

# Mobile elevating work platforms — Design, calculations, safety requirements and test methods relative to special features

## Part 1: MEWPs with retractable guardrail systems

ICS 53.020.99

## National foreword

This British Standard is the UK implementation of ISO 16653-1:2008.

The UK participation in its preparation was entrusted to Technical Committee MHE/12, Lifting platforms.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2008

© BSI 2008

ISBN 978 0 580 54468 2

### Amendments/corrigenda issued since publication

Date	Comments

# INTERNATIONAL STANDARD

**ISO**  
**16653-1**

First edition  
2008-06-01

---

---

## **Mobile elevating work platforms — Design, calculations, safety requirements and test methods relative to special features —**

### **Part 1: MEWPs with retractable guardrail systems**

*Plates-formes élévatrices mobiles de personnel — Conception, calculs,  
exigences de sécurité et méthodes d'essai concernant les  
caractéristiques spéciales —*

*Partie 1: PEMP avec système de garde-corps rétractable*



Reference number  
ISO 16653-1:2008(E)

© ISO 2008

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## 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 16653-1 was prepared by Technical Committee ISO/TC 214, *Elevating work platforms*.

ISO 16653 consists of the following parts, under the general title *Mobile elevating work platforms — Design, calculations, safety requirements and test methods relative to special features*:

- *Part 1: MEWPs with retractable guardrail systems*
- *Part 2: MEWPs with non-conductive (insulating) components*

MEWPs for orchard operations are to form the subject of a future part 3.

## **Introduction**

The object of ISO 16653 is to define rules for safeguarding persons and objects against the risk of accident associated with the operation of special-application mobile elevating work platforms (MEWPs).

The requirements of ISO 16653 are intended to supplement or modify those of ISO 16368 (see Clause 2). Unless specified otherwise within this part of ISO 16653, all the relevant provisions of ISO 16368 are applicable in addition to the provisions of this part of ISO 16653.

ISO 16653 does not repeat all the general technical rules applicable to every electrical, mechanical or structural component.

The safety requirements of this part of ISO 16653 have been drawn up on the basis that MEWPs are periodically maintained according to manufacturers' instructions, working conditions, frequency of use and applicable regulations.

It is assumed that MEWPs will be checked for function daily before start of work and that they will not be 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.

Where, for clarity, an example of a safety measure is given in the text, this is not intended as the only possible solution. Any other solution leading to an equivalent level of safety is permissible.

# Mobile elevating work platforms — Design, calculations, safety requirements and test methods relative to special features —

## Part 1: MEWPs with retractable guardrail systems

### 1 Scope

This part of ISO 16653 specifies the safety requirements for mobile elevating work platforms (MEWPs) with guardrail systems. It is intended to be used in conjunction with ISO 16368.

It is applicable to such MEWPs designed for applications requiring special access to specific work areas. These MEWPs can be either self-propelled or manually propelled and are used to elevate personnel to a level at which they can place, install or retrieve objects or material on a routine basis. To facilitate operator access to the work area, the retraction of a portion of the MEWP's work platform guardrail system(s) can be necessary.

It is not applicable to powered industrial trucks used to pick and place stock or inventory.

### 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 16368, *Mobile elevating work platforms — Design, calculations, safety requirements and test methods*<sup>1)</sup>

### 3 List of hazards

The hazards identified by the risk assessment procedure are presented in Table 1. These hazards are in addition to those specified in ISO 16368.

---

1) To be published. (Revision of ISO 16368:2003)

**Table 1 — List of hazards**

Hazards		Relevant clauses/subclauses in this part of ISO 16653
<b>1</b>	<b>Falling of persons from the platform</b>	4
1.1	Personal protective equipment	4.1.1
1.2	Guardrail system	4.1.2
1.3	Safety information — MEWP markings	6.1
1.4	Safety information — Operator instructions	6.2
<b>2</b>	<b>Objects falling from platform</b>	4.2
<b>3</b>	<b>Function speeds</b>	5.1, 5.2
<b>4</b>	<b>Missing or improperly positioned safety devices</b>	4.1.2
<b>5</b>	<b>Driving with guardrails retracted</b>	4.1.2.5

## 4 Work platform

### 4.1 Guardrail (protection) systems

#### 4.1.1 General

The work platform shall be designed with a guardrail system around its periphery. For the purposes of properly accessing work areas, a portion of the guardrail system may be designed to be retractable. The work platform shall be designed to guard against falls through the use of a fall restraint system.

#### 4.1.2 Retractable guardrail systems

**4.1.2.1** The guardrail system(s) shall be designed to lock into a normal position that fully encloses the periphery of the work platform.

**4.1.2.2** A portion of the guardrail system(s) shall also be designed to open and lock into one or more retracted positions.

**4.1.2.3** The means used to lock the guardrail system(s) into position shall be readily accessible for inspection.

**4.1.2.4** In all locked positions, the guardrails shall be constructed to withstand concentrated loads of 500 N per person, applied at the least favourable positions in the least favourable direction at 0,5 m intervals without causing permanent deformation of the guardrails.

**4.1.2.5** The drive function shall be disabled when the guardrails are retracted.

**4.1.2.6** The above (4.1.2.1 to 4.1.2.5) shall be verified by a design check and by visual examination.

#### 4.1.3 Anchorage points

Each MEWP shall be equipped with one or more anchorage points that are accessible by occupants from the work platform. Anchorage point locations shall be designed for use with a fall restraint system.

## 4.2 Floor of work platform

The floor of the work platform shall contain a strip at the periphery where the guardrail is removable to define the boundary of the platform. The strip shall be contoured and shall not exceed 1 cm in height and 3 cm in width.



### 4.3 Controls

The operator controls shall be located in an area where the guardrails cannot be retracted or removed.

## 5 Function speeds

### 5.1 Maximum travel speeds in elevated travel position

Travel speeds of MEWPs of types 2 and 3 in the elevated travel position shall not exceed the following:

- a) 0,75 m/s for vehicle-mounted MEWPs when using the travelling controls inside the cab;
- b) 1,5 m/s for rail-mounted MEWPs;
- c) 0,5 m/s for all other self-propelled MEWPs of types 2 and 3.

This shall be verified by a design check and functional test.

### 5.2 Speeds of extending structure

The following speeds shall not be exceeded:

- a) 0,3 m/s for telescoping of the boom;
- b) 0,5 m/s for slewing or rotation (horizontal speed at the outer edge of the work platform measured at maximum range).

This shall be verified by a functional test.

## 6 Information for use

### 6.1 Markings

Information regarding the requirement to utilize the fall restraint system when the guardrail system is retracted shall be permanently and clearly marked on each work platform.

### 6.2 Instruction handbook

The instruction handbook shall include the following information:

- operating instructions pertaining to the proper retraction or removal, and installation, of the guardrail system(s);
- operating instructions that are unique to the conditions of use of a MEWP for which the guardrails may be retracted;
- manufacturer's fall restraint system equipment requirements (e.g. maximum lanyard length).

---

---

**ICS 53.020.99**

Price based on 3 pages



---

## BSI - British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

### Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

### Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001 Email: [orders@bsigroup.com](mailto:orders@bsigroup.com) You may also buy directly using a debit/credit card from the BSI Shop on the Website <http://www.bsigroup.com/shop>

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

### Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact Information Centre. Tel: +44 (0)20 8996 7111 Fax: +44 (0)20 8996 7048 Email: [info@bsigroup.com](mailto:info@bsigroup.com)

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001 Email: [membership@bsigroup.com](mailto:membership@bsigroup.com)

Information regarding online access to British Standards via British Standards Online can be found at <http://www.bsigroup.com/BSOL>

Further information about BSI is available on the BSI website at <http://www.bsigroup.com>

### Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright and Licensing Manager. Tel: +44 (0)20 8996 7070 Email: [copyright@bsigroup.com](mailto:copyright@bsigroup.com)

BSI Group  
Headquarters 389  
Chiswick High Road,  
London, W4 4AL, UK  
Tel +44 (0)20 8996 9001  
Fax +44 (0)20 8996 7001  
[www.bsigroup.com/  
standards](http://www.bsigroup.com/standards)