN ISO 11102-1:2000**

**01-april-2000**

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**Reciprocating internal combustion engines - Handle starting equipment - Part 1:  
Safety requirements and tests (ISO 11102-1:1997)**

Reciprocating internal combustion engines - Handle starting equipment - Part 1: Safety requirements and tests (ISO 11102-1:1997)

Hubkolben - Verbrennungsmotoren Handkurbel-Starteinrichtungen - Teil 1:  
Sicherheitstechnische Anforderungen und Prüfung (ISO 11102-1:1997)

Moteurs alternatifs a combustion interne - Dispositifs de démarrage a la manivelle -  
Partie 1: Exigences de sécurité et essais (ISO 11102-1:1997)

**Ta slovenski standard je istoveten z: EN ISO 11102-1:1997**

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**ICS:**

27.020	Motorji z notranjim zgorevanjem	Internal combustion engines
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<b>SIST EN ISO 11102-1:2000</b>	<b>en</b>
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EUROPEAN STANDARD

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## Reciprocating internal combustion engines - Handle starting equipment - Part 1: Safety requirements and tests (ISO 11102-1:1997)

Moteurs alternatifs à combustion interne - Dispositifs de démarrage à la manivelle - Partie 1: Exigences de sécurité et essais (ISO 11102-1:1997)

Verbrennungsmotoren - Handkurbel-Starteinrichtungen - Teil 1: Sicherheitstechnische Anforderungen und Prüfung (ISO 11102-1:1997)

This European Standard was approved by CEN on 12 September 1997.

CEN members are bound to comply with the CEN/GENELEC 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 CEN 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 CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

### Foreword

The text of the International Standard ISO 11102-1:1997 has been prepared by Technical Committee ISO/TC 70 "Internal combustion engines" in collaboration with Technical Committee CEN/TC 270 "Internal combustion engines", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

### Endorsement notice

The text of the International Standard ISO 11102-1:1997 was approved by CEN as a European Standard without any modification.

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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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Reference number  
ISO 11102-1:1997(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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11102-1 was prepared by Technical Committee ISO/TC 70, *Internal combustion engines*.

ISO 11102 consists of the following parts, under the general title *Reciprocating internal combustion engines — Handle starting equipment*:

- *Part 1: Safety requirements and tests*
- *Part 2: Method of testing the angle of disengagement*

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# Reciprocating internal combustion engines — Handle starting equipment —

## Part 1: Safety requirements and tests

### 1 Scope

This part of ISO 11102 specifies requirements for handle starting equipment used on reciprocating internal combustion engines for land, rail and marine use, excluding engines used to propel road vehicles and aircraft. It may be applied to engines used to propel road construction, earth moving machines and for other applications where no suitable International Standards exist.

In addition to the technical safety requirements, this part of ISO 11102 describes procedures for checking adherence to these requirements.

### 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 11102. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 11102 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.

ISO 11102-2:1997, *Reciprocating internal combustion engines — Handle starting equipment — Part 2: Method of testing the angle of disengagement.*

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### 3 Definitions

For the purposes of this part of ISO 11102 the following definitions apply.

**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 interrupts 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**  
that part of the handle starting system which guides the starting handle during starting and prevents its being thrown out after disengagement



**3.4 kick back limiter**

that part of the handle starting system which, when used in accordance with the instructions and when maintained correctly, prevents or limits the kick back travel to such an extent as to avoid the risk of injury

**3.5 kick back**

the 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**

the 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**

the 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**

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

**3.9 kick back angle**

the angle through which the shank of the starting handle turns from the point of its change of rotational direction until it comes to the 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, the additional requirements of the classification society shall be 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 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 agreement between the manufacturer, supplier and customer.

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**5 Technical safety requirements****5.1 Introduction**

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).

The resulting angular velocity is at a maximum at the point of disengagement. Due to its inertia, the handle will turn further until all of the kinetic energy has been dissipated in overcoming friction and the force exerted by the operator or until it comes up against a stop.

For this reason, the kick back travel and angle are larger, by an undefined amount, than the disengagement travel and angle respectively.



The main factor which leads to injury is not the force itself with which the handle kicks back but the distance during which this force can act upon the operator.

Limitation of the kick back force can therefore not be accepted as a measure to prevent accidents when correctly using a starting handle. Instead, the concern is to limit the kick back travel.

## 5.2 General requirements

**5.2.1** The handle starting system shall be equipped with an automatic disengagement device (see 3.2). The handle shall be prevented from re-engaging when the engine is running.

**5.2.2** The handle starting system shall be fitted with a guide (see 3.3) which allows the handle to be removed from the engine only when it is disengaged. This can be achieved, for example, when the handle is not being turned, or being turned only very slowly, or when turning it in the direction opposite to the starting rotation.

**5.2.3** The starting handle shall be fitted with a non-removable grip which can freely rotate and shall guarantee safe operation when used properly. These requirements also apply to the use of sleeves.

**5.2.4** Starting handles are to be permanently marked with the manufacturer's or supplier's identification.

## 5.3 Requirements in the event of kick back

The angle of disengagement shall not exceed 35° and the disengagement travel shall not exceed 100 mm.

## 6 Tests

### 6.1 Checking angle of disengagement and travel

The requirements of 5.3 shall be checked by reference to the manufacturer's design data. If required, tests in accordance with ISO 11102-2 shall be made.

### 6.2 Checking of other requirements

All other requirements shall be checked by reference to the manufacturer's data and by physical tests.

These must include a visual check for functional suitability of the starting pin, the starting dog and the starting handle guide.

## 7 Test report

The manufacturer/importer or his agent shall supply a test report which contains at least the following:

- a) starting handle identification: [SIST EN ISO 11102-1:2000](https://standards.iteh.ai/catalog/standards/sist/d5890414-f062-402d-8c9f-c087203c7566/sist-en-iso-11102-1-2000)  
 — type;  
 — manufacturer/supplier;
- b) engine identification:  
 — type;  
 — manufacturer/supplier;
- c) description of the kick back limiter;

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