
Geregistreeerde Belgische norm

NBN EN 14044

2e uitg., februari 2014

Normklasse: S 21

Hoogwerkers voor brandweer en reddingsdiensten - Autoladders met sequentiële bewegingen - Veiligheids- en prestatie-eisen en beproevingsmethoden

Moyens élévateurs aériens à l'usage des services de secours et de lutte contre l'incendie- Échelles pivotantes à mouvements séquentiels - Prescriptions de sécurité et de performances et méthodes d'essais

High rise aerial appliances for fire and rescue service use - Turntable ladders with sequential movements - Safety and performance requirements and test methods

Toelating tot publicatie: 28 februari 2014

Vervangt NBN EN 14044+A1 (2009).

Deze Europese norm EN 14044:2014 heeft de status van een Belgische norm.

Deze Europese norm bestaat in drie officiële versies (Duits, Engels, Frans).

***norme belge
enregistrée***

NBN EN 14044

2e éd., février 2014

Indice de classement: S 21

Moyens élévateurs aériens à l'usage des services de secours et de lutte contre l'incendie- Échelles pivotantes à mouvements séquentiels - Prescriptions de sécurité et de performances et méthodes d'essais

Hoogwerkers voor brandweer en reddingsdiensten - Autoladders met sequentiële bewegingen - Veiligheids- en prestatie-eisen en beproevingsmethoden

High rise aerial appliances for fire and rescue service use - Turntable ladders with sequential movements - Safety and performance requirements and test methods

Autorisation de publication: 28 février 2014

Remplace NBN EN 14044+A1 (2009).

La présente norme européenne EN 14044:2014 a le statut d'une norme belge.

La présente norme européenne existe en trois versions officielles (allemand, anglais, français).

English Version

**High rise aerial appliances for fire and rescue service use -
Turntable ladders with sequential movements - Safety and
performance requirements and test methods**

Moyens élévateurs aériens à l'usage des services de secours et de lutte contre l'incendie - Échelles pivotantes à mouvements séquentiels - Prescriptions de sécurité et de performances et méthodes d'essais

Hubrettungsfahrzeuge für die Feuerwehr - Drehleitern mit aufeinander folgenden (sequenziellen) Bewegungen (Halbautomatik-Drehleitern) - Sicherheits- und Leistungsanforderungen sowie Prüfverfahren

This European Standard was approved by CEN on 26 October 2013.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

Contents

Page

Foreword	4
Introduction	7
1 Scope	8
2 Normative references	8
3 Terms and definitions, symbols and abbreviated terms	9
4 List of significant hazards	20
5 Requirements	28
5.1 Safety requirements and/or measures	28
5.1.1 General	28
5.1.2 Requirements in respect of stability	29
5.1.3 Requirements relating to the strength of the turntable ladder	41
5.1.4 Verification of vehicle performance by functional testing	43
5.1.5 Requirements relating to function	44
5.1.6 Requirements relating to noise	71
5.2 Performance requirements	72
5.2.1 Operational requirements	72
5.2.2 Requirements demanded by national regulations	72
5.2.3 Overall maximum dimensions	73
5.2.4 Maximum gross laden mass	73
5.2.5 Radio interference	74
6 Designation	75
7 Information for use	75
7.1 General	75
7.2 Instruction handbook	75
7.2.1 General	75
7.2.2 Operating instruction	75
7.2.3 Transport, handling and storage information	77
7.2.4 Information on commissioning	77
7.2.5 Machine details	77
7.2.6 Maximum loads in the rescue cage and/or on the ladder set	78
7.2.7 Maintenance information for use by trained personnel	78
7.2.8 Special working methods or conditions	78
7.2.9 Periodical examinations and tests	78
7.3 Marking	79
Annex A (informative) Example of table reporting the stability tests	81
Annex B (normative) Operating time	82
Annex C (informative) List of nominal reaches in several European countries applicable to turntable ladders	83
Annex D (informative) Verification and reception tests	85
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	89
Bibliography	90

Figures

Figure 1 — Example of boundary	14
Figure 2 — Jacking width	15
Figure 3 — Designation of ladder set sections	19
Figure 4 — Example of forces acting on turntable ladder	30
Figure 5 — Resulting force of the working load.....	31
Figure 6 — Surface exposed to the wind	32
Figure 7 — Minimum required residual force related to jacking width.....	34
Figure 8 — Maximum and minimum jacking width.....	35
Figure 9 — Test position without rescue cage.....	39
Figure 10 — Test position with rescue cage	39
Figure 11 — Static tilt angle δ for turntable ladders	48
Figure 12 — Maximum angle of elevation.....	50
Figure 13 — Relative positions of hand and guard-rails.....	52
Figure 14 — Impact simulation on the rescue cage	55
Figure 15 — Rung alignment.....	62
Figure 16 — Minimum dimensions of ladder sections	65
Figure 17 — Rung spacing dimensions	65
Figure 18 — Winding diameter.....	69
Figure 19 — Diagram of minimum unaffected zones	74
Figure 20 — Example of a warning label for the number of person permissible in the rescue cage.....	80

Tables

Table 1 — List of significant hazards	20
Table 2 — Safety factors for load calculations	32
Table 3 — Test cases for verification method 2.....	37
Table 4 — Functional Safety and Performance Level.....	56
Table 5 — Functional requirements for ladder set main control console	58
Table 6 — Dimensions	65
Table 7 — Determination of factor c	68
Table 8 — Determination of factor h_1 for the following construction unit.....	69
Table 9 — Determination of factor h_2 for the following construction unit.....	69
Table 10 — Nominal reaches.....	72
Table 11 — Overall maximum dimensions in travel position	73
Table 12 — Maximum gross laden mass	73
Table 13 — Masses taken into consideration in the calculation of gross laden mass	73
Table A.1 — Example of table reporting the stability tests.....	81
Table B.1 — Determination of the operating time.....	82
Table C.1 — Nominal reaches of turntable ladders in several European countries.....	83
Table D.1— Verifications and reception tests	85

Foreword

This document (EN 14044:2014) has been prepared by Technical Committee CEN/TC 192 “Fire and rescue service equipment”, the secretariat of which is held by BSI.

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 2014, and conflicting national standards shall be withdrawn at the latest by July 2014.

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

This document supersedes EN 14044:2005+A1:2009.

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(s).

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

The significant changes with respect to the previous edition of EN 14044 are as follows:

- a) ladder class > 30 to 56 added;
- b) terms and definitions for turntable ladder with sequential movements, rescue height, supported boundary, jacking width and load per person reworded, for dead man's device, working position and boundary added and for special boundary of use deleted;
- c) calculation of the working load and of diverse force revised;
- d) fatigue stress analysis completely revised;
- e) static stability revised and depends on the jacking width with defined residual forces;
- f) verification of static stability and dynamic stability revised;
- g) functional requirements revised;
- h) requirement for audible alarm at low battery voltage added;
- i) verification relating to the strength of the turntable ladder at the boundary of free-standing use with a_{max} revised;
- j) verification relating to the strength of the turntable ladder at the boundary of free-standing use (without or with rescue cage) deleted;
- k) verification relating to turntable ladders constructed to be operated only with the rear axle suspension fully or partially locked revised;
- l) requirement that loaded ladder shall maintain its position for 10 min with a variation less than 150 mm added;
- m) at least 100 mm difference at relative positions for the suspension locking device added;
- n) static tilt angle added;

- o) requirements on hand and guard-rails of the rescue cage revised and a requirement relating to aperture size added;
- p) requirements for anchoring points in the rescue cage for personal protective equipment against falling added;
- q) requirements relating to access doors and door locking devices in the rescue cage fully revised;
- r) requirements and verification revised relating to attachment systems for turntable ladders with a removable rescue cage;
- s) working light requirements revised;
- t) safety related parts of the control system according to category 1 or 2 of EN 954-1 changed to performance level (PL) according to EN ISO 13849-1;
- u) general normative reference to CEN/TS 15989 for the symbols on the control console added and all figures and tables with symbols deleted;
- v) requirements for the main control console added, that movement via the control lever of the rescue cage control console shall only take place after unlocking the emergency stop control in the rescue cage;
- w) indicator (e.g. display) to show the actual values of ladder length, ladder extension and elevation angle together with the maximum achievable values added;
- x) requirement revised relating to access from the ground to the ladder set (either directly (e.g. access ladder) or indirectly (e.g. deck));
- y) voice communication revised;
- z) rung alignment revised;
- aa) requirement revised relating to transmission systems (safety factors) and cable drums (grooves or devices preventing the cable running off the drum);
- bb) safety requirements related to electromagnetic phenomena and requirements relating to noise revised;
- cc) recommendation to use dependability management systems added;
- dd) precision of designation;
- ee) instruction handbook revised;
- ff) list of all known nominal reaches in several European countries applicable to turntable ladders in Annex C added;
- gg) list of verification and reception tests in Annex D with short description of requirement/test added;
- hh) Annex ZA deleted relating to the relationship between this European Standard and the Essential Requirements of the replaced EU Directive 98/37/EC;
- ii) Normative references revised: withdrawn standards EN 418, EN 457, EN 954-1, EN 982, EN 1050, EN ISO 12100-1:2003, EN ISO 12100-2:2003 have been deleted, CEN/TS 15989, EN ISO 4413, EN ISO 7731, EN ISO 12100:2010, EN ISO 13849-1, EN ISO 13850 have been added, and EN 1846 (all parts) as well as EN 60204-1 have been updated regarding dated reference;
- jj) Bibliography revised;

kk) content of standard editorially revised.

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a type C standard as stated in EN ISO 12100.

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

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 the other standards, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

1.1 This European Standard specifies the safety and performance requirements and test methods applicable to turntable ladders with sequential movements of classes 18, 24, 30 and > 30 to 56, as defined in 3.13, under the control of fire-fighters and intended for fire fighting and rescuing people.

NOTE This European Standard is intended to be used in conjunction with EN 1846–1, EN 1846–2 and EN 1846–3.

Turntable ladder vehicles comprise a chassis, bodywork and a powered extending structure unit in the form of a ladder with or without a rescue cage.

Turntable ladder vehicles covered by this European Standard have a self-propelled chassis, the motor of which supplies the power necessary for the operation of the ladder. They do not permit operational movements to be made simultaneously.

1.2 This European Standard deals with the technical safety requirements to minimize the hazards listed in Clause 4 which can arise during commissioning, operational use, routine checking and maintenance of turntable ladders when carried out in accordance with the specifications given by the manufacturer or the manufacturer's authorized representative.

1.3 This European Standard deals with the use of turntable ladder vehicles within an ambient temperature range from –15 °C to +35 °C and with a wind velocity on the ladder set $\leq 12,5$ m/s. Additional measures can be necessary for use outside this range. Special designs for use under special climatic conditions should be agreed between the manufacturer and the purchaser. Any additional requirements are outside the scope of the standard.

1.4 This European Standard does not deal with the design of a standard automotive chassis with regard to hazards resulting from or due to use as a road vehicle.

1.5 This European Standard is not applicable to turntable ladder vehicles with sequential movements which are manufactured before the date of publication of this European Standard 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 1846-1, *Firefighting and rescue service vehicles - Part 1: Nomenclature and designation*

EN 1846-2:2009+A1:2013, *Firefighting and rescue service vehicles - Part 2: Common requirements - Safety and performance*

EN 1846-3, *Firefighting and rescue service vehicles - Part 3: Permanently installed equipment - Safety and performance*

CEN/TS 15989, *Firefighting vehicles and equipment - Symbols for operator controls and other displays*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005, modified)*

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

EN 61310-1, *Safety of machinery - Indication, marking and actuation - Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1)*