SLOVENSKI STANDARD
SIST EN 16517:2022

01-februar-2022

Kmetijski in gozdarski stroji - Mobilni žični žerjavi za spravilo lesa - Varnost

Agricultural and forestry machinery - Mobile yarders for timber logging - Safety

Land- und Forstmaschinen - Mobile Seilkrananlagen für den Holztransport - Sicherheit

Matériel agricole et forestier - Téléphériques forestiers mobiles pour l'exploitation du bois - Sécurité

Ta slovenski standard je istoveten z: **EN 16517:2021**

ICS:

53.020.99	Druga dvigalna oprema	Other lifting equipment
65.060.80	Gozdarska oprema	Forestry equipment

SIST EN 16517:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16517

December 2021

ICS 53.020.20; C

English Version

Agricultural and forestry machinery - Mobile yarders for timber logging - Safety

Matériel agricole et forestier - Téléphériques forestiers mobiles pour l'exploitation du bois - Sécurité

Land- und Forstmaschinen - Mobile Seilkrananlagen für den Holztransport - Sicherheit

This European Standard was approved by CEN on 24 October 2021.

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COMITÉ EUROPÉEN DE NORMALISATION
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Ref. No. EN 16517:2021 E

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European foreword

This document (EN 16517:2021) 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of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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 has been prepared under a Standardization Request 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 document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Cable yarders in the context of this document are machines consisting of a yarder (including all components), ropes (cables, lines) and a transporter system (carriage, rider block or butt rigg) where the trees/logs/wooden biomass is hooked on to the transporter. The yarder is mounted on a chassis (wheeled, tracked or sledge frame) and is designed for a quick change of location. In most cases, the logging operations change position on a 1-3 day frequency.

Typical operation for cable yarders is the close collaboration of mechanized components with workers, often in rough terrain. Cable yarding includes a lot of manual work in very difficult terrain where the weight of the tools and ropes has a direct impact on the operators' ergonomic workload. Ergonomics play therefore an important role in choosing adequate working coefficients for all elements. A review of the relevant literature; historical experience and operation of cable yarders have indicated a wide range of working coefficients (safety factor) with a focus on 2, 5 to 3 for the skyline and mainline.

This document is a type-C standard as stated 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 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.

1 Scope

This document gives safety requirements, and the means of verification, for the design and construction of mobile yarders for logging of forest products and their mounting. It counts for all logging operations with cable yarders both in sloped and flat terrain. In addition, it specifies the type of information on safe working practices (including residual risks) meant to be provided by the manufacturer.

It deals with the significant hazards (as listed in Table 1), hazardous situations and events relevant to mobile yarders used as intended and under the conditions of misuse foreseeable by the manufacturer (see Clauses 4 and 5).

Emission of noise (with regard to airborne noise) is not covered by this document.

It is not applicable to:

— rope splicing;

— ancillary loaders or cable cranes;

— cableways for material transport (other than wood); and

— skidder winches (skidding).

The specifications of cabin in this context are only relevant for the yarder or a yarder-loader combination. The cabin and the chassis of the vehicle (prime mover), to which the yarder is mounted are not part of this document.

This document is not applicable to mobile yarders manufactured before the date of its publication.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 353-1:2014+A1:2017, *Personal fall protection equipment - Guided type fall arresters including an anchor line - Part 1: Guided type fall arresters including a rigid anchor line*

EN 353-2:2002, *Personal protective equipment against falls from a height - Part 2: Guided type fall arresters including a flexible anchor line*

EN 12077-2:1998+A1:2008, *Cranes safety - Requirements for health and safety - Part 2: Limiting and indicating devices*

EN 12385-1:2002+A1:2008, *Steel wire ropes - Safety - Part 1: General requirements*

EN 12385-2:2002+A1:2008, *Steel wire ropes - Safety - Part 2: Definitions, designation and classification*

EN 12385-3:2020, *Steel wire ropes - Safety - Part 3: Information for use and maintenance*

EN 12385-4:2002+A1:2008, *Steel wire ropes - Safety - Part 4: Stranded ropes for general lifting applications*

EN 12965:2019, *Tractors and machinery for agriculture and forestry - Power take-off (PTO) drive shafts and their guards - Safety*

EN 12999:2020, *Cranes - Loader cranes*

EN 13001-3-1:2012+A2:2018, *Cranes - General Design - Part 3-1: Limit States and proof competence of steel structure*

EN 13001-3-2:2014, *Cranes - General design - Part 3-2: Limit states and proof of competence of wire ropes in reeving systems*

EN 13557:2003+A2:2008, *Cranes - Controls and control stations*

EN 13586:2020, *Cranes - Access*

EN 17067:2018, *Forestry machinery - Safety requirements on radio remote controls*

EN 60204-1:2018, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2016)*

EN 60204-32:2008, *Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines (IEC 60204-32:2008)*

EN 60947-5-5:1997,[1] *Low-voltage switchgear and controlgear - Part 5-5: Control circuit devices and switching elements - Electrical emergency stop device with mechanical latching function (IEC 60947-5-5:1997)*

EN 61000-6-2:2005,[2] *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments (IEC 61000-6-2:2005)*

EN 61000-6-4:2007,[3] *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4:2006)*

EN ISO 3411:2007, *Earth-moving machinery - Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 3449:2008, *Earth-moving machinery - Falling-object protective structures - Laboratory tests and performance requirements (ISO 3449:2005)*

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)*

[1] As impacted by EN 60947-5-5:1997/A1:2005, EN 60947-5-5:1997/A2:2017 and EN 60947-5-5:1997/A11:2013.

[2] As impacted by EN 61000-6-2:2005/AC:2005.

[3] As impacted by EN 61000-6-4:2007/A1:2011.

EN ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)*

EN ISO 13854:2019, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 13857:2019, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

ISO 730:2009,[4] *Agricultural wheeled tractors — Rear-mounted three-point linkage — Categories 1N, 1, 2N, 2, 3N, 3, 4N and 4*

ISO 3600:2015, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and format*

ISO 4309:2017, *Cranes — Wire ropes — Care and maintenance, inspection and discard*

ISO 6750-1:2019, *Earth-moving machinery — Operator's manual — Part 1: Contents and format*

ISO 7000:2019, *Graphical symbols for use on equipment — Registered symbols*

ISO 8083:2006, *Machinery for forestry — Falling-object protective structures (FOPS) — Laboratory tests and performance requirements*

ISO 8084:2003, *Machinery for forestry — Operator protective structures — Laboratory tests and performance requirements*

ISO 16625:2013, *Cranes and hoists — Selection of wire ropes, drums and sheaves*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
cableway
suspended cable used as an elevated rope along which a carriage can be pulled or moved

[4] As impacted by ISO 730:2009/AMD 1:2014.

3.2
yarder
mobile or semi mobile unit that consists of a set of winch drums/pulley's to operate lines for a temporary cableway

Note 1 to entry: An ancillary carriage is pulled or moved by a cable (main line and/or haul back line) on the suspended cable way which is used to bring the trees/logs/wooden biomass to the unloading zone. It can be mounted on a sledge, behind or on a tractor, skidder or a truck.

3.3
tower yarder
yarder mounted to a vehicle or a trailer (prime mover) with integrated tower that can be tilted and/or telescoped to horizontal position or retracted for transport reasons

3.4
butt rig
system of swivels, chain-like links, shackles, and bull hooks connected between the mainline and the haul back line

Note 1 to entry: Chokers are attached to the butt rig with choker hooks (see 3.22).

3.5
rider block
block running (riding) on the haul backline to lift the butt rig which is connected to the rider block with a short strap or chain

3.6
carriage
wheeled equipment that moves along the skyline with components to transport and lift loads (trees/logs/wooden biomass)

Note 1 to entry: Movement can be provided by the mainline, haul-backline or separate integral engine.

3.7
skyline
cable on which the carriage rides

Note 1 to entry: It is the top line in the system.

3.8
main line
haul-in line
cable to pull the carriage directly to the yarder that can also be used for lifting, lowering and lateral hauling of the load (log)

3.9
haul-back line
cable to pull the carriage away from the yarder that can also be used for lifting, lowering and lateral hauling of the load (log)

Note 1 to entry: In high lead systems, it takes over the carrying function.

3.10
auxiliary line
cable for additional functions without carrying or retaining function

3.11
slack-pulling line
cable activating clamps or switching operations at the carriage without carrying or retaining function

3.12
setup-line
cable to supply the setup; without carrying or retaining function

3.13
lift line
cable exclusively to lower, lift and lateral haul the load (trees/logs/wooden biomass)

3.14
guy line
fixed ropes to rig the yarder, the intermediate supports or spar trees under the applied loads

3.15
tensioning line
cable as component of a tensioning tool

3.16
skidding line dutchman
cable (separate drive) to pull away the loads from the landing zone that can be used for lateral positioning of the other lines on the area of operations

3.17
mounting (straw) line
light weight cable (separate drive) exclusively for installation and dismantling purposes

3.18
transverse line
cross line
cable or chain to carry the block or support saddle

3.19
fixing line
cable, belt, strap or chain to attach components to stumps, trees, plate and pin, earth anchors or rock bolts

3.20
intermediate support line
line to keep intermediate supports in position

3.21
auxillary equipment
accessories which are subordinated

EXAMPLE Choker.