
**Hand-held non-electric power tools —
Safety requirements —**

**Part 12:
Circular, oscillating and reciprocating saws**

Machines portatives à moteur non électrique — Exigences de sécurité —

Partie 12: Scies circulaires, scies oscillantes et scies alternatives

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ISO 11148-12:2012

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 11148-12 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 3, *Pneumatic tools and machines*.

ISO 11148 consists of the following parts, under the general title *Hand-held non-electric power tools — Safety requirements*:

- Part 1: Assembly power tools for non-threaded mechanical fasteners
- Part 2: Cutting-off and crimping power tools
- Part 3: Drills and tappers
- Part 4: Non-rotary percussive power tools [ISO 11148-12:2012](https://standards.iteh.ai/catalog/standards/sist/390d268b-e01f-4555-99ce-65f2d7c63fcc/iso-11148-12-2012)
- Part 5: Rotary percussive drills
- Part 6: Assembly power tools for threaded fasteners
- Part 7: Grinders
- Part 8: Sanders and polishers
- Part 9: Die grinders
- Part 10: Compression power tools
- Part 11: Nibblers and shears
- Part 12: Circular, oscillating and reciprocating saws

A part 13, dealing with fastener driving tools, is under preparation.

Introduction

This International Standard is a type-C standard as stated in ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are defined in the Scope of this part of ISO 11148.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of other standards for machines that have been designed and built according to the requirements of this type-C standard.

ISO 11148 consists of a number of independent parts for individual types of hand-held non-electric power tools.

Certain parts of ISO 11148 cover hand-held non-electric power tools driven by internal combustion engines powered by gaseous or liquid fuel. In these parts, the safety aspects relating to internal combustion engines are found in a normative annex.

The parts are type-C standards and refer to pertinent standards of type A and B where such standards are applicable.

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Hand-held non-electric power tools — Safety requirements —

Part 12:

Circular, oscillating and reciprocating saws

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1 Scope

This part of ISO 11148 specifies safety requirements for hand-held non-electric power tools (hereinafter “circular, oscillating and reciprocating saws”) intended for sawing. The circular, oscillating and reciprocating saws can be powered by compressed air, hydraulic fluid or internal combustion engines and are intended to be used by one operator and supported by the operator’s hand or hands, with or without a suspension, e.g. a balancer.

NOTE 1 At the time of publication, no circular, oscillating or reciprocating saws driven by internal combustion engines are known [other than circular saws with bonded abrasives and/or super abrasives (diamond) cut-off wheels]. Once these are identified, it is intended to amend this part of ISO 11148 to include such power tools.

This part of ISO 11148 is applicable to

- circular saws;
- circular knives;
- oscillating saws having a saw blade with a radius of 50 mm or less or a diamond cutting-off blade with a radius of 100 mm or less;
- oscillating knives (including windshield knives);
- reciprocating saws, including jig saws and power hack saws.

NOTE 2 For examples of circular, oscillating and reciprocating saws, see Annex B.

NOTE 3 For circular saws with bonded-abrasive and/or super-abrasive (diamond) cut-off wheels, see ISO 11148-7 and ISO 19432.

This part of ISO 11148 is not applicable to special requirements and modifications of circular, oscillating and reciprocating saws for the purpose of mounting them in fixtures.

This part of ISO 11148 deals with all significant hazards, hazardous situations or hazardous events relevant to circular, oscillating and reciprocating saws when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer, with the exception of the use of circular, oscillating and reciprocating saws in potentially explosive atmospheres.

NOTE 4 EN 13463-1 gives requirements for non-electrical equipment for potentially explosive atmospheres.

2 Normative references

The following referenced documents are indispensable for the application 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 3857-3, *Compressors, pneumatic tools and machines — Vocabulary — Part 3: Pneumatic tools and machines*

ISO 5391, *Pneumatic tools and machines — Vocabulary*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

ISO 13732-3, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces*

ISO 15744, *Hand-held non-electric power tools — Noise measurement code — Engineering method (grade 2)*

ISO 17066, *Hydraulic tools — Vocabulary*

ISO 20643, *Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission*

ISO 28927-8, *Hand-held portable power tools — Test method for evaluation of vibration emission — Part 8: Saws, polishing and filing machines with reciprocating action and small oscillating or rotating action*

EN 12096, *Mechanical vibration — Declaration and verification of vibration emission values*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3857-3, ISO 5391, ISO 12100 and ISO 17066 (for hydraulic tools) and the following apply.

3.1 General terms and definitions (standards.iteh.ai)

3.1.1

hand-held power tool

machine operated by one or two hands and driven by rotary or linear motors powered by compressed air, hydraulic fluid, gaseous or liquid fuel, electricity or stored energy (e.g. by a spring) to do mechanical work and so designed that the motor and the mechanism form an assembly that can easily be brought to its place of operation

NOTE Hand-held power tools driven by compressed air or gas are called pneumatic tools (or air tools). Hand-held power tools driven by hydraulic liquid are called hydraulic tools.

3.1.2

inserted tool

tool inserted in the circular, oscillating or reciprocating saw to perform the intended work

3.1.3

service tool

tool for performing maintenance or service on the circular, oscillating or reciprocating saw

3.1.4

control device

device to start and stop the circular, oscillating or reciprocating saw or to change the direction of the rotation or to control the functional characteristics, such as speed and power

3.1.5

start-and-stop device

throttle

manually operated control on the circular, oscillating or reciprocating saw by which the energy supply to the motor can be turned on and off

3.1.6**hold-to-run start-and-stop device****constant pressure throttle**

start-and-stop device that automatically returns to the OFF position when force on the start-and-stop device actuator is released

3.1.7**lock-on start-and-stop device****constant pressure throttle with instant release lock**

hold-to-run start-and-stop device that can be locked in the ON position and which is designed so that it permits the circular, oscillating or reciprocating saw to be turned off by a single motion of the same finger or fingers used to turn it on

3.1.8**lock-off start-and-stop device****lock-off throttle**

start-and-stop device that automatically latches in the OFF position when the actuator is released and where two motions are required to energize the circular, oscillating or reciprocating saw

3.1.9**positive on-off start-and-stop device****positive on-off throttle**

start and stop device that remains in an ON position until it is manually changed

3.1.10**maximum operating pressure**

maximum pressure at which a circular, oscillating or reciprocating saw may be operated

3.1.11**whip hose**

air hose connecting the main air hose and an air tool for the purpose of providing more flexibility

3.1.12**rated air pressure**

air pressure, required at an air tool inlet port to assure rated performance of the tool, also considered the maximum pressure at which the tool may be operated

3.1.13 Rated speed**3.1.13.1****rated speed**

⟨pneumatic tool⟩ speed of an air tool at no load and rated air pressure at the tool inlet port

NOTE The rated speed is expressed in revolutions per minute.

3.1.13.2**rated speed**

⟨hydraulic tool⟩ nominal speed of a hydraulic tool at no load and rated flow at the tool inlet port

NOTE The rated speed is expressed in revolutions per minute.

3.1.14**maximum attainable speed**

maximum speed which the tool can achieve under the most adverse condition of possible maladjustment or malfunction of its speed control devices, when supplied with compressed air at the pressure marked on the circular, oscillating or reciprocating saw

3.1.15**suspension device**

device attached to the tool, whose primary purpose is to reduce the strain on the operator caused by the weight of the tool

NOTE The device can also have a secondary purpose of transmitting a reaction torque.

3.2 Definitions related to circular, oscillating and reciprocating saws

3.2.1

circular saw

rotary power tool equipped with a circular saw blade

3.2.2

panel saw

air tool for cutting ferrous or non-ferrous panelling, usually having an angle drive and blade speeds of 9,1 m/s (1 800 sfpm) or less

3.2.3

trim saw

air tool for cutting trim, composition board, plywood, plastic and thin non-ferrous materials usually at speeds of over 20,3 m/s (4 000 sfpm)

3.2.4

oscillating saw

power tool equipped with a circular or segment saw blade, which moves with an angular oscillating movement

3.2.5

reciprocating saw

power tool equipped with a straight saw blade, which moves with a reciprocating movement

EXAMPLE Jig saw or power hack saw.

3.2.6

knife

edge tool used as a cutting instrument, which has a pointed blade, a sharp edge and a handle

3.2.7

riving knife

metal part placed in the plane of the saw blade, which prevents the wood from tightening on to the rear part of the saw blade, thus preventing the backward movement of the tool or the jamming of the saw blade

3.2.8

circular knife

rotary power tool equipped with a circular knife

3.2.9

oscillating knife

power tool equipped with a knife, which moves with an angular oscillating movement

3.2.10

saw blade

blade of circular, segment or straight shape intended for cutting or cutting-off operations by chip removal by means of teeth with cutting edges

3.2.11

guide plate

part supporting the saw on the material being cut

See Figure 2.

3.2.12

shoe or backing plate

support for the reciprocating saw against the work while a cut is being made

4 Safety requirements and/or protective measures

4.1 General

The machine shall comply with the safety requirements and/or protective measures and be verified in accordance with Clause 5. In addition, the machine shall be designed in accordance with the principles of ISO 12100 for relevant, but not necessarily significant, hazards, which are not dealt with by this part of ISO 11148.

The measures adopted to comply with the requirements of this clause shall take account of the state-of-the-art.

It is recognized that optimizing the design with respect to some safety measures can result in a degradation of performance against other safety requirements. In such cases, it is required to strike a balance between the various requirements in order to achieve a circular, oscillating or reciprocating saw design that satisfies each requirement, so far as is reasonably practicable, and remains fit for purpose.

4.2 Mechanical safety

4.2.1 Surfaces, edges and corners

Accessible parts of circular, oscillating and reciprocating saws, except the inserted tool, shall not have sharp edges or angles or rough or abrasive surfaces; see ISO 12100:2010, 6.2.2.1.

4.2.2 Supporting surface and stability

Circular, oscillating and reciprocating saws shall be so designed that they can be laid aside and remain in a stable position on a plane surface.

4.2.3 Flanges

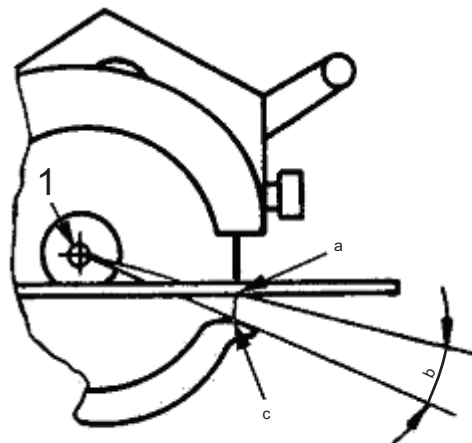
Flanges for circular saws, for clamping the saw blade to the working spindle shall be of equal size, and of a size not less than 0,3 times the rated diameter of the blade.

4.2.4 Hydraulic fluid ejection

Hydraulic systems of the circular, oscillating and reciprocating saws shall be enclosed so as to give protection against high-pressure fluid ejection.

4.2.5 Guide plate

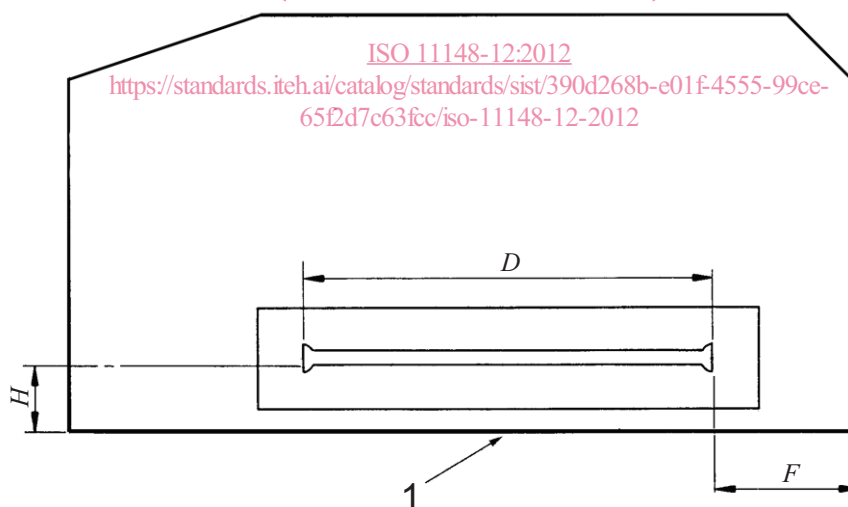
Circular saws shall have a guide plate of a size and shape to support the saw against the material being cut. The guide plate shall be securely fastened to the saw housing. If the blade exposure angle, α , below the guide plate (see Figure 1) exceeds 10° , the guide plate shall have an outboard section (see Figure 2). The outboard section shall enclose the full diameter of the saw blade and its outer edge shall not be less than 25 mm from the face of the blade, H in Figure 2. The distance between the periphery of the largest specified blade to the front edge of the base plate, F , shall be larger than 13 mm. The angle in Figure 1 shall be measured between the intersections of the blade tip circle with the underside of the base and each side of the lower guard.



Key

- 1 centre of blade
- a Blade periphery intersect point with the bottom plane of the base plate.
- b Blade exposure angle, α .
- c Blade periphery intersect point with the perpendicular projection on to the blade, of either side or the front tip of the movable guard, which yields the largest blade exposure angle, α_{\max} .

Figure 1 — Blade exposure angle
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Key

- 1 outboard section of the base plate
- D diameter of the blade
- F dimension from the periphery of the largest specified blade to the front edge of the base plate measured along the bottom surface of the base plate at maximum cutting depth; $F > 13$ mm
- H dimension from the outside edge of the base plate on the blade side, to the near surface of the thickest specified blade of a not inclined base plate; $H \geq 25$ mm

Figure 2 — Guide plate dimensions

Reciprocating saws shall be equipped with a shoe or backing plate, which supports the reciprocating saw against the work while a cut is being made.