
**Powered hand-held hedge trimmers —
Safety**

Taille-haies portatifs à moteur — Sécurité

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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 10517 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 13, *Powered lawn and garden equipment*.

This second edition cancels and replaces the first edition (ISO 10517:1993), which has been technically revised as follows. It has been harmonized with the revised requirements of EN 774. Noise and vibration requirements have been included as well as a table listing the significant hazards.

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Introduction

Noise emission and vibration levels are primarily determined for

- manufacturers' declaration of levels,
- comparisons of the vibration level and noise emitted by hedge trimmers in the family concerned, and
- for purposes of noise control at the source at the design stage.

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Powered hand-held hedge trimmers — Safety

IMPORTANT — The electronic file of this document contains colours which are considered to be useful for the correct understanding of the document. Users should therefore consider printing this document using a colour printer.

1 Scope

This International Standard specifies safety requirements and their verification for the design and construction of hand-held, integrally-driven petrol combustion engine hedge trimmers, hereafter referred to as “hedge trimmers”, designed to be used by a single operator for trimming hedges and bushes while utilizing one or more linear reciprocating cutter blades.

It establishes methods for the elimination or reduction of hazards arising from the use of the trimmers. In addition, it specifies the type of information to be provided by the manufacturer on safe working practices.

This International Standard deals with all significant hazards, hazardous situations and events relevant to hand-held powered hedge trimmers when they are used as intended (see Clause 4).

This International Standard does not deal with low noise design. It is not applicable to hedge trimmers with an engine displacement over 80 cm³, nor is it applicable to hedge trimmers manufactured before the date of its publication.

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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 354:2003, *Acoustics — Measurement of sound absorption in a reverberation room*

ISO 3744:1994, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane*

ISO 3767-1:1998, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols*

ISO 3767-3:1995, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 3: Symbols for powered lawn and garden equipment*

ISO 3767-4:1993, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 4: Symbols for forestry machinery*

ISO 3864-1:2002, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs in workplaces and public areas*

ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

ISO 5347-22:1997, *Methods for the calibration of vibration and shock pick-ups — Part 22: Accelerometer resonance testing — General methods*

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ISO 7293:1997, *Forestry machinery — Portable chain saws — Engine performance and fuel consumption*

ISO 8041:2005, *Human response to vibration — Measuring instrumentation*

ISO 8893:1997, *Forestry machinery — Portable brush-cutters and grass-trimmers — Engine performance and fuel consumption*

ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane*

EN 12096:1997, *Mechanical vibration — Declaration and verification of vibration emission values*

ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles*

ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

IEC 61672-1:2002, *Electroacoustics — Sound level meters — Part 1: Specifications*

IEC 60745-1:2006, *Hand-held motor operated electric tools — Safety — Part 1: General requirements*

IEC 60745-2-15:2006, *Hand-held motor-operated electric tools — Safety — Part 2-15: Particular requirements for hedge trimmers*

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3 Terms and definitions

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

3.1

petrol combustion engine hedge trimmer

machine fitted with reciprocating blades made of metal, intended to cut and form hedges, bushes and similar vegetation

3.2

cutting device

part of the assembly consisting of cutter blade and shear plate, or of the cutter blades together with any supporting part, which performs the cutting action and that can be single- or double-sided

See Figure 2.

3.3

cutter blade

part of the cutting device having blade teeth which cut by a shearing action either against other blade teeth or against a shear plate

See Figure 2.

3.4

blade tooth

part of the cutter blade which is sharpened to perform the shearing action

See Figure 2.

3.5**cutting length**

effective cutting length of the cutting device measured from the inside edge of the first blade tooth or shear plate tooth to the inside edge of the last blade tooth or shear plate tooth

See Figure 3.

NOTE Where both blades move, the measurements are taken when the first and last teeth are furthest apart.

3.6**front handle**

handle located at or towards the cutting device

See Figure 1.

3.7**rear handle**

handle located furthest from the cutting device

See Figure 1.

3.8**throttle lock**

device for temporarily setting the throttle in a partially open position to aid starting

3.9**throttle trigger**

device for operating the throttle

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3.10**blade control**

device activated by the operator's hand or finger for controlling the cutter blade movement

NOTE Depending on the application, this can require a single or a two-stage operation.

3.11**blunt extension**

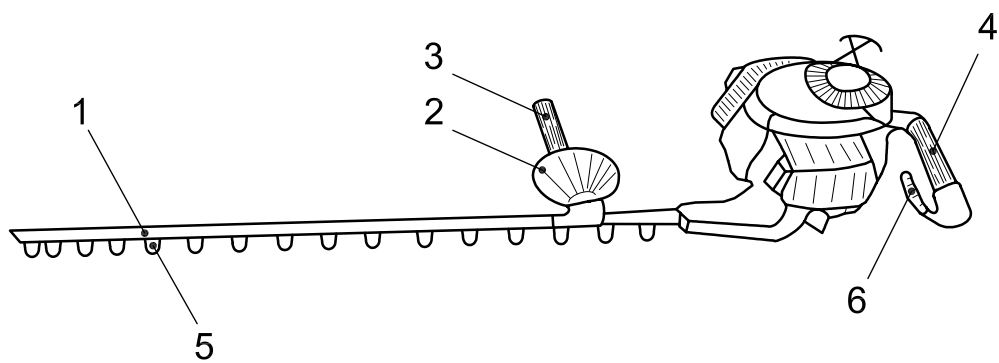
extending blunt part of the cutting device or an extending part of an unsharpened plate fitted to the cutting device to prevent contact with the moving cutter blade

3.12**maximum operating engine [motor] speed**

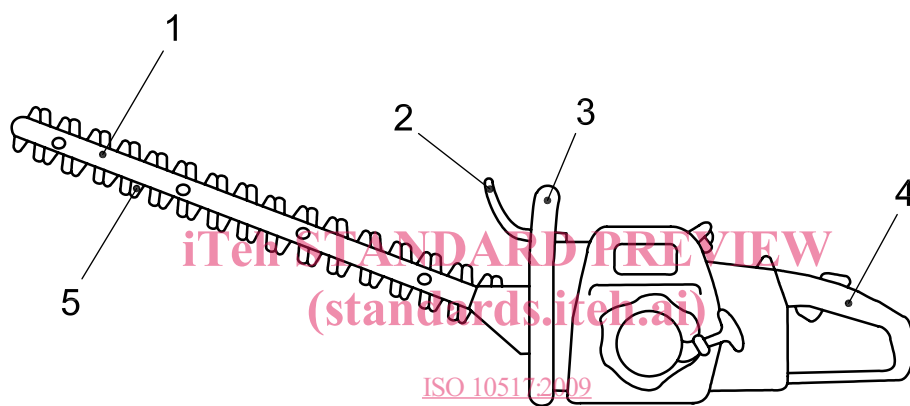
highest engine [motor] speed obtainable with the cutting device engaged

3.13**adjustable handle**

handle whose position can be modified either by movement or by rotation

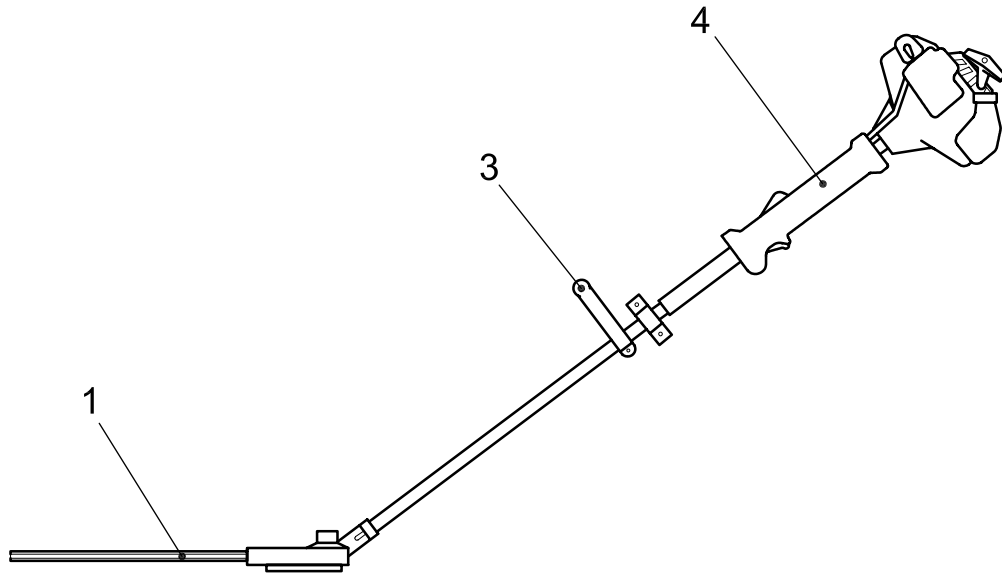


a) Petrol combustion engine hedge trimmer



b) Petrol combustion engine hedge trimmer

Figure 1 (continued)



c) Long-reach petrol combustion engine hedge trimmer

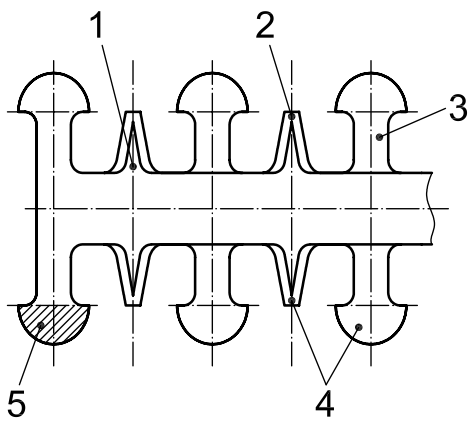
Key

- 1 cutting device
- 2 guard
- 3 front handle
- 4 rear handle
- 5 blade tooth
- 6 blade control

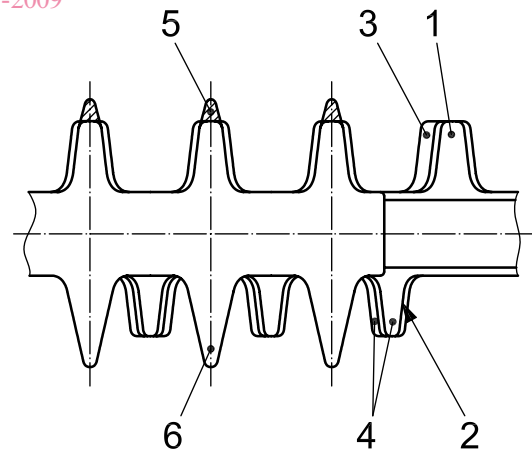
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Figure 1 — Examples of types of hedge trimmer-
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a)

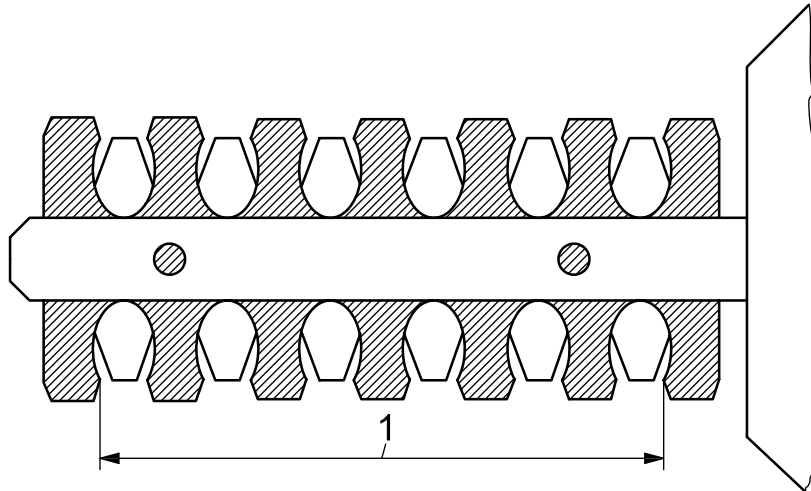


b)

Key

- 1 cutting blade
- 2 blade tooth
- 3 shear plate
- 4 cutting device
- 5 blunt extension
- 6 unsharpened plate

Figure 2 — Cutting device



Key

1 cutting length

Figure 3 — Cutting length

4 List of significant hazards

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This clause contains for defined danger zones all the significant hazards, hazardous situations and events, as far as they are dealt with in this International Standard, identified by risk assessment as significant for these types of hedge trimmer and which require specific action by the designer or manufacturer to eliminate or to reduce the risk (see Table 1). It is the responsibility of the manufacturer to check whether or not the safety requirements given by this International Standard apply to each significant hazard presented by the specific hedge trimmer and to confirm that the risk assessment is complete with particular attention to

- the intended use of the hedge trimmer including maintenance, setting and cleaning and its foreseeable misuse, and
- identification of all significant hazards associated with the hedge trimmer.

Table 1 — Significant hazards associated with powered hand-held hedge trimmers

	Hazard	Location or event	Clause/subclause of this International Standard
1	Mechanical hazards Due to: a) shape b) relative locations	Holding and operating the hedge trimmer Safe positioning in use	5.2.1 6.1; Annex A
1.2	Shearing hazard	Clearing processed material from cutting device	5.2.2, 5.2.3, 5.2.5, 6.1; Annex A
1.3	Cutting or severing hazard	Inadvertent contact with cutting device	5.2.2, 5.2.3, 5.2.4, 5.2.5, 5.2.6, 6.1; Annex A
1.4	Entanglement hazard	Loose clothing entering cutting device	6.1; Annex A
1.10	Ejection of parts (of machinery and processed materials/workpieces)	Processed material ejected from cutting device	6.1; Annex A
2	Electrical hazards		
2.1	Contact of persons with live parts (direct or indirect)	High voltage and ignition parts Damage to cables due to oil, fuel and abrasion	5.9.1, 5.9.2, 5.9.3
3	Thermal hazards		
3.1	Burns, scalds and other injuries, by possible contact of persons with objects or materials with an extremely high or low temperature, by flames or explosions and also by the radiation of heat sources	Contact with hot parts	5.6
4	Hazards generated by noise		
4.1	Hearing loss (deafness), other physiological disorders (e.g. loss of balance, loss of awareness)	Hearing damage due to hedge trimmer and/or processing of material	5.11, 6.1, 6.2; Annexes A and D
5	Hazards generated by vibration (resulting in a variety of neurological and vascular disorders)	Hand/arm damage due to hedge trimmer and/or processing of material	5.10, 6.1, 6.2; Annexes A and C
7	Hazards generated by materials and substances processed, used or exhausted by machinery, including:		
7.1	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	Breathing in of engine exhaust fumes	5.8, 6.1; Annex A
7.2	Fire or explosion hazard	Refuelling	5.7, 6.1; Annex A
8	Hazards generated by neglecting ergonomic principles in hedge trimmer design (mismatch of machinery with human characteristics and abilities) caused, for example, by:		
8.1	Unhealthy postures or excessive efforts	Handling during use	6.1; Annex A
8.3	Neglected use of personal protection equipment	Protect against noise and vibration	5.10, 5.11, 6.1, 6.2; Annex A
8.6	Human error	Incorrect use, etc. Danger to bystanders	6.1; Annex A
8.7	Inadequate design, location of manual controls	Location of stop/start control	5.4.2, 5.4.3
		Identification of control(s)	5.4.1, 5.4.3

Table 1 (continued)

	Hazard	Location or event	Clause/subclause of this International Standard
10	Hazards caused by failure of energy supply, breaking down of machinery parts and other functional disorders , including:		
10.3	Failure, malfunction of control system (unexpected start-up, unexpected overrun)	Unexpected movement of cutting device Run-down of cutting device	5.2.3, 5.2.4, 5.2.5, 5.3
10.4	Errors of fitting	Fitting an incorrect blade or fitting blade incorrectly	5.2.7; 6.1; Annex A
11	Hazards caused by (temporary) missing and/or incorrectly positioned safety-related measures/means , for example:		
11.1	All kinds of guards	Protection against access to hazardous parts	5.2.2, 5.2.6, 5.5, 5.6, 5.9
11.3	Starting and stopping devices	Control of hedge trimmer	5.2, 5.3, 5.4
11.4	Safety signs and signals	User awareness of hazards	6.2, Annex B
11.5	All kinds of information or warning devices	User awareness and safe use	Clause 6; Annexes A and B
11.6	Energy supply disconnecting devices	Engine stop	5.4.3

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5 Safety requirements and/or verification of safety measures

5.1 General

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The hedge trimmer shall comply with the safety requirements and/or protective measures of this clause. In addition, the hedge trimmer shall be designed according to the principles of ISO 12100-1 and ISO 12100-2 for hazards relevant but not significant that are not dealt with by this International Standard (e.g. sharp edges other than the cutting device).

5.2 Handles and cutting device

5.2.1 Handles

The number of handles shall be in accordance with Table 2.

The handles shall be designed and constructed in such a way as to make starting and stopping straightforward and so that each one can be grasped (held) with one hand. The gripping surface of handles shall be at least 100 mm long. On bail or closed handles (U-shaped handles) this dimension is related to the inner width of the gripping surface. On straight handles it is the complete length between the housing and the end of the handle.

The gripping length of a bail or closed handle shall comprise any length that is straight or curved at a radius of greater than 100 mm, together with any blend radius, but not more than 10 mm at either or both ends of the gripping surface.

There shall be a minimum radial clearance of 25 mm around the gripping length.

If a part containing the motor complies with the dimensions above, it may be considered as a handle.

If a straight handle is supported centrally (i.e. "T" type), the gripping length shall be calculated as follows:

- a) for handles with a periphery (not including the support) of less than 80 mm, the gripping length is the sum of the two parts either side of the support;
- b) for handles with a periphery (not including the support) of 80 mm or more, the gripping length is the complete length from end to end.

Where appropriate, the part of the handle containing the blade control actuator shall be counted as part of the handle gripping length. Finger grip or similar superimposed profiles shall not affect the method of calculating handle gripping length.

If handles are adjustable to different positions, it shall not be possible to fix them in a position which contravenes other provisions of this International Standard.

For handles with blade control which are adjustable without the use of a tool, it shall not be possible to alter the handle position when the cutting device is powered. When altering the position of a handle with blade control, the blade control shall be disabled such that the cutting device can not be powered until the handle is locked into one of its designated operating positions (e.g. the control is automatically disengaged from the throttle of the engine if the handle is not locked into one of the positions of use).

Compliance shall be checked by inspection and measurement.

5.2.2 Hand protection

From any handle it shall not be possible to touch the moving cutter blade with fingers spread out.

All handles shall be so located that the test distance from the cutter blade to the side furthest from the cutter blade of any handle is not less than 120 mm. The distance shall be measured along the shortest path from the side of the handle furthest from the cutter blade to the nearest cutting edge of the cutter blade [see Figure 4 a)]. If there is a guard, the distance shall be measured from the furthest side of the handle to the guard and from there to the nearest cutting edge of the cutter blade [see Figure 4 b)].

If the cutting device can be adjusted or altered for length, distance from handles or angle with respect to the handles, then this measurement shall be taken in the position in which any part of the cutting blade is nearest to the front handle. Positions where the cutting device will not operate are not included.