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Mobile elevating work platforms — Design, calculations, safety requirements and test methods

Plates-formes élévatrices mobiles de personnel — Conception, calculs, exigences de sécurité et méthodes d'essai

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 16368 was prepared by Technical Committee ISO/TC 214, *Elevating work platforms*.

This second edition cancels and replaces the first edition (ISO 16368:2003), which has been technically revised.

Introduction

The object of this International Standard is to define rules for safeguarding persons and objects against the risk of accident associated with the operation of mobile elevating work platforms (MEWPs). MEWPs are assemblies of one or more sub-assemblies produced by one or more manufacturers. A MEWP is the product of activities that include design, production and testing, as well as the provision of information on the MEWP itself.

This International Standard does not repeat all the general technical rules applicable to every electrical, mechanical or structural component. Its safety requirements have been drawn up on the basis that MEWPs are periodically maintained according to given instructions, working conditions, frequency of use and national or other regulations. It is assumed that MEWPs are checked for function before start of work, whether used daily or seldom used, and are not put into operation unless all the required control and safety devices are available and in working order. Where, for clarity, an example of a safety measure is given in the text, it is not intended as the only possible solution. Any other solution leading to the same risk reduction is permissible if an equivalent level of safety is achieved.

Annex A explains the choice of Beaufort Scale 6 as the maximum wind speed.

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 TC 98/WG 1 of the European Committee for Standardization (CEN) to determine a suitable factor and stability calculation method for MEWPs have been adopted. That test method is described in Annex B as a guide for the responsible entity 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 from the widely accepted DIN 15020[31] have been included both in the body of this International Standard and in Annex C, with a worked example given in Annex D.

Annex E gives kerb test calculations, Annex F provides information on the instruction handbook, and Annex G specifies additional requirements for cableless controls and control systems.

Annex H presents the list of significant hazards dealt with by this International Standard.

Mobile elevating work platforms — Design, calculations, safety requirements and test methods

1 Scope

This International Standard specifies safety requirements and preventive measures, and the means for their verification, for all types and sizes of mobile elevating work platforms (MEWPs) intended for moving persons to working positions. It gives the structural design calculations and stability criteria, construction, safety examinations and security tests to be applied before a MEWP is first put into service, identifies the hazards arising from the use of MEWPs and describes methods for the elimination or reduction of those hazards.

This International Standard is not applicable to

a) permanently installed personnel-lifting appliances serving defined levels,

b) fire-fighting and fire rescue appliances,

c) unguided work cages suspended from lifting appliances,

d) elevating operator position on rail-dependent storage and retrieval equipment,

e) tail lifts,

f) mast-climbing work platforms (see ISO 16369),

g) fairground equipment,

h) lifting tables with a lifting height of less than 2 m,

i) builder's hoists for persons and materials,

j) aircraft ground-support equipment,

k) digger derricks,

l) elevating operator positions on industrial trucks,

m) under-bridge inspection and maintenance devices,

n) certain requirements for insulating aerial devices on a chassis for use in live work on electrical installations.

It does not cover hazards arising from

- use in potentially explosive atmospheres,
- use of compressed gases for load-bearing components,
- work on live electrical systems.

NOTE 1 Hazards arising from work on live electrical systems are addressed in IEC 61057. MEWPs equipped with certain non-conductive (insulating) components can provide some protection from hazards associated with inadvertent contact with such systems (see ISO 16653-2).

NOTE 2 For MEWPs that employ aerial devices used for live working, this International Standard will need to be used in conjunction with IEC 61057, taking into consideration the potential exceptions from this International Standard that are specified in IEC 61057.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 3864 (all parts), *Graphical symbols — Safety colours and safety signs*

ISO 4305, *Mobile cranes — Determination of stability*

ISO/TR 11688-1:1995, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

ISO 13850, *Safety of machinery — Emergency stop — Principles for design*

ISO 13854, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

ISO 18893, *Mobile elevating work platforms — Safety principles, inspection, maintenance and operation*

ISO 20381, *Mobile elevating work platforms — Symbols for operator controls and other displays*

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

IEC 60204-1:2000, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

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

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

IEC 60947-5-1:2000, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18893 and the following apply.

3.1
access position
normal position which provides access to and from the **work platform** (3.40)

NOTE The access position, **lowered travel position** (3.18), **stowed position** (3.34) and **transport position** (3.35) can be identical.

3.2
aerial device
any device, extensible, articulating or both, which is primarily designed and used to position personnel

NOTE This does not include the **chassis** (3.5). When an aerial device is mounted on a mobile chassis it becomes a component of a **MEWP** (3.19). The device can also be used to handle material, if designed and equipped for that purpose.