



SLOVENSKI STANDARD
SIST EN 609-1:1999

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Kmetijski in gozdarski stroji - Varnost cepilnikov lesa - 1. del: Cepilniki s klinom

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 buches - Partie 1: Fendeuses a
coin

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Ta slovenski standard je istoveten z: EN 609-1:1999

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ICS 65.060.80

English version

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 20 February 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Contents

	Page
Foreword	3
0 Introduction	4
1 Scope	4
2 Normative References	4
3 Definitions	5
3.1 Wedge splitter	5
4 Safety requirements	5
4.1 Electrical equipment.....	5
4.2 Safety and reliability of control systems.....	6
4.3 Starting and stopping	6
4.4 Hydraulic equipment	7
4.5 Log support	7
4.6 Guarding of the splitting zone.....	7
4.7 Return movement of the splitting wedge.....	7
4.8 Stability	8
4.9 Additional requirements for vertical wedge splitters.....	8
4.10 Guarding of mechanical drives	10
5 Verification of safety requirements	11
6 Information for use	11
6.1 Marking	11
6.2 Warning notices	11
6.3 Instruction handbook	12
Annex A (normative)	14
List of hazards	14
Annex ZA (informative)	19
Clauses of this European Standard addressing essential requirements or other provisions of EU Directives	19

Foreword

This European Standard 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 September 1999, and conflicting national standards shall be withdrawn at the latest by September 1999.

This European Standard 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(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

The annex A is normative and contains the "List of hazards".

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0 Introduction

The extent to which hazards are covered is indicated in the scope of this standard. In addition, machinery shall comply as appropriate with EN 292-1 and EN 292-2 for hazards which are not covered by this standard.

1 Scope

This European Standard specifies safety requirements, and their verification for the design and construction of wedge splitters, designed to be used by one operator for splitting wood, irrespective of the nature of the power source used.

On a dual purpose circular saw for firewood/log splitting machine only the log splitter part of the machine is covered by this standard. For circular saws for firewood see prEN 1870-6:1997.

This standard describes methods for the elimination or reduction of risks arising from their use. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

The list of significant hazards dealt with is given in annex A. Annex A also indicates the hazards which have not been dealt with.

This European Standard applies primarily to machines which are manufactured after the date of issue of the standard.

2 Normative References

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 292-1	1991	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN 292-2	1991	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications
EN 292-2/A1	1995	
EN 574	1996	Safety of machinery - Two-hand control devices - Functional aspects - Principles for design
EN 953	1997	Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards
EN 954-1	1996	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
EN 982	1996	Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulics
EN 1088	1995	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection

EN 60204-1	1992	Safety of machinery - Electrical equipment of machines – Part 1: General requirements
EN 60529	1991	Degrees of protection provided by enclosures (IP code)
EN 60947-4-1	1992	Low-voltage switchgear and controlgear - Part 4: Contactors and motor-starters - Section 1: Electromechanical contactors and motor-starters
EN 60947-5-1	1991	Low-voltage switchgear and controlgear - Part 5: Control circuit devices and switching elements - Section 1: Electromechanical control circuit devices
prEN 1553	1998	Agricultural and, machinery - Agricultural self-propelled, mounted, semi-mounted and trailed machines - Common safety requirements -
prEN 1870-6	1997	Safety of woodworking machines - Circular sawing machines – Part 6: Firewood sawing machine/circular saw bench with manual loading and/or unloading
prEN 12965	1997	Tractors and machinery for agriculture and forestry – Power take-off drive shafts and their guards - Safety
HD 21.1 S1	1997	Polyvinyl chloride insulated cables Polyvinyl of rated voltages up to and including 450/750 V; Part 1: General requirements
HD 22.1 S3	1997	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 1: General requirements

3 Definitions

For the purposes of this European Standard, the definitions given in EN 292-1 apply together with the following definition:

3.1 Wedge splitter

A log splitting machine in which the log is pressed against a fixed plate by means of a splitting wedge (see figures 1 to 3 for examples), or in which a log is split by being pressed against a fixed splitting wedge by a pressure plate.

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4 Safety requirements

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4.1 Electrical equipment

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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 IP 54 in accordance with EN 60529.

See 6.3 s) for the use of PRCD.

4.2 Safety and reliability of control systems

Control systems shall be at least category 1 according to 6.2.2 of EN 954-1:1996.

For the purpose of this standard, "safety related control systems" means the system from and including the initial manual control or position detector to the point of input to the final actuator or element, e.g. motor. Safety related control systems of this machine include the following :

- starting ;
- normal stopping ;
- interlocking devices ;
- interlocking devices with guard locking.

For the purpose of this standard "well tried" according to EN 954-1 means :

- a) for electrical components that they comply with the relevant standards such as :
 - EN 60947-5-1:1991 (section 3) for control switches with positive opening operation used as mechanically actuated position detectors for interlocking guards and for relays used in auxiliary circuits ;
 - EN 60947-4-1 for electromechanical contactors and motor starters used in main circuits ;
 - HD 22.1 S3 for rubber insulated cables ;
 - HD 21.1 S1 for polyvinyl chloride insulated cables if these cables are additionally protected against mechanical damage by positioning (e.g. inside frames) ;
- b) for electrical principles that they comply with the first four measures listed in 9.4.2.1 of EN 60204-1:1992. The circuits shall be "hardwired". Electronic components alone do not fulfil category 1 ;
- c) for mechanical components that they comply with 3.5 of EN 292-2:1991 ;
- d) for mechanically actuated position detectors for guards that they are actuated in the positive mode and their arrangement/fastening and cam design/mounting comply with 5.2.2 and 5.3 of EN 1088:1995 ;
- e) for interlocking devices with guard locking that they are a minimum of type 3 according to table 1 of EN 1088:1995 ;
- f) for hydraulic components and systems that they comply with EN 982.

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4.3 Starting and stopping

On electrically driven machines, a control device for starting and stopping the machine shall be provided within the reach of the operator when he is in the operating position.

On machines not powered by electricity, the engine start and stop control or the tractor start and stop control are regarded as the operator's controls for starting and stopping the machine.

4.4 Hydraulic equipment

Hydraulic equipment shall comply with EN 982.

Pressurized hoses, lines and components shall be located or shielded so that in the event of rupture, the fluid can not be discharged directly onto the operator when in the operating position.

4.5 Log support

A support or holding device shall be provided for the log. This device shall be designed to allow the log to be split without the need for it to be held in position by the hands or feet. The device shall also prevent the log, or parts of it, falling onto the operator when he is in the operating position, before, during or after splitting. See figures 1 and 2 for examples.

4.6 Guarding of the splitting zone

During the splitting process, the splitting zone shall be guarded by one of the following methods:

- a) use of an interlocking guard with guard locking; it shall not be possible to open the guard if the splitting process is not complete and if pressure is being applied to the splitting wedge/pressure plate in the splitting direction. See figure 3 for example ;
- b) layout of the manual controls so that the operator cannot be caught between the pressure plate and the splitting wedge, or between the log and the splitting wedge, the pressure plate or other parts of the machine. This requirement is satisfied by using two-hand controls (see 9.1 to 9.4 and 9.6 of EN 574:1996) which conform to all of the following :
 - the two-hand controls shall be of the "hold-to-run" type, i.e. the splitting process is stopped if either manual control is released and ;
 - the wedge/the pressure plate shall not return to the starting position if one manual control is in the "On" position and ;
 - it shall be impossible to start the splitting process inadvertently or to operate both manual controls simultaneously with one hand or arm or with other parts of the body (see 9.1 to 9.4 and 9.6 of EN 574:1996) and ;
 - the controls shall be laid out in such a way that the operator has an unobstructed view of the splitting zone (see figures 1 and 2).

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4.7 Return movement of the splitting wedge

On machines where the wedge moves, the operator shall be protected against trapping hazards which arise between a log jammed on the wedge and parts of the machine as the wedge returns to the starting position. Protection can be achieved by one of the following measures :

- control of the return movement of the wedge by means of two-hand controls of the "hold- to-run" type; these may be the controls used to control the splitting process. The requirements in 4.6 of this standard shall be met ;
- automatic stopping of the wedge by a device (e.g. a touch bar, see figure 1) which is actuated by the jammed log. The force needed to actuate the device shall not exceed 50 N.

4.8 Stability

The machine shall be of an adequate stable design. The machine shall have a bearing surface which transmits to the ground a maximum pressure of 400 kPa.

The machine shall be designed to be stable when parked according to the instruction handbook (see 6.3 e)) and meet which ever of the following tests offers the greater margin of stability::

- a) the machine shall not turn over when it is placed on a horizontal hard surface, e.g. concrete, and subjected to an inclination of 8.5° in any direction;.
- b) the machine shall not turn over when it is placed on a horizontal hard surface, e.g. concrete, and subjected to a horizontal force of 300 N applied in all directions at a point 1650 mm from the ground or at the highest point of the machine - which ever is the smallest.

4.9 Additional requirements for vertical wedge splitters

In order to prevent foot injuries to the operator, on vertical wedge splitters where the support plate stands directly on the ground, the plate shall :

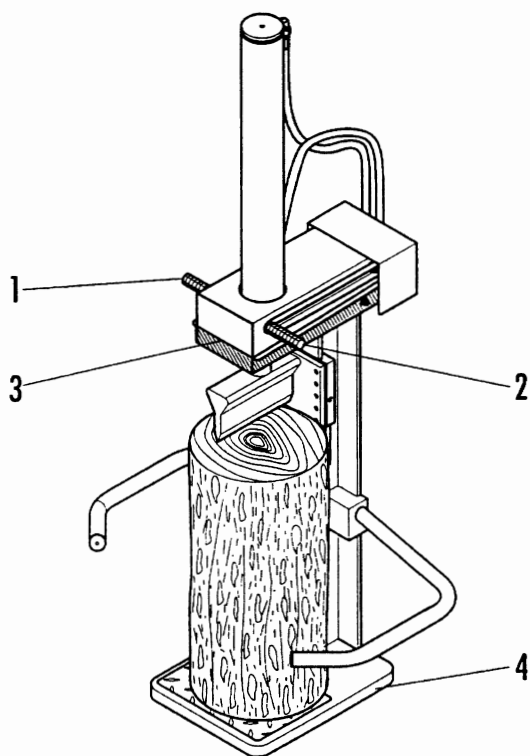
- extend forward at least 100 mm beyond the front edge of the wedge and;
- be at least 50 mm in height.

(See figure 1).

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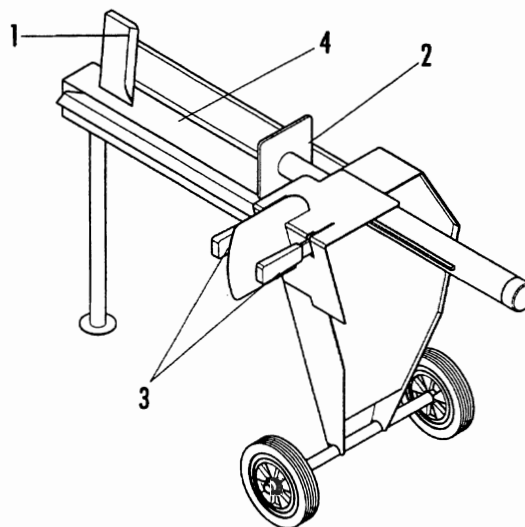
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- 1 1st control of two-hand control
- 2 2nd control of two-hand control
- 3 touch bar for return movement (see 4.7)
- 4 log support

Figure 1: Vertical wedge splitter



- 1 fixed wedge
- 2 movable pressure plate
- 3 two-hand controls
- 4 log support

Figure 2: Horizontal wedge splitter with fixed wedge

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