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Powered shredders and chippers — Definitions, safety requirements and test procedures

Broyeurs et déchiqueteurs à moteur — Définitions, exigences de sécurité et modes opératoires

Reference number
ISO 11448:1997(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 11448 was prepared by Technical Committee 23, *Tractors and machinery for agriculture and forestry*, Subcommittee 13, *Powered lawn and garden equipment*.

Annexes A, B and C form an integral part of this International Standard. Annexes D and E are for information only.

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Powered shredders and chippers – Definitions, safety requirements and test procedures

1 Scope

This International Standard presents definitions of terms and specifies safety requirements and test procedures applicable to hand-fed powered shredders and chippers, including those which have vacuum assisted collection and are used in a stationary position and are designed primarily for use with organic material at and around the home. This International Standard does not apply to shredders and chippers with feed openings greater than 400 mm × 400 mm measured at the relevant safety distance to the cutting means.

This International Standard does not specify requirements for units powered by an external power source or for powered discharge units intended to broadcast material or load vehicles. Mechanically powered feed intake machines or attachments are excluded from this International Standard, as are machines for which the cutting means is either one or more non-metallic filaments, or one or more non-metallic cutting elements pivotally mounted on a generally circular central drive unit, where these cutting elements rely on centrifugal force to achieve cutting, and have a kinetic energy for each single cutting means of less than 10 J.

The electrical aspects of electrically powered shredder/grinders and shredder/baggers having a voltage exceeding 42 V d.c. or mains connected are not covered by this International Standard.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of the IEC and ISO maintain registers of currently valid International Standards.

ISO 3767-1:—[1], *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 3767-5:1992, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 5: Symbols for manual portable forestry machinery.*

ISO 11684:1995, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles.*

ISO 13852:1996, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs.*

IEC 335-1:1991, *Safety of household and similar electrical appliances — Part 1: General requirements.*

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1) To be published. (Revision of ISO 3767:1991)

IEC 335-2-93:—[2] , *Safety of household and similar electrical appliances — Part 2: Particular requirements for powered shredders.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 chipper
Machine for the purpose of cutting branches and wood into chips, having one or more cutting means and designed to operate in a stationary position (see figures 1 and 2).

3.2 discharge chute
Extension of the opening through which shredded or chipped material is discharged.

3.3 discharge zone
Space into which shredded or chipped material is ejected from the machine.

3.4 exhaust system
Means of conveying exhaust gases from the engine exhaust port to the atmosphere.

3.5 feed intake opening
Opening through which material is inserted to be fed to the cutting mechanism.

3.6 guard
Component intended to provide protection for the operator or bystander from injury.

3.7 material discharge deflector
Fixed or movable component used to direct the flow of processed material being discharged from the machine.

3.8 maximum operating engine speed
Highest engine speed obtainable when adjusted in accordance with manufacturer's specifications and/or instructions with the cutting means engaged.

3.9 normal operation
Any use of the machine which is reasonably foreseeable, and which is consistent with such activities as reducing organic material, starting, stopping, fuelling, or connecting to (or disconnecting from) a power source.

3.10 normal use
Normal operation, plus routine maintenance, servicing, cleaning, transporting, attaching or removing accessories, and making ordinary adjustments as determined by the manufacturer's instructions.

3.11 power source
Engine or motor which provides mechanical energy for linear or rotational movement.

3.12 screen; grid
Perforated metal piece or bar(s) located between the cutting means and discharge chute or opening of the machine to assist in reducing bulk organic materials to smaller pieces.

3.13 shredder
Machine for the purpose of reducing bulk organic materials to smaller pieces, having one or more cutting means and designed to operate in a stationary position (see figures 1 and 2).

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2) To be published.

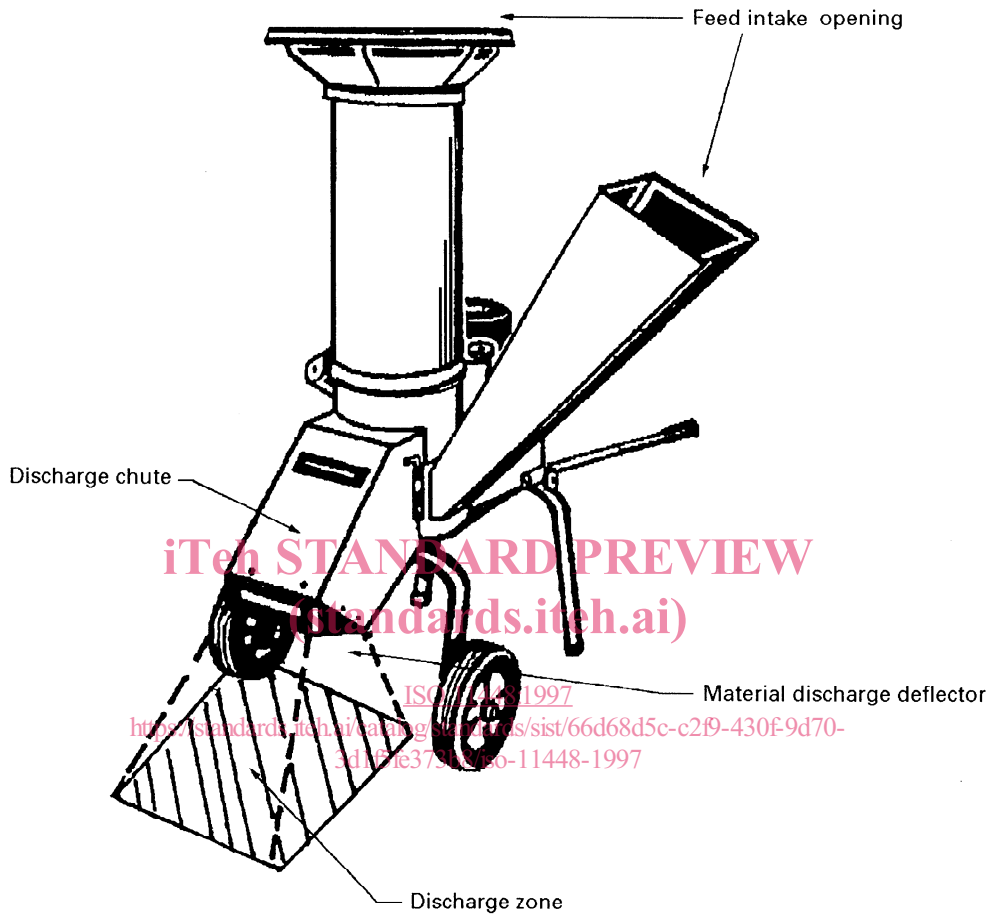


Figure 1 — Example of typical chipper/shredder

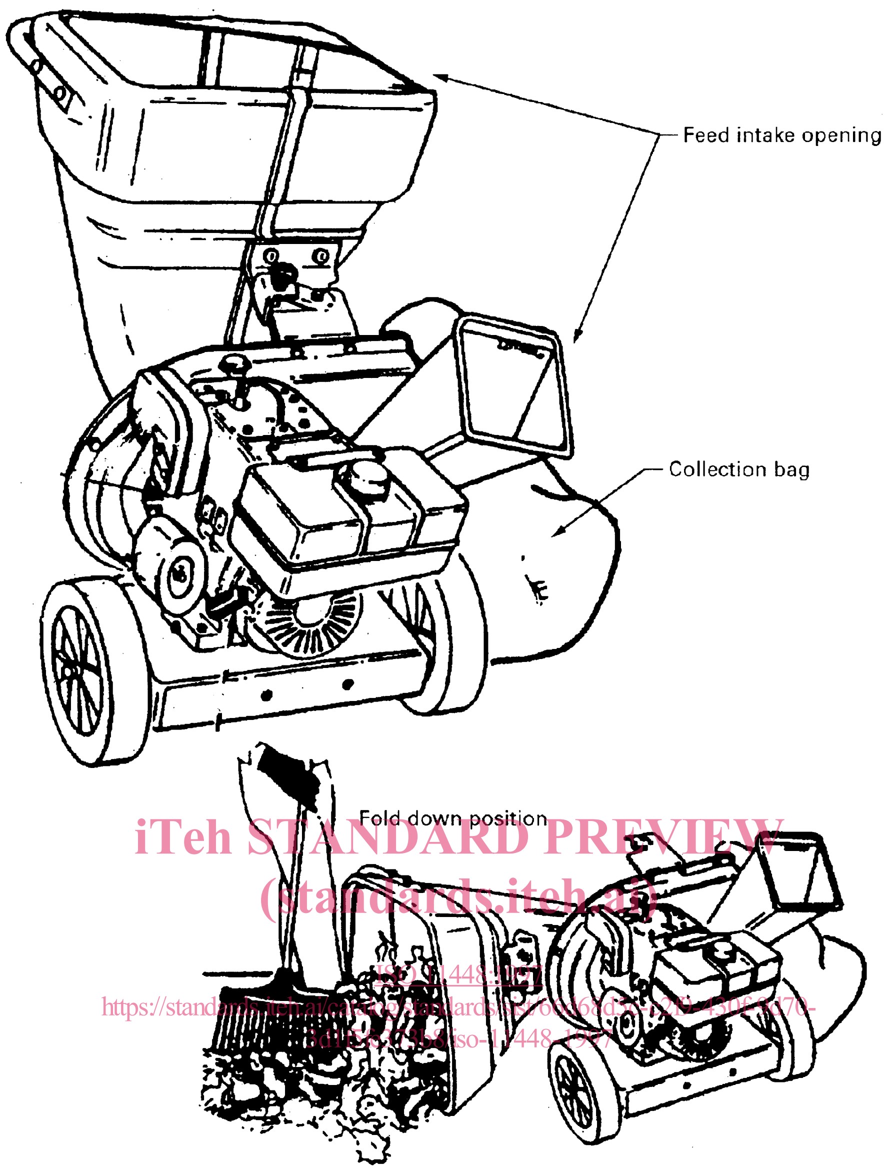


Figure 2 — Example of typical chipper/shredder

4 General construction

4.1 Power-driven components

All power-driven components (except the cutting means) shall be guarded to prevent contact with these parts during normal operation. The principles set out in ISO 13852 shall be followed when developing the guard system.

Rotating covers or discs shail have a continuous unbroken or smooth surface.

4.2 Feed openings and safety distances

To safeguard against contact with the cutting means the machines shall be constructed to meet the requirements given in tables 1 and 2.

Table 1 — Safety distances from feed openings less than 250 mm

Dimensions in millimetres

Feed opening size[1]	Distance from opening to cutting means		
	Feed opening shape		
	slot	square	round
⩽ 40	⩾ 200	⩾ 200	⩾ 120
> 40 ⩽ 50	⩾ 850[2)3)]	⩾ 200	⩾ 200
> 50 ⩽ 250	⩾ 850[3)]	⩾ 850[3)]	⩾ 850[3)]

1) Measured across the narrowest point.

2) If the length of the slot opening measured along the longest side of the slot is ⩽ 65 mm, the safety distance can be reduced to 200 mm.

3) Where the height of the lowest outer edge of any barrier or the feed opening itself is ⩾ 1 200 mm above the ground, the safety distance is measured as a chain measurement from the outer edge (see figure 3). Openings < 1 200 mm above the ground are measured as the shortest distance from the plane of the opening. If the opening is more than 1 200 mm above the ground, this safety distance to the cutting means can be reduced by $L/2$ where $L = h - 1\,200$ and h is the height above the ground of the lowest point of the feed opening.

Where a feed opening is not a slot, square or round, the overall size of the opening is considered to be a slot, square, or round envelope that contains the opening. The shortest safety distance of this envelope may then be used. Where a combination of slots, squares, and/or rounds are used and they create a pinch point of less than or equal to 30 mm, each shape can be considered separately for opening size and safety distance.

Figure 3 — Chain measurement

Table 2 — Safety distances from feed openings greater than 250 mm

Dimensions in millimetres

Height above the ground at the lowest edge of the feed opening	Distance to the cutting means from the edge of the feed opening
⩽ 1200	⩾ 1200[1)]
⩾ 1200	⩾ 850[2)]

1) Where the height of the lowest edge of the opening is below 1 200 mm, the chute shall be restricted to not more than 400 mm × 400 mm at the distance of at least 850 mm from the cutting means and the actual opening shall measure no more than 1 000 mm in any direction (see figure 4).

2) Where the height of the lowest outer edge of any barrier or the feed opening itself is ⩾ 1 200 mm above the ground, the safety distance is measured as a chain measurement from the outer edge (see figure 3). Openings < 1 200 mm above the ground are measured as the shortest distance from the plane of the opening. If the opening is more than 1 200 mm above the ground, this safety distance to the cutting means can be reduced by $L/2$ where $L = h - 1\,200$ and h is the height above the ground of the lowest point of the feed opening.

Dimensions in millimetres

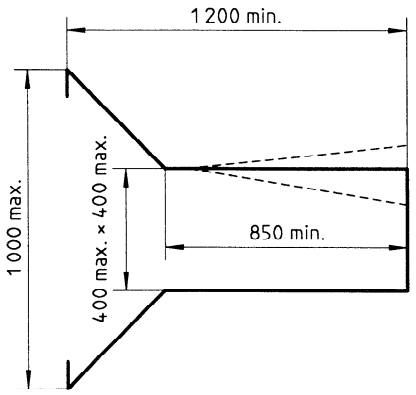


Figure 4 — Example of compliance with table 2 for height opening below 1200 mm

4.3 Discharge openings

The discharge chute shall be designed so as to prevent direct access to and accidental contact with the cutting means, where no part of the outer edge of the discharge chute is more than 350 mm from the ground. The cutting means shall be at least 3 mm above the highest part of the outer edge of the discharge chute and the minimum distance from the chute edge to the hazard point shall be 230 mm (see figure 5).

Dimensions in millimetres

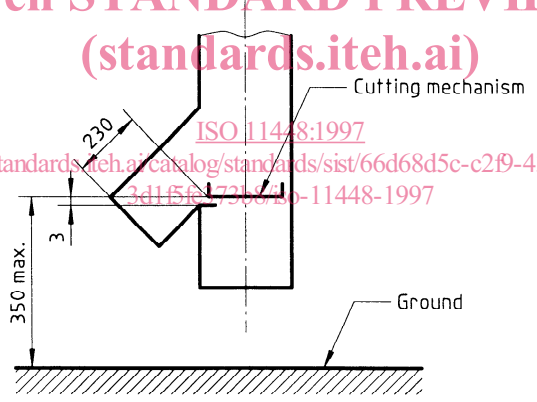


Figure 5 — Discharge opening distance requirements

If the highest edge of the discharge opening is greater than 350 mm from the ground and smaller than 120 mm × 120 mm, the safety distance shall conform to the principles set out in ISO 13852.

If the highest edge of the discharge opening is greater than 350 mm from the ground and larger than 120 mm × 120 mm, the safety distance shall be at least 850 mm and the maximum discharge opening shall be 250 mm × 250 mm.

Discharge openings enclosed with a bag or container which when removed does not meet the above requirements shall be fitted with an interlock which cause the moving parts to come to rest. While the cutting means is exposed it shall not be possible to start the engine.

4.4 Guard attachment

Guards allowing access to the cutting means shall be interlocked to cause the moving parts to come to rest before access can be gained. It shall not be possible to start the engine while the cutting means is exposed. Other guards shall be permanently attached to the machine and shall not be detachable without the use of tools, or the construction of the machine shall be such that it cannot be used without the guard in its guarding position.

Guards shall be provided to prevent accidental contact with hazardous points when servicing the machine as recommended by the manufacturer. Guards may require repositioning for servicing requirements as directed by manufacturer's instructions.

Where a guard is designed to be opened or removed and thus exposes a hazard, a safety sign warning of the hazard shall be located on the guard or adjacent to the hazard.

Where a guard is positioned so that it may be used as a step, it shall withstand a force of 1 200 N.

4.5 Heat protection

4.5.1 Temperature limits of exposed parts

A guard shall be provided to prevent accidental contact with any exposed engine exhaust components which are larger than 10 cm^2 and which have a surface temperature greater than 80 °C (at 20 °C ± 3 °C) ambient temperature during normal starting and operation of the machine. For the purposes of this equipment, the guard is considered to be part of the exposed engine exhaust components.

4.5.2 Test equipment and method of test

4.5.2.1 Test equipment

The measuring equipment shall have an accuracy of ± 4 °C.

4.5.2.2 Method of test

The test shall be conducted in the shade. The engine shall be operated at its maximum operating speed until the surface temperatures stabilize. Temperatures shall be determined by correcting the observed temperature by the difference between the specified ambient and test ambient temperature. Identify the hot surface area(s) on the engine exhaust system. When the distance between the identified hot area and the nearest control is greater than 100 mm, cone A shall be used. When the distance between the identified hot area and the nearest control is less than 100 mm, cone B shall be used. See figure 6.

For cone A, move the cone, keeping the axis of the cone anywhere between 0° and 180° to the horizontal and with the nose or point of the cone in a downward to horizontal direction towards the hot surface. The cone shall not be moved in an upward direction. Move cone B in any direction. When moving the cone, determine if the cone tip or conical surface makes contact with the hot surface area(s).

4.5.2.3 Test acceptance

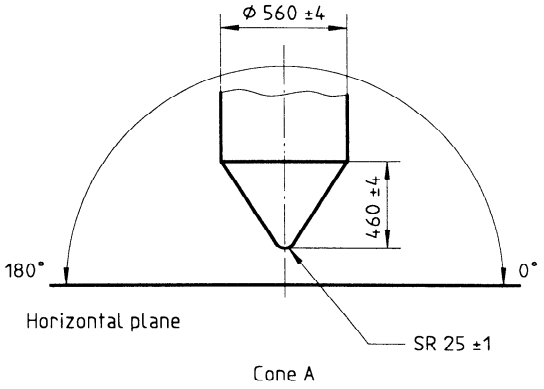
The tip or conical surface of cone A or B shall not be able to make contact with a hot surface area greater than 10 cm^2 of the exhaust system.

4.6 Controls

4.6.1 Location

No control used for stopping, starting, or speed control shall be located in such a manner as to require the operator to be in the discharge zone or in front of the engine exhaust outlet.

Dimensions in millimetres



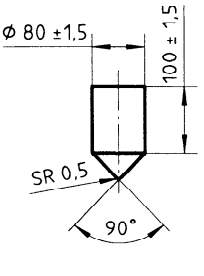


Figure 6 — Test cones

4.6.2 Engine stopping and starting

An engine stopping device shall be provided. The device shall not depend on sustained manual pressure for its continued operation. The device shall require manual and intentional activation in order to restart the engine, and shall be accessible from starting positions.

Machines shall not be equipped with a starter operated by means of a loose rope.

Machines started by means of a crank shall disconnect the crank from the shaft immediately after starting.

4.6.3 Identification of controls

The function, direction and/or method of operation of the controls shall be clearly identified by a durable label or mark.

Easily understandable, detailed instructions on the operation of all controls shall be provided in an operator's manual.

NOTE — International symbols may be used for identification of controls. Reference should be made to ISO 3767-1, ISO 3767-3 and ISO 3767-5.

5 Marking

5.1 Machine identification

All machines shall be marked legibly and permanently with the following information:

— name of the manufacturer or supplier;

— model number or type;

— serial number.

5.2 Warnings and symbols

All machines shall be prominently marked with the following warnings (hazard pictorials) or appropriate symbols:

— **"DANGER: Rotating cutting blades. Keep hands and feet out of openings while machine is running."** (wording should be adjusted to suit specific machine under consideration);

— "Read operator's manual";

— "Wear eye protection";

— "Wear ear protection" (when appropriate);

— "Wear ear and eye protection" (when appropriate);

— direction of rotation of cutting means.

The symbols or hazard pictorials shall follow the conventions laid down in ISO 3767-1, 3767-3 and 3767-5 for symbols, and in ISO 11684 for hazard pictorials. This International Standard does not require specific symbols or hazard pictorials to be used on the machine, but stresses that accepted conventions shall be used when developing the appropriate symbol or hazard pictorial. Annex D presents examples of symbols and hazard pictorials which may be used on shredders and chippers.

All symbols and hazard pictorials shall be explained in the operator's manual.

5.3 Labels

5.3.1 Requirements

Labels provided for identification and directional or cautionary information shall have a reasonable life for the anticipated machine operating environment and shall satisfy the following requirements:

— the label shall have a durable bond with the base surface material;

— the label shall be weather resistant and under normal cleaning procedures shall not fade, discolour, crack or blister and shall remain legible;

— marks or labels giving cautionary information shall be located close to the relevant hazard. Such labels shall be in the official language(s) of the country in which the product is sold.

5.3.2 Durability test

To test the durability of the marking and/or labels, rub them by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with hexane.

After the test the marking shall be easily legible, it shall not be easily possible to remove any labels and they shall shown no curling.

6 Maintenance and operation requirements

Each machine shall be provided with a manual giving operating, servicing and maintenance instructions. The instructions shall include those operations which can normally be performed by the operator.

NOTE — For advice on formatting of instructions, see ISO 3600.

The instructions shall include, where appropriate, the following: