



SLOVENSKI STANDARD
oSIST prEN 280-1:2018
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Premične dvizne delovne ploščadi - 1. del: Konstrukcijski izračuni - Merila stabilnosti - Konstrukcijska izvedba - Varnost - Pregledi in preskusi

Mobile elevating work platforms - Part 1: Design calculations - Stability criteria - Construction - Safety - Examinations and tests

Fahrbare Hubarbeitsbühnen - Teil 1: Berechnung - Standsicherheit - Bau - Sicherheit - Prüfungen

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Plates-formes élévatrices mobiles de personnel - Partie 1 : Calculs de conception - Critères de stabilité - Construction - Sécurité - Examens et essais

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ICS:

53.020.99 Druga dvigalna oprema Other lifting equipment

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EUROPEAN STANDARD
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prEN 280-1

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Mobile elevating work platforms - Part 1: Design calculations - Stability criteria - Construction - Safety - Examinations and tests

Plates-formes élévatrices mobiles de personnel - Partie
1 : Calculs de conception - Critères de stabilité -
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Standstabilität - Bau - Sicherheit - Prüfungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 98.

If this draft becomes a European Standard, 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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prEN 280-1:2018 (E)**European foreword**

This document (prEN 280-1:2018) has been prepared by Technical Committee CEN/TC 98 "Lifting platforms", the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 280:2013+A1:2015.

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.

EN 280-1:2018 includes the following major changes with respect to EN 280:2013+A1:2015:

- In 1.4: the groups into which MEWPs are divided have been précised;
- Subclause 5.3 "Chassis and stabilisers" has been totally restructured and new requirements have been added;
- In 5.3.1.2: requirements for inclination have been reviewed;
- In 5.3.1.18: requirements for rail mounted MEWPs have been included;
- Subclause 5.3.2.3: requirements for MEWPs equipped with one or more oscillating axles have been included;
- In 5.4.1.7: variable working envelope by manual selection of more than one rated load has been précised;
- In 5.6.1: adjustments of the platform levels have been included;
- In 5.6.3: on work platforms with fixed guard handrails minimum dimensions of openings for the purpose of access to it have been added;
- In 5.6.14: "Anchorage(s) for the connection of a restraint device" has been added;
- In 5.6.15: requirements with regard to vibrations have been included;
- In 5.6.16: requirements for protection of operators on the platform have been added;
- In 5.6.17: requirements for "Exchangeable work platforms" have been included;
- In 5.7.9 "Overriding of emergency stops respectively safety functions..." has been totally revised;
- Subclause 5.11: for safety-related parts of control systems (SRP/CS) that perform the relevant safety function the references to categories according to EN 954-1 (see Table 6) have been replaced by references to performance levels according to EN ISO 13849-1;
- Subclause 6.1.4.2: requirements for platform with extension have been added;
- New Annex F "Additional requirements for wireless controls and control systems" has been added.

Introduction

This standard is a type C standard as stated in EN ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous 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 the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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 assumed that MEWPs are used only by qualified and trained operators.

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

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

- As far as possible this European Standard sets out only the requirements that materials and equipment need 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 does not need to 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/TC 98/WG 1 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 utilization for wire ropes found in other standards for lifting devices, appropriate extracts of the widely accepted standard DIN 15020-1 have been taken into 5.5.2 and Annex C (normative) with a worked example in Annex D (informative).

prEN 280-1:2018 (E)**1 Scope**

1.1 This document specifies safety requirements and measures for all types and sizes of Mobile Elevating Work Platform (MEWP, see 3.1) 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 only at access positions at ground level or on the chassis.

This document also covers static elevating work platforms of group B (see 1.4).

NOTE Machines designed for the handling of goods which are equipped with work platforms as interchangeable equipment are regarded as MEWPs.

1.2 This document 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) use in potentially explosive atmospheres;
- b) electromagnetic incompatibility;
- c) work from the platform on external live electric systems;
- d) use of compressed gases for load bearing components;
- e) getting on and off the work platform at changing levels;
- f) specific applications (e.g. railway, ships) covered by National or local regulations.

1.3 This document does not apply to:

- a) machinery serving fixed landings (see e.g. EN 81-1 and EN 81-2, EN 12159);
- b) fire-fighting and fire rescue appliances (see e.g. EN 1777);
- c) unguided work cages suspended from lifting appliances (see e.g. EN 1808);
- d) elevating operator position on rail dependent storage and retrieval equipment (see EN 528);
- e) tail lifts (see EN 1756-1 and EN 1756-2);
- f) mast climbing work platforms (see EN 1495);
- g) fairground equipment;
- h) lifting tables (see EN 1570-1 and EN 1570-2);
- i) aircraft ground support equipment (see e.g. EN 1915-1 and EN 1915-2);
- j) elevating operator positions on industrial trucks (see EN 1726-2).

1.4 Classification:

MEWPs are divided into two main groups:

- a) Group A: MEWPs where the vertical projection of the centre of the area of the platform in all platform configurations at the maximum chassis inclination specified by the manufacturer is always inside the tipping lines.
- b) Group B: All other MEWPs.

Relating to travelling, MEWPs are divided into three types:

- 1) Type 1: Travelling is only allowed with the MEWP in its transport configuration;
- 2) Type 2: Travelling with raised work platform is controlled from a point of control at the chassis;
- 3) Type 3: Travelling with raised work platform is controlled from a point of control at the work platform.

NOTE Type 2 and type 3 can be combined.

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

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

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

EN 14033-1, *Railway applications - Track - Railbound construction and maintenance machines - Part 1: Technical requirements for running*

EN 14033-2:2017, *Railway applications - Track - Rail bound construction and maintenance machines - Part 2: Technical requirements for travelling and working*

EN 15746-1:2010+A1:2011, *Railway applications - Track - Road-rail machines and associated equipment - Part 1: Technical requirements for running and working*

EN 15954-1:2013, *Railway applications - Track - Trailers and associated equipment - Part 1: Technical requirements for running and working*

EN 15955-1:2013, *Railway applications - Track - Demountable machines and associated equipment - Part 1: Technical requirements for running and working*

EN 60068-2-64, *Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance (IEC 60068-2-64)*

EN 61310-1:2008, *Safety of machinery - Indication, marking and actuation - Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)*

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

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

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

EN 62061, *Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061)*

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 13849-2, *Safety of machinery - Safety-related parts of control systems - Part 2: Validation (ISO 13849-2)*

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

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

ISO 3864-1, *Graphical symbols - Safety colours and safety signs - Part 1: Design principles for safety signs and safety markings*

ISO 4302, *Cranes - Wind load assessment*

ISO 4305, *Mobile cranes - Determination of stability*

ISO 4309, *Cranes - Wire ropes - Care and maintenance, inspection and discard*

ISO/TR 23849:2010, *Guidance on the application of ISO 13849-1 and IEC 62061 in the design of safety-related control systems for machinery*

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 <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

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 only at access positions at ground level or on the chassis and which consists as a minimum of a work platform with controls, an extending structure and a chassis

3.2

work platform

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

Note 1 to entry: See Figure 1.

3.3

extending structure

structure which is connected to the chassis and supports the work platform and which allows movement of the work platform to its required position

Note 1 to entry: See Figure 1.

Note 2 to entry: It may, for example, be a single or a telescoping or an 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

base of the MEWP, which may be pulled, pushed, self-propelled, etc. or stationary

Note 1 to entry: See Figure 1.

3.5

stabilisers

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

Note 1 to entry: See Figure 1.

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3.6

access position

position(s) to provide access to and from the work platform

Note 1 to entry: Access position and transport configuration can be identical.

3.7

transport configuration

configuration of the MEWP prescribed by the manufacturer in which the MEWP is intended to be delivered to the place of use

Note 1 to entry: Access position and transport configuration can be identical.

3.8

lowering

operations to move the work platform to a lower level

Note 1 to entry: See Figure 2.

3.9

raising

operations to move the work platform to a higher level

Note 1 to entry: See Figure 2.

prEN 280-1:2018 (E)**3.10
rotating**

circular movement of the work platform about a vertical axis

Note 1 to entry: See Figure 2.

**3.11
slewing**

circular movement of the extending structure about a vertical axis

Note 1 to entry: See Figure 2.

**3.12
travelling**

movements of the chassis except during transportation

Note 1 to entry: See Figure 2.

**3.13
vehicle mounted MEWP**

MEWP where the chassis is a vehicle and where travelling controls are located within the cab of the vehicle

**3.14
pedestrian controlled MEWP**

MEWP where the controls for powered movement in the transport configuration are located so that they are capable of being operated by a person walking close to the MEWP

**3.15
self-propelled MEWP**

MEWP where the travelling controls are located at the work platform

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**3.16
rated load**

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

Note 1 to entry: 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 powered 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 1 to entry: The system includes the measuring device(s), the way the measuring devices are incorporated in the machinery 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 1 to entry: The system includes the measuring device(s), the way the measuring devices are incorporated in the machinery and the signal processing system.

3.25**wireless control**

means by which the MEWP operator's commands are transmitted without any physical connection for at least part of the distance between the control console and the rest of the control system

3.26**self-revealing failure or fault**

failure or fault of a component where the failure or fault is apparent to the MEWP operator and can be revealed without the use of monitoring services

Note 1 to entry: Failure or fault may be apparent to the MEWP operator through:

- changes of operating characteristics, and/or
- visual evidence, and/or
- audible evidence, and/or
- other evidence.

3.27**working envelope**

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

Note 1 to entry: MEWPS can have more than one working envelope.

prEN 280-1:2018 (E)**3.28****exchangeable work platform**

work platform according to 3.2 which is intended to be exchanged without using tools

Note 1 to entry: Such platforms may be of different sizes and/or capacities.

Note 2 to entry: Such platforms do not modify the original function of the MEWP.

Note 3 to entry: Work platforms which are interchangeable equipment intended to be fitted on machines other than MEWPs are not covered by this definition. For the combination refer to note in 1.1.

3.29**lowered travel position**

configuration(s) of the MEWP for travel at maximum travel speed

Note 1 to entry: The lowered travel position, access position and transport position can be identical.

3.30**safety function**

function of a machine whose failure can result in an immediate increase of the risk(s)

Note 1 to entry: A safety function may be composed of safety devices (e.g. actuators, sensors, logic units and switching components) and software as well as interconnecting means.

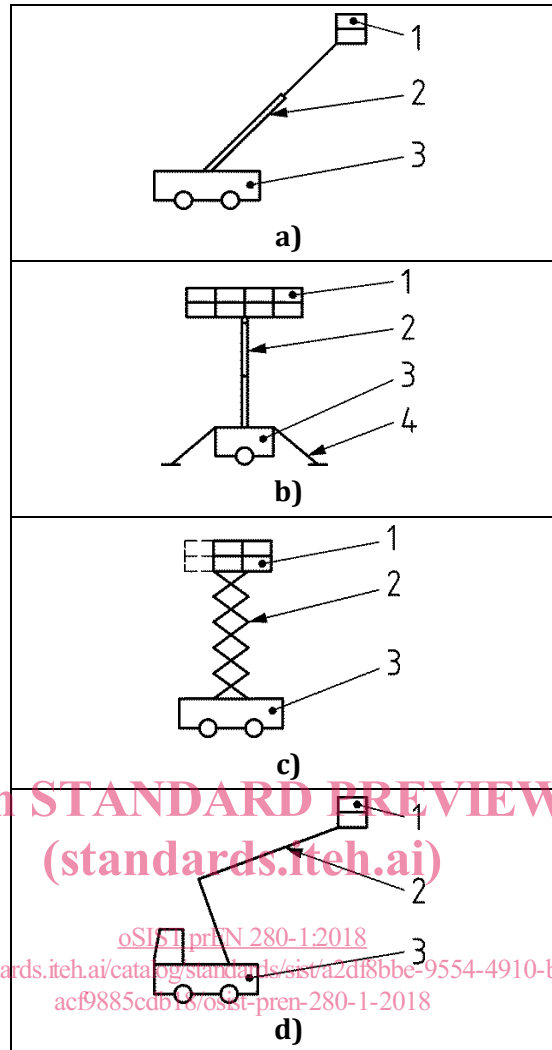
3.31**elevated travel position**

configuration of the MEWP (3.1) for travel outside the lowered travel position (3.29)

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**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)