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Agricultural and forestry machinery - Safety of log splitters - Part 1: Wedge splitters

Land- und Forstmaschinen - Sicherheit von Holzspaltmaschinen - Teil 1:
Keilspaltmaschinen

Matériel agricole et forestier - Sécurité des fendeuses de bûches - Partie 1: Fendeuses à
coin

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EUROPEAN STANDARD
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**Agricultural and forestry machinery - Safety of log splitters
- Part 1: Wedge splitters**

Matériel agricole et forestier - Sécurité des fendeuses
de bûches - Partie 1 : Fendeuses à coin

Land- und Forstmaschinen - Sicherheit von
Holzspaltmaschinen - Teil 1: Keilspaltmaschinen

This European Standard was approved by CEN on 2 October 2016.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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EN 609-1:2017 (E)**European foreword**

This document (EN 609-1:2017) has been prepared by Technical Committee CEN/TC 144 “Tractors and machinery for agriculture and forestry”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by June 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 609-1:1999+A2:2009.

This document 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 2006/42/EC.

For relationship with EU Directive 2006/42/EC, see informative Annex ZA, which is an integral part of this document.

EN 609, *Agricultural and forestry machinery — Safety of log splitters*, is currently composed with the following parts:

- *Part 1: Wedge splitters;*
- *Part 2: Screw splitters.*

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The new edition of this standard proposes a new specific approach, which evaluates the dangers of specifically this type of machine. Machines have been divided into four categories, which are machines for short logs or long logs with splitting direction of horizontal or vertical to reflect the differences concerning safety issues.

The main changes in this new edition are the following:

- four (4) different machine categories, which all have machine specific safety requirements and options (Horizontal and Vertical – Long logs and Short logs);
- more specific interpretation of safety distances for these specific types of machines (EN 13857 and machine specific distances);
- specific requirements for log handling, which includes holding before, during and after the splitting, but also log lifting;
- improved ergonomic requirements, which consider the actual use of the machine;
- requirements for AOPD;
- requirements for hauling winches that can be, and often are, attached to the wedge splitters;
- new tests and verifications, how to interpret the standard.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom..

Introduction

The structure of safety standards in the field of machinery is as follows:

- a) type-A standards (basic standards) giving basic concepts, principles for design, and general aspects that can be applied to machinery;
- b) type-B standards (generic safety standards) dealing with one or more safety aspects or one or more types of safeguards that can be used across a wide range of machinery:
 - 1) type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);
 - 2) type-B2 standards on safeguards (e.g. two-hand control device, interlocking devices, pressure-sensitive devices, guards);
- c) type-C standards (machinery safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This document is a type “C” standard as defined in EN ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

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

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

EN 609-1:2017 (E)

1 Scope

This European Standard specifies the safety requirements, and their verification for the design and construction of horizontal and vertical wedge splitters, designed for splitting logs for firewood, irrespective of the nature of the power source used. This standard deals with wedge splitters that are designed so that the splitting operation is activated by one person only, however it is foreseeable that other operators may be working with the machine e.g. for loading or unloading. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

This document deals with all the significant hazards, hazardous situations and hazardous events relevant to these machines when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Table 1).

This document is not applicable to machines that are designed for both cutting into length for splitting and splitting for firewood.

This document is not applicable to wedge splitters which are manufactured before the date of publication of this document by CEN.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 574:1996+A1:2008, *Safety of machinery - Two-hand control devices - Functional aspects - Principles for design*

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EN 691-1:2012, *Safety of woodworking machines - Part 1: Common requirements*

EN 894-1:1997+A1:2008, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 1: General principles for human interactions with displays and control actuators*

EN 894-3:2000+A1:2008, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators*

EN 12965:2003+A2:2009, *Tractors and machinery for agriculture and forestry - Power take-off (PTO) drive shafts and their guards - Safety*

EN 14492-1:2006+A1:2009, *Cranes - Power driven winches and hoists - Part 1: Power driven winches*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2006)*

EN 60529:1991¹⁾, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61496-1:2013, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests (IEC 61496-1:2012)*

1) EN 60529:1991 is impacted by the stand-alone amendments EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013 and the corrigendum EN 60529:1991/corrigendum May 1993.

EN 61496-2:2013, *Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) (IEC 61496-2:2013)*

EN ISO 4254-1:2015, *Agricultural machinery - Safety - Part 1: General requirements (ISO 4254-1:2013)*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13850, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850)*

EN ISO 13855:2010, *Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

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

EN ISO 14119:2013, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2013)*

EN ISO 14120:2015, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

IEC 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*

ISO 3767-1:1998²⁾, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols*

ISO 3767-2:2016, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 2: Symbols for agricultural tractors and machinery*

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

2) ISO 3767-1:1998 is impacted by the stand-alone amendments ISO 3767-1:1998/Amd 1 2008 and ISO 3767-1:1998/Amd 2 2012.

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN ISO 12100:2010 and the following definitions apply.

3.1

wedge splitter

machine in which the log is split as the result of being pressed between a wedge (i.e. the cutting tool of the machine) and a plate

Note 1 to entry: See Figures 1 to 4.

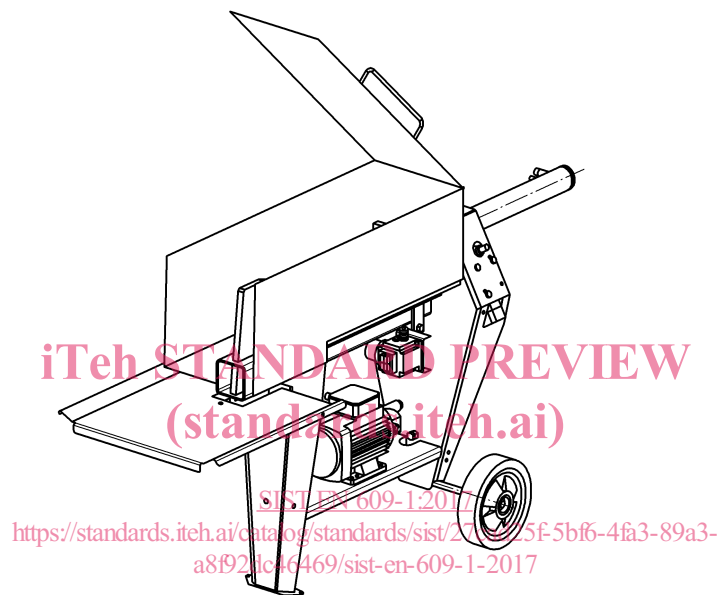


Figure 1 — Example of a horizontal short log wedge splitter

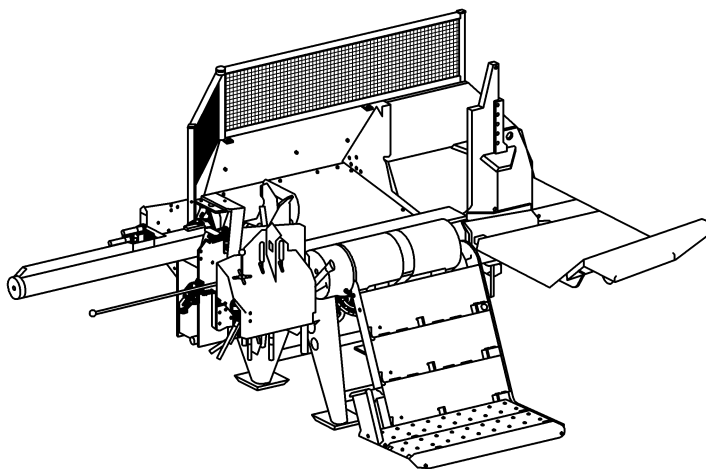


Figure 2 — Example of a horizontal long log wedge splitter

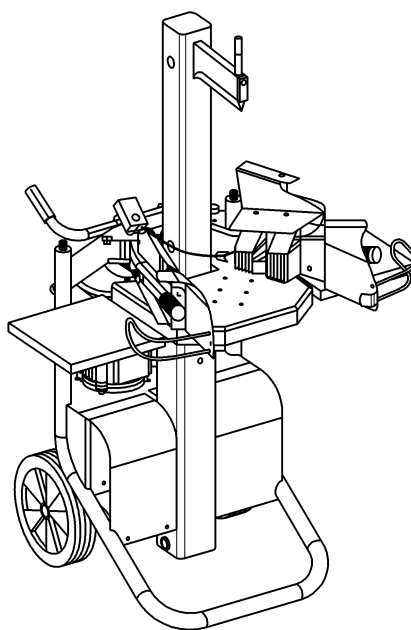


Figure 3 — Example of a vertical short log wedge splitter

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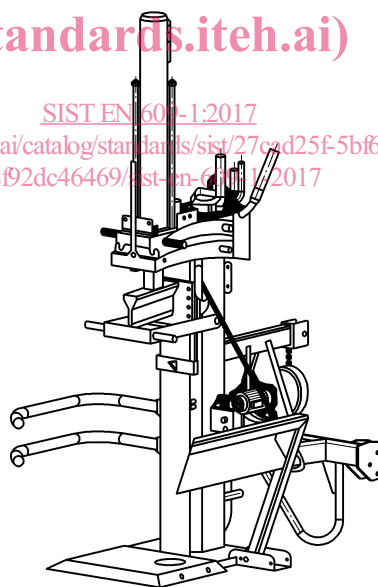


Figure 4 — Example of a vertical long log wedge splitter

3.2

horizontal wedge splitter

wedge splitter with an inclination of the splitting axis of between 0° to 30° to horizontal axis

3.3

vertical wedge splitter

wedge splitter with an inclination of the splitting axis of between 90° to 120° to the horizontal axis

EN 609-1:2017 (E)**3.4****automatic wedge splitter**

wedge splitter in which, after the process is started, continuous feeding of the splitting zone, splitting of the log and the discharge of the splitting zone is carried out without further operator intervention

3.5**semi-automatic wedge splitter**

wedge splitter, in which a single splitting process is started by the operator actuating a control and the splitting process is completed without further operator intervention

3.6**manual wedge splitter**

wedge splitter in which a log is placed manually for splitting and the splitting movement is carried out using a hold-to-run device

3.7**short log wedge splitter**

wedge splitter in which the space between the foremost point of the splitting wedge and the pressure plate or a log support plate is 550 mm or less

3.8**long log wedge splitter**

wedge splitter in which the space between the foremost point of the splitting wedge and the pressure plate or a log support plate is greater than 550 mm

3.9**pressure plate**

moving part of the machine which pushes the log against a wedge

3.10**wedge**

stationary or moving tool which causes the log to split

3.11**log support plate**

stationary part of the machine against which the log is pushed by the moving wedge

3.12**splitting zone**

area in which the log is being split

3.13**splitting bed**

part of a horizontal wedge splitter on which the log is placed for splitting

3.14**log handling device**

part of a wedge splitter, which is used for positioning or lifting the log for splitting e.g. hoist or winch

3.15**AOPD**

active optoelectronic protective device

4 List of significant hazards

Table 1 gives the significant hazard(s), the significant hazardous situation(s) and hazardous event(s) covered by this document that have been identified by risk assessment as being significant for this type of machine, and which require specific action by the designer or manufacturer to eliminate or reduce the risk.

Attention is drawn to the necessity to verify that the safety requirements specified in this document apply to each significant hazard presented by a given machine and to validate that the risk assessment is complete.

Table 1 — List of significant hazards

No	Hazards, hazardous situations and hazardous events	EN ISO 12100	Relevant subclause of this document
1	Mechanical hazards related to: - machine parts or work pieces:		
	a) shape;	6.2.2.1, 6.2.2.2, 6.3	5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.18
	b) relative location;		5.9, 5.10, 5.11, 5.12, 5.13, 5.18
	c) mass and stability (potential energy of elements which may move under the effect of gravity)		5.10, 5.12, 5.13, 5.16, 5.18
	d) mass and velocity (kinetic energy of elements in controlled or uncontrolled motion);		5.9, 5.10, 5.11, 5.12, 5.13, 5.16, 5.18
	e) mechanical strength.		5.9, 5.10, 5.11, 5.12, 5.13, 5.16
	- accumulation of energy inside the machinery:		
	g) liquids and gases under pressure;	6.2.10, 6.3.5.4	5.7, 5.8
1.1	Crushing hazard		5.9, 5.10, 5.11, 5.12, 5.13, 5.17, 5.18
1.2	Shearing hazard		5.9, 5.10, 5.11, 5.12, 5.13
1.3	Cutting or severing hazard		5.9, 5.10, 5.11, 5.12, 5.13
1.4	Entanglement hazard		5.9, 5.10, 5.11, 5.12, 5.13, 5.16, 5.17.

No	Hazards, hazardous situations and hazardous events	EN ISO 12100	Relevant subclause of this document
1.5	Drawing-in or trapping hazard		5.9, 5.10, 5.11, 5.13, 5.16, 5.17
1.9	High pressure fluid injection or ejection hazard	6.2.10	5.7, 5.8
2	Electrical hazards due to:		
2.1	Contact of persons with live parts (direct contact)	6.2.9, 6.3.5.4	5.2, 5.3, 5.7.1
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	6.2.9	5.2, 5.3, 5.7.1
8	Hazards generated by neglecting ergonomic principles in machinery design related to:		
8.1	Unhealthy postures or excessive effort	6.2.7, 6.2.8.2, 6.2.11.12, 6.3.5.5, 6.3.5.6	5.3, 5.16
8.2	Hand-arm or foot-leg anatomy	6.2.8.3	5.3, 5.16
8.4	Local lighting	6.2.8.6	7.3
8.6	Human error, human behaviour	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4	7.3
8.7	Design, location or identification of manual controls	6.2.8.7, 6.2.11.8	5.3
8.8	Design or location of visual display units	6.2.8.8, 6.4.2	5.3
9	Combination of hazards	6.3.2.1	5.7
10	Unexpected start up, unexpected overrun/over speed (or any similar malfunction) from:		
10.1	Failure/disorder of the control system	6.2.11, 6.3.5.4	5.3.2, 5.4, 5.7
10.2	Restoration of energy supply after an interruption	6.2.11.4	5.3.2, 5.4, 5.7, 5.8
10.3	External influences on electrical equipment	6.2.11.11	5.3, 5.7.1
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, See 8.6)	6.2.8, 6.2.11.8, 6.2.11.10, 6.3.5.2, 6.4.3	5.3, 7.3
11	Impossibility of stopping the machine in the best possible conditions	6.2.11.1, 6.2.11.3, 6.3.5.2	5.3, 5.4, 5.5, 5.7

No	Hazards, hazardous situations and hazardous events	EN ISO 12100	Relevant subclause of this document
13	Failure of the power supply	6.2.11.1, 6.2.11.4	5.3.2, 5.7
14	Failure of the control circuit	6.2.11, 6.3.5.4	5.3.2
15	Errors of fitting	6.2.7, 6.4.5	7.3
16	Break-up during operation	6.2.3	5.3.2, 7.3
17	Falling or ejected objects or fluids	6.2.3, 6.2.10	5.8, 5.9, 5.10,
18	Loss of stability / overturning of machinery	6.3.2.6	5.10, 5.12, 5.13, 5.15, 5.16, Annex D

5 Safety requirements and/or protective measures

5.1 General

Machinery shall comply with the safety requirements and/or protective measures of Clause 5. The machine shall also be marked in accordance with 7.2 and shall be provided or equipped with warnings in accordance with 7.3.

In addition, the machine shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards which are not dealt with by this document.

On a wedge splitter, which can be used both in the horizontal and vertical position, all requirements for both systems shall be fulfilled.

Access to the rotating or moving parts shall be prevented. Guarding, see EN ISO 14120 for fixed and movable guards, shall comply with EN ISO 13857:2008, Tables 1, 3, 4 and 6.

5.2 Electrical equipment

The electrical equipment of electrically driven machines shall comply with EN 60204-1.

The degree of protection of all electrical components shall be a minimum of IP54, and IP 44 for the plug and main switch box in accordance with EN 60529.

See 7.3.2 w) for the use of portable residual current device.

5.3 Control systems

5.3.1 General

Unless otherwise specified in this document controls shall be at least category 1 in accordance with EN ISO 13849-1:2015, 6.2.4.

Log splitters shall be equipped with only one control station.