
**Agricultural and forestry machinery —
Safety requirements and testing for
portable, hand-held, powered brush-
cutters and grass-trimmers —**

**Part 2:
Machines for use with back-pack power
unit**

*Matériel agricole et forestier — Exigences de sécurité et essais pour
débroussailleuses et coupe-herbe portatifs à moteur —*

Partie 2: Machines pour utilisation avec source motrice portée à dos



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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 11806-2 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 17, *Manually portable forest machinery*.

This first edition of ISO 11806-2 cancels and replaces ISO 14865:1998 and ISO 14740:1998.

ISO 11806 consists of the following parts, under the general title *Agricultural and forestry machinery — Safety requirements and testing for portable, hand-held, powered brush-cutters and grass-trimmers*:

- *Part 1: Machines fitted with an integral combustion engine*
- *Part 2: Machines for use with back-pack power unit*

iv

Introduction

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

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the scope of this document.

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

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Agricultural and forestry machinery — Safety requirements and testing for portable, hand-held, powered brush-cutters and grass-trimmers —

Part 2: Machines for use with back-pack power unit

1 Scope

This part of ISO 11806 gives safety requirements and measures for their verification for the design and construction of portable, hand-held, powered brush-cutters and grass-trimmers with a back-pack-mounted combustion engine power source and mechanical power transmission between the power source and the cutting attachment. Methods for the elimination or reduction of hazards arising from the use of these machines and the type of information on safe working practices to be provided by the manufacturer are specified.

This part of ISO 11806, taken together with the relevant clauses of ISO 11806-1 (see 4.1), deals with all significant hazards, hazardous situations and hazardous events, with the exception of whole-body vibration from the back-pack power unit, relevant to these machines when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

NOTE 1 A standardized test procedure for measuring whole-body vibration from the back-pack power unit is presently not available.

NOTE 2 See Annex A, together with Annex A in ISO 11806-1:2011, for a list of significant hazards.

This part of ISO 11806 is applicable to portable, hand-held, powered brush-cutters and grass-trimmers manufactured after its date of publication.

This part of ISO 11806 is not applicable to machines equipped with metallic cutting attachments consisting of more than one piece, e.g. pivoting chains or flail blades.

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 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 11806-1: 2011, *Agricultural and forestry machinery — Safety requirements and testing for portable, hand-held, powered brush-cutters and grass-trimmers — Part 1: Machines fitted with an integral combustion engine*

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11806-1 and the following apply.

NOTE Figure 1 provides an example of a brush-cutter with a back-pack power source falling within the scope of this part of ISO 11806.

3.1

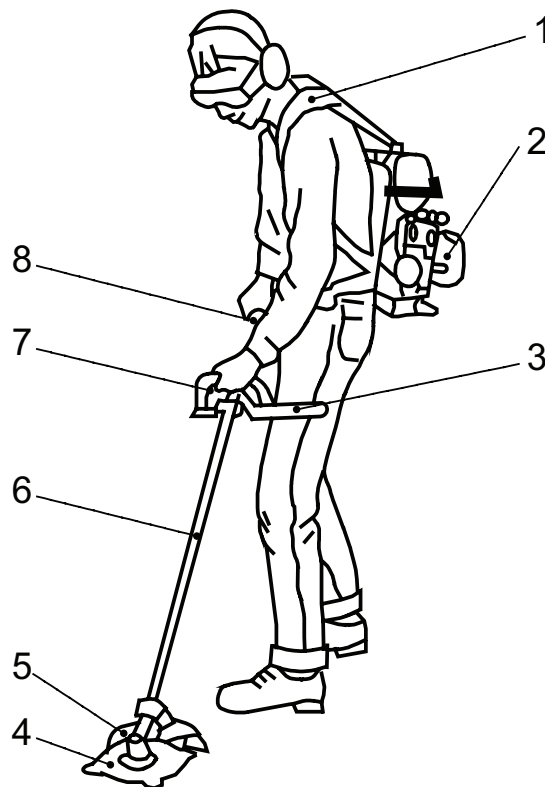
appliance

assembly of drive shaft tube, cutting attachment with its guard and handles

3.2

machine

complete brush-cutter (or grass-trimmer), including back-pack power unit and appliance



Key

- 1 harness
- 2 back-pack power unit
- 3 barrier
- 4 blade
- 5 cutting-attachment guard
- 6 drive-shaft tube
- 7 front handle
- 8 rear handle

Figure 1 — Example of a brush-cutter with back-pack power unit

4 Safety requirements and/or protective measures

4.1 General

Machines shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of ISO 12100 for relevant but not significant hazards which are not dealt with by this part of ISO 11806.

Machines shall comply with ISO 11806-1:2011, Clause 4, except for 4.5.

The safe operation of a brush-cutter and a grass-trimmer also depends on the safe environment associated with the use of personal protective equipment (PPE), such as gloves, slip-resistance footwear, and leg, eye and hearing protective equipment, as well as safe working procedures (see ISO 11806-1:2011, 5.1).

If a grass-trimmer can be converted to a brush-cutter then the converted machine shall comply with requirements for a brush-cutter and vice versa.

Except where otherwise specified in this part of ISO 11806, the safety distances specified in ISO 13857:2008, 4.2.4.1 and 4.2.4.3, shall be met.

4.2 Distance to cutting attachment

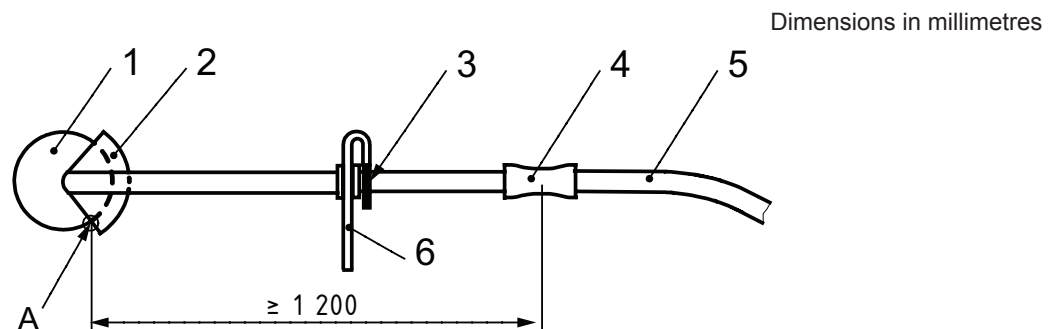
4.2.1 Requirements

Machines with front and rear handles shall have a minimum straight-line distance of 1 200 mm from the mid-point of the rear handle to the nearest unguarded point of the cutting attachment (point A in Figure 2). Point A is the intersection between the plane perpendicular to the cutting path and the side-edge of the cutting-attachment guard.

This minimum distance shall apply to all recommended cutting attachments.

4.2.2 Verification

The distance shall be verified by measurement.



Key

- 1 cutting attachment
- 2 guard
- 3 centre at rear of front handle
- 4 handle grip
- 5 flexible power transmission
- 6 barrier

Figure 2 — Example of an appliance with a saw-blade cutting attachment and front and rear handles

4.3 Handgrip on back-pack power unit

4.3.1 Requirement

A handgrip shall be available which may be a part of the frame and which shall allow an operator to grasp the back-pack power unit for handling and transport.

The handgrip shall be designed such that

- it can be fully gripped by an operator when wearing gloves,
- it provides the necessary sureness of grip by its shaping and surface,
- its length is at least 100 mm and where, for a bail or closed hand-grip, this length is straight or curved at a radius greater than 100 mm together with any blend radius, but not more than 10 mm at one or both ends of the gripping surface.

4.3.2 Verification

The handgrip design shall be verified by inspection, measurement and functional testing.

4.4 Harness for back-pack power unit

4.4.1 Requirements

A double shoulder harness shall be provided to carry the back-pack power unit. It shall be adjustable to fit the size of the operator.

The harness shall be equipped with a quick-release mechanism positioned either at the connection between the power source and the harness or between the harness and the operator. Either the design of the harness or the use of the quick-release mechanism shall enable the back-pack power unit to be released quickly from the operator in the event of an emergency.

If a quick release mechanism is provided it shall be possible to open it under load to release the back-pack power unit using only one hand.

4.4.2 Verification

The harness, its functionality and its adjustment shall be verified by inspection. The quick-release mechanism shall be checked by a functional test, carried out by a person wearing the harness with a vertical load of three times the dry weight of the back-pack power unit acting on the suspension point.

4.5 Hydraulic and pneumatic pipes and hoses

4.5.1 Requirements

Hydraulic systems shall comply with the safety requirements of ISO 4413. Pneumatic systems shall comply with the safety requirements of ISO 4414.

Hydraulic and pneumatic pipes and hoses subject to internal pressures in excess of 500 kPa shall be shielded so that in the event of rupture during operation of the machine, the fluid cannot be discharged directly onto the operator.

4.5.2 Verification

The shielding of pipes and hoses shall be verified by inspection.

5 Information for use

The instruction handbook to be provided with the machine shall comply with ISO 11806-1:2011, 5.1.

The machine shall be marked in accordance with ISO 11806-1:2011, 5.2, and carry warnings in accordance with ISO 11806-1:2011, 5.3.

Annex A (informative)

List of significant hazards

This annex specifies the additional significant hazards, hazardous situations and significant hazardous events that have been identified as being significant for the back-pack power unit for brush-cutters and grass-trimmers and which require specific action by the designer or manufacturer to eliminate or reduce the risk.

Table A.1 — List of significant hazards associated with back-pack power unit for brush-cutters and grass-trimmers

Ref. No.	Hazard		Subclause of this part of ISO 11806
	Origin (source)	Potential consequences	
1	Mechanical hazards		
	Hydraulic and pneumatic system	Injury from high-pressure fluid injection	4.4
2	Combination of hazards		
	Poor postures or excessive effort in combination with inadequate design or location of manual controls, including inadequate consideration of human hand-arm anatomy, related to handle design and machine balance.	Discomfort, fatigue, injuries to locomotor apparatus, loss of control	4.2, 4.3

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