SLOVENSKI STANDARD
SIST EN 280:2002+A2:2009

01-november-2009

Premiļne dvigne delovne ploģļadi - Izraļuni - Merila stabilnosti - Konstrukcijske izvedbe - Varnost - Pregledi in preskusi

Mobile elevating work platforms - Design calculations - Stability criteria - Construction - Safety - Examinations and tests

Fahrbare Hubarbeitsbühnen - Berechnung - Standsicherheit - Bau - Sicherheit - Prüfungen

Plates-formes élévatrices mobiles de personnel - Calculs de conception - Critère de stabilité - Construction - Sécurité - Examen et essais

Ta slovenski standard je istoveten z: **EN 280:2001+A2:2009**

ICS:

53.020.99	Druga dvigalna oprema	Other lifting equipment

SIST EN 280:2002+A2:2009 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 280:2001+A2

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ICS 53.020.99

Supersedes EN 280:2001

English Version

Mobile elevating work platforms - Design calculations - Stability criteria - Construction - Safety - Examinations and tests

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

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Foreword

This document (EN 280:2001+A2:2009) has been prepared by Technical Committee CEN/TC 98 “Lifting platforms”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by February 2010, and conflicting national standards shall be withdrawn at the latest by February 2010.

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 includes Amendment 1, approved by CEN on 2004-05-13 and Amendment 2, approved by CEN on 2009-07-16.

This document supersedes EN 280:2001.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩ and ⟨A2⟩ ⟨A2⟩.

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).

⟨A2⟩ For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A2⟩

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

〈A2〉 This European Standard is a type C standard as stated in EN ISO 12100. 〈A2〉

The object of this European Standard is to define rules for safeguarding persons and objects against the risk of accidents associated with the operation of Mobile Elevating Work Platforms (MEWPs).

— This European Standard does not repeat all the general technical rules applicable to every electrical, mechanical or structural component.

— The safety requirements of this European Standard have been drawn up on the basis that MEWPs are periodically maintained according to manufacturers' instructions, working conditions, frequency of use and national regulations.

It is also assumed that MEWPs are checked for function daily before start of work and are not put into operation unless all required control- and safety-devices are available and in working order.

If a MEWP is seldom used, the checks may be made before start of work.

Furthermore it is assumed that persons on the work platform in case of power supply failure are not incapacitated and can assist in the operation of the overriding emergency device.

— As far as possible this European Standard sets out only the requirements that materials and equipment have to meet in the interest of safety, and it is assumed that persons operating MEWPs are adequately trained.

— Where for clarity an example of a safety measure is given in the text, this shall not be considered as the only possible solution. Any other solution leading to the same risk reduction is permissible if an equivalent level of safety is achieved.

— As no satisfactory explanation could be found for the dynamic factors used for stability calculations in previous national standards, the results of the tests carried out by the former CEN/TC98/WG1 to determine a suitable factor and stability calculation method for MEWPs have been adopted. The test method is described in annex B (informative) as a guide for manufacturers wishing to use higher or lower operating speeds and to take advantage of developments in control systems.

Similarly, to avoid the unexplained inconsistencies in coefficients of utilisation for wire ropes found in other standards for lifting devices, appropriate extracts of the widely accepted standard DIN 15020 have been taken into 5.4.2 and annex C (normative) with a worked example in annex D (informative).

1 Scope

1.1 This European Standard specifies technical safety requirements and measures for all types and sizes of Mobile Elevating Work Platform (MEWP) intended to move persons to working positions where they are carrying out work from the work platform (WP) with the intention that persons are getting on and off the work platform at one defined access position.

1.2 This European Standard is applicable to the structural design calculations and stability criteria, construction, safety examinations and tests before MEWPs are first put into service. It identifies the hazards arising from the use of MEWPs and describes methods for the elimination or reduction of these hazards.

It does not cover the hazards arising from:

a) operation by radio and other wire-less controls;

b) use in potentially explosive atmospheres;

c) electromagnetic incompatibility;

d) work on live electric systems;

e) use of compressed gases for load bearing components;

f) getting on and off the work platform at changing levels.

1.3 This European standard does not apply to:

a) permanently installed personnel lifting appliances serving defined levels (see e.g. EN 81-1:1998 and EN 81-2:1998);

b) fire-fighting and fire rescue appliances (see e.g. prEN 1777:1994);

c) unguided work cages suspended from lifting appliances (see e.g. EN 1808:1999);

d) elevating operator position on rail dependent storage and retrieval equipment (see EN 528:1996);

e) tail lifts (see prEN 1756-1:1994 and prEN 1756-2:1997);

f) mast climbing work platforms (see EN 1495:1997);

g) fairground equipment;

h) lifting tables with a lifting height of less than 2 m (see EN 1570:1998);

i) builders hoists for persons and materials (see prEN 12159:1995);

j) aircraft ground support equipment (see e.g. prEN 1915-1 and 2:1995);

k) elevating operator positions on industrial trucks (see prEN 1726-2:1999).

1.4 Classification

MEWPs are divided into two main groups:

Group A: MEWPs where the vertical projection of the centre of gravity of the load is always inside the tipping lines.

Group B: MEWPs where the vertical projection of the centre of gravity of the load may be outside the tipping lines.

Relating to travelling, MEWPs are divided into three types:

type 1 Travelling is only allowed with the MEWP in its transport position;

type 2 Travelling with raised work platform is controlled from a point of control at the chassis;

type 3 Travelling with raised work platform is controlled from a point of control at the work platform.

NOTE The types 2 and 3 can be combined

1.5 This standard applies to machines which are manufactured 12 months after publication of this 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 (including amendments).

[A2] *deleted text* [A2]

EN 349, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body.*

EN 418, *Safety of machinery - Emergency stop equipment, functional aspects - Principles for design.*

[A1] EN 954-1:1996, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design* [A1]

[A1] CR 954-100:1999, *Safety of machinery — Safety related parts of control systems — Part 100: Guide on the use and application of EN 954-1:1996* [A1]

[A2] *deleted text* [A2]

EN 60204-1:1997, *Safety of machinery - Electrical equipment of machines – Part 1: General requirements (IEC 60204-1:1997).*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989).*

[A1] *deleted text* [A1]

[A2] EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Technical principles (ISO 12100-2:2003)* [A2]

[A1] EN ISO 13849-2:2003, *Safety of machinery — Safety related parts of control systems — Part 2: Validation* [A1]

ISO 3864:1984, *Safety colours and safety signs.*

ISO 4302, *Cranes - Wind load assessment.*

ISO 4305, *Mobile cranes - Determination of stability.*

ISO 4309, *Cranes - Wire ropes - Code of practice for examination and discard.*

NOTE Only documents which had reached the status of a standard at the end of January 2000 have been considered.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 1070:1998 and the following apply:

3.1
mobile elevating work platform (MEWP)
mobile machine that is intended to move persons to working positions where they are carrying out work from the work platform with the intention that persons are getting on and off the work platform at one defined access position and which consists as a minimum of a work platform with controls, an extending structure and a chassis. In this standard the abbreviation MEWP is used for mobile elevating work platform

3.2
work platform (see Figure 1)
fenced platform or a cage which can be moved under load to the required working position and from which erection, repair, inspection or similar work can be carried out

3.3
extending structure (see Figure 1)
structure which is connected to the chassis and supports the work platform. It allows movement of the work platform to its required position. It may, for example, be a single or a telescoping or a articulating boom or ladder, or a scissors mechanism or any combination of them, and may or may not slew on the base

3.4
chassis (see Figure 1)
base of the MEWP. It may be pulled, pushed, self propelled, etc.

3.5
stabilisers (see Figure 1)
all devices and systems used to stabilise MEWPs by supporting and/or levelling the complete MEWP or the extending structure, e.g. jacks, suspension locking devices, extending axles

3.6
access position [1)]
position to provide access to the work platform

3.7
transport position [1)]
position of the work platform prescribed by the manufacturer in which the MEWP is brought to the place of use

3.8
lowering (see Figure 2)
all operations to move the work platform to a lower level

1) Access position and transport position can be identical

3.9
raising (see Figure 2)
all operations to move the work platform to a higher level

3.10
rotating (see Figure 2)
circular movement of the work platform about a vertical axis

3.11
slewing (see Figure 2)
circular movement of the extending structure about a vertical axis

3.12
travelling (see Figure 2)
all movements of the chassis with work platform out of transport position

3.13
vehicle mounted MEWP
MEWP that has travelling controls located within the cab of the vehicle

3.14
pedestrian controlled MEWP
MEWP that has the controls for powered transport located so that they are capable of being operated by a person walking close to the MEWP

3.15
self propelled MEWP
MEWP that has the travelling controls located at the work platform

3.16
rated load
load for which the MEWP has been designed for normal operation. The rated load is composed of persons, tools and material acting vertically on the work platform

NOTE A MEWP can have more than one rated load.

3.17
load cycle
cycle starting from the access position, carrying out work and returning to the access position

3.18
wire rope drive system
system that comprises one or more wire rope(s) running on rope drums and on or over rope pulleys as well as any associated rope drums, rope pulleys and compensating pulleys

3.19
chain drive system
system that comprises one or more chain(s) running on chain sprockets and on or over chain pulleys as well as any associated chain sprockets, chain pulleys and compensating pulleys

3.20
type test
test on the representative model of a new design or one incorporating significant changes to an existing design, carried out by or on behalf of the manufacturer or his authorised representative

3.21
totally manually operated MEWP
MEWP with movement powered only by manual effort

3.22
rail mounted MEWP
MEWP where travelling is guided by rails

3.23
load sensing system
system of monitoring the vertical load and vertical forces on the work platform

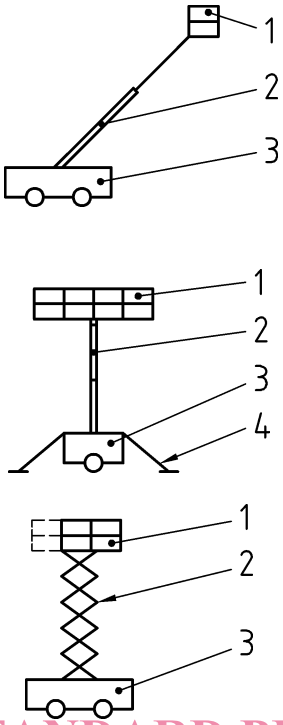
NOTE The system includes the measuring device(s), the method of mounting the measuring devices and the signal processing system.

3.24
moment sensing system
system of monitoring the moment acting about the tipping line tending to overturn the MEWP

NOTE The system includes the measuring device(s), the method of mounting the measuring devices and the signal processing system.

3.25
working envelope
space in which the work platform is designed to work within the specified loads and forces under normal operating conditions

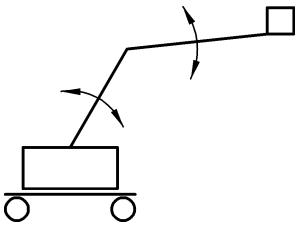
NOTE MEWPS can have more than one working envelope.



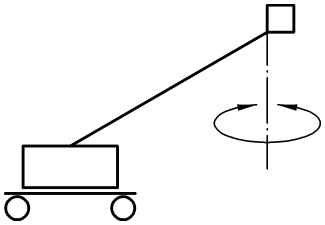
Key

1 work platform (see 3.2)
2 extending structure (see 3.3)
3 chassis (see 3.4)
4 stabilisers (see 3.5)

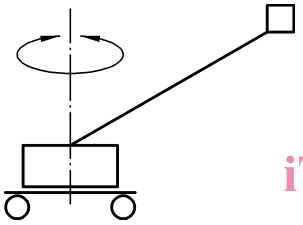
Figure 1 — Illustration of some definitions (1)



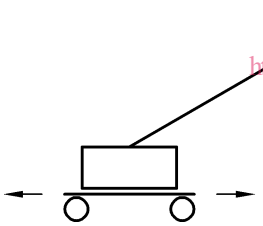
lowering/raising (see 3.8 and 3.9)



rotating (see 3.10)



slewing (see 3.11)



travelling (see 3.12)

Figure 2 — Illustration of some definitions (2)

4 List of hazards

The hazards have been identified by the risk assessment procedure and the corresponding requirements formulated.

A hazard which is not significant and for which, therefore, no requirements are formulated, is shown in the Corresponding Requirements column as NS (not significant).

Table 1 — List of significant hazards

Significant hazards		relevant clauses in this standard
1	**Mechanical hazards**	**-**
1.1	Crushing hazard	5.2.4, 5.3.5, 5.3.23, 5.3.4, 5.6.9, 5.7.1, 7.2.13
1.2	Shearing hazard	5.4.4, 5.7.1, 7.2.13
1.3	Cutting or severing hazard	NS
1.4	Entanglement hazard	5.3.20, 7.2.13
1.5	Drawing-in or trapping hazard	5.3.20, 7.2.13
1.6	Impact hazard	5.3.5, 5.3.25, 7.1.1.1 h)
1.7	Stabbing or puncture hazard	NS
1.8	Friction or/abrasion hazard	7.1.1.6e)
1.9	High pressure fluid injection hazard	5.9.1, 5.9.2, 5.9.3, 5.9.4, 5.9.5, 5.9.10
1.10	Ejection of parts	NS
1.11	Loss of stability (of machinery and machine parts)	5.2, 5.3.2, 5.3.6, 5.3.7, 5.3.8, 5.3.10, 5.3.11, 7.2.1l)
1.12	Slip, trip and fall hazards	5.6.2, 5.6.3, 5.6.4, 5.6.5, 5.6.6, 5.6.7, 7.2.13
2	**Electrical hazards, caused for example by:**	**-**
2.1	Electrical contact (direct or indirect)	5.8, 7.1.1.2 g)
2.2	Electrostatic phenomena	NS
2.3	Thermal radiation	NS
2.4	External influences on electrical equipment	5.8.1
3	**Thermal hazards for example resulting in:**	**-**
3.1	Burns and scalds by a possible contact of persons by flames or explosions and also by the radiation of heat sources	5.3.20
3.2	Health-damaging effects by hot or cold work environment	5.3.20

(continued)

Table 1 — (continued)

Significant hazards		relevant clauses in this standard
4	**Hazards generated by noise, resulting for example in:**	**-**
4.1	Hearing losses (deafness), other physiological disorders (e.g. loss of balance, loss of awareness etc.)	NS
4.2	Interference with speech communication, acoustic signals etc.	NS
5	**Hazards generated by vibration (resulting in a variety of neurological and vascular disorders)**	5.3.24, 7.1.1.2 l)
6	**Hazards generated by radiation, especially by:**	**-**
6.1	Electrical arcs	7.1.1.2 g)
6.2	Lasers	NS
6.3	Ionising radiation sources	NS
6.4	Machine making use of high frequency electromagnetic fields	5.8.1
7	**Hazards generated by materials and substances processed, used or exhausted by machinery for example:**	**-**
7.1	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, dusts and fumes	5.3.21, 5.3.25
7.2	Fire or explosion hazard	5.3.22
7.3	Biological and microbiological (viral or bacterial) hazards	NS
8	**Hazards generated by neglecting ergonomic principles in machine design (mismatch of machinery with human characteristics and abilities) caused for example by:**	**-**
8.1	Unhealthy postures or excessive efforts	5.6.6, 5.6.7
8.2	Inadequate consideration of human handarm or foot-leg anatomy	NS
8.3	Neglected use of personal protection equipment	NS
8.4	Inadequate area lighting	NS
8.5	Mental overload or underload, stress, etc.	NS
8.6	Human error	5.7.1, 5.7.3
9	**Hazard combinations**	**-**
10	**Hazards caused by failure of energy supply, breaking down of machinery parts, and other functional disorders, for example:**	**-**
10.1	Failure of energy supply (of energy and/or control circuits) (continued)	5.3.12, 5.7.6, [A1] deleted text [A1] [A1] 5.7.8 [A1], 5.9.6, 5.9.7, 5.9.8, 5.9.9, [A1] deleted text [A1]