

<b>STN</b>	<b>Technické pomôcky Zdvíhadlá na premiestňovanie osôb Požiadavky a skúšobné metódy (ISO 10535: 2021, opravená verzia 2023-08)</b>	<b>STN EN ISO 10535</b>  84 7076
------------	--	--

Assistive products - Hoists for the transfer of persons - Requirements and test methods (ISO 10535:2021, Corrected version 2023-08)

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 10/23

Obsahuje: EN ISO 10535:2021, ISO 10535 Corrected version 2023-08:2021

Oznámením tejto normy sa ruší  
STN EN ISO 10535 (84 7076) z februára 2022

**137631**



EUROPEAN STANDARD

**EN ISO 10535**

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2021

ICS 11.180.10

Supersedes EN ISO 10535:2006

English Version

**Assistive products - Hoists for the transfer of persons -  
Requirements and test methods (ISO 10535:2021,  
Corrected version 2023-08)**

Produits d'assistance - Lève-personnes pour transférer  
des personnes - Exigences et méthodes d'essais (ISO  
10535:2021, Version corrigée 2023-08)

Hilfsmittel - Lifter zum Transfer von Menschen mit  
Behinderungen - Anforderungen und Prüfverfahren  
(ISO 10535:2021, korrigierte Fassung 2023-08)

This European Standard was approved by CEN on 31 August 2021.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 16 August 2023.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN ISO 10535:2021 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

## **European foreword**

This document (EN ISO 10535:2021) has been prepared by Technical Committee ISO/TC 173 "Assistive products" in collaboration with Technical Committee CEN/TC 293 "Assistive products and accessibility" the secretariat of which is held by SIS.

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 May 2022, and conflicting national standards shall be withdrawn at the latest by May 2022.

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

This document supersedes EN ISO 10535:2006.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## **Endorsement notice**

The text of ISO 10535:2021, Corrected version 2023-08 has been approved by CEN as EN ISO 10535:2021 without any modification.

# INTERNATIONAL STANDARD

# ISO 10535

Third edition  
2021-10

Corrected version  
2023-08

---

---

## **Assistive products — Hoists for the transfer of persons — Requirements and test methods**

*Produits d'assistance — Lève-personnes pour transférer des  
personnes — Exigences et méthodes d'essais*



Reference number  
ISO 10535:2021(E)

© ISO 2021

**ISO 10535:2021(E)****COPYRIGHT PROTECTED DOCUMENT**

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>vii</b>
<b>Introduction</b> .....	<b>viii</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 General requirements and test methods</b> .....	<b>8</b>
4.1 General requirements.....	8
4.1.1 Risk management.....	8
4.1.2 Ergonomic factors.....	8
4.1.3 Noise and vibration.....	8
4.1.4 Safety of moving and folding parts.....	9
4.1.5 Prevention of traps for parts of the human body.....	10
4.1.6 V-shaped openings.....	11
4.2 General test methods.....	11
4.2.1 Test conditions.....	11
4.2.2 Apparatus.....	11
4.2.3 Permissible errors of test equipment.....	12
4.2.4 Test report.....	12
4.2.5 Safety and performance requirements.....	16
4.2.6 Test methods for general safety requirements.....	19
4.3 Requirements for body-support units.....	22
4.4 Central suspension point.....	22
4.4.1 Requirements for central suspension point.....	22
4.4.2 Test method for the central suspension point.....	22
4.5 Spreader bar.....	22
4.5.1 Requirements for spreader bar.....	22
4.5.2 Test methods for the spreader bar.....	23
4.6 Performance.....	23
4.6.1 Requirements for performance.....	23
4.6.2 Test methods for performance.....	23
4.7 Rate of movements of the hoist.....	24
4.7.1 Requirements for rate of lifting and lowering.....	24
4.7.2 Test methods for rate of lifting and lowering.....	24
4.7.3 Requirements for rate of powered horizontal movement.....	24
4.7.4 Test methods for rate of powered horizontal movement.....	24
4.8 Operating forces/torques.....	24
4.8.1 Requirements for operating forces/torques.....	24
4.8.2 Test methods for operating forces/torques.....	25
4.9 Durability.....	25
4.9.1 Requirements for durability.....	25
4.9.2 Test methods for durability.....	25
4.10 Hydraulic components.....	27
4.10.1 Requirements for hydraulic components.....	27
4.10.2 Test methods for hydraulic components.....	28
4.11 Pneumatic components.....	28
4.11.1 Requirements for pneumatic components.....	28
4.11.2 Test methods for pneumatic components.....	28
4.12 Machine washable hoists.....	29
4.12.1 Requirements for machine washable hoists.....	29
4.12.2 Test methods for machine washable hoists.....	29
4.13 Requirement for information supplied by the manufacturer.....	30
4.13.1 General.....	30
4.13.2 Instructions for use.....	30

**ISO 10535:2021(E)**

	4.13.3 Labelling .....	32
<b>5</b>	<b>Mobile hoists — Specific requirements and test methods</b> .....	<b>37</b>
	5.1 General requirements .....	37
	5.2 Static strength .....	37
	5.2.1 Requirements for static strength .....	37
	5.2.2 Test methods for static strength .....	37
	5.3 Static stability .....	38
	5.3.1 Requirements for static stability .....	38
	5.3.2 Test methods for static stability .....	38
	5.4 Immobilizing device (brakes) .....	38
	5.4.1 Requirements for immobilizing device (brakes) .....	38
	5.4.2 Test methods for immobilizing device (brakes) .....	38
	5.5 Moving forces .....	39
	5.5.1 Requirements for moving forces .....	39
	5.5.2 Test methods for moving forces .....	39
	5.6 Requirement for information supplied by the manufacturer .....	40
	5.6.1 Pre-sale information .....	40
<b>6</b>	<b>Mobile hoists for transferring a person in standing position— Specific requirements and test methods</b> .....	<b>41</b>
	6.1 General requirements .....	41
	6.2 Static strength .....	41
	6.2.1 Requirements for static strength .....	41
	6.2.2 Test method for static strength .....	41
	6.3 Static stability .....	41
	6.3.1 Requirements for static stability .....	41
	6.3.2 Test methods for static stability .....	42
	6.4 Immobilizing device (brakes) .....	43
	6.4.1 Requirements for immobilizing device (brakes) .....	43
	6.4.2 Test methods for immobilizing device (brakes) .....	43
	6.5 Moving forces .....	43
	6.5.1 Requirements for moving forces .....	43
	6.5.2 Test methods for moving forces .....	43
	6.6 Durability .....	43
	6.6.1 Requirements for durability .....	43
	6.6.2 Test methods for durability .....	43
	6.7 Requirement for information supplied by the manufacturer .....	44
	6.7.1 Pre-sale information .....	44
<b>7</b>	<b>Stationary hoists — Specific requirements and test methods</b> .....	<b>44</b>
	7.1 General requirements .....	44
	7.2 Specific safety requirements .....	45
	7.2.1 Requirements for specific safety requirements .....	45
	7.2.2 Test methods for specific safety requirements .....	45
	7.3 Static strength (free-standing stationary hoists only) .....	45
	7.3.1 Requirements for static strength (free-standing stationary hoists only) .....	45
	7.3.2 Test methods for static strength (free-standing stationary hoists only) .....	45
	7.4 Static stability (free-standing stationary hoists only) .....	46
	7.4.1 Requirements for static stability (free-standing stationary hoists only) .....	46
	7.4.2 Test methods for static stability (free-standing stationary hoists only) .....	46
	7.5 Static strength for all other stationary hoists .....	47
	7.5.1 Requirements for static strength for all other stationary hoists .....	47
	7.5.2 Test methods for static strength for all other stationary hoists .....	47
	7.6 Requirement for information supplied by the manufacturer .....	47
	7.6.1 User information .....	47
<b>8</b>	<b>Non-rigid body-support units — Specific requirements and test methods</b> .....	<b>47</b>
	8.1 General requirements .....	47
	8.2 Requirements for material and seams of the non-rigid body-support unit .....	47



8.3	Test methods for non-rigid body-support unit.....	48
8.3.1	Test methods for non-rigid body-support unit designed to be laundered.....	48
8.3.2	Test method for durability for non-rigid body-support unit.....	48
8.4	Requirement for information supplied by the manufacturer.....	48
8.4.1	Pre-sale information.....	48
8.4.2	User information.....	48
8.4.3	Labelling.....	49
<b>9</b>	<b>Rigid body-support units — Specific requirements and test methods.....</b>	<b>49</b>
9.1	General requirements.....	49
9.2	Requirements for backrest.....	50
9.3	Requirements and test methods for durability.....	50
9.4	Requirement for information supplied by the manufacturer.....	50
9.4.1	User information.....	50
9.4.2	Labelling.....	50
<b>10</b>	<b>Bathtub hoists — Specific requirements and test methods.....</b>	<b>51</b>
10.1	General requirements.....	51
10.1.1	General.....	51
10.1.2	Risk analysis.....	51
10.1.3	Ergonomic factors.....	51
10.1.4	Noise.....	51
10.1.5	Safety of moving and folding parts.....	51
10.1.6	Prevention of traps for parts of the human body.....	51
10.1.7	V-shaped openings.....	51
10.2	General test methods.....	52
10.2.1	Test conditions.....	52
10.2.2	Test equipment.....	52
10.2.3	Permissible errors of test equipment.....	52
10.2.4	Test report.....	52
10.3	Safety requirements.....	52
10.3.1	General safety requirements.....	52
10.3.2	Test methods for general safety requirements.....	52
10.4	Body-support units.....	53
10.5	Spreader bar.....	53
10.6	Performance.....	53
10.7	Rate of movements of the hoist.....	53
10.8	Operating forces/torques.....	53
10.9	Durability.....	53
10.9.1	Requirements for durability.....	53
10.9.2	Test methods for durability.....	53
10.10	Static strength and stability.....	54
10.10.1	Requirements for static strength and stability.....	54
10.10.2	Test methods for static strength and stability.....	54
10.11	Hydraulic components.....	54
10.12	Pneumatic components.....	55
10.13	Specific safety requirements.....	55
10.13.1	Requirements for specific safety requirements.....	55
10.13.2	Test methods for specific safety requirements.....	55
10.14	Non-rigid body-support units.....	55
10.15	Rigid body-support units — Requirements.....	55
10.16	Requirement for information supplied by the manufacturer.....	55
10.16.1	General.....	55
10.16.2	Instructions for use.....	55
10.16.3	Labelling.....	55
	<b>Annex A (informative) Rationale for specific safety requirements.....</b>	<b>56</b>
	<b>Annex B (informative) Periodic inspection and maintenance.....</b>	<b>58</b>
	<b>Annex C (informative) Compatibility of hoist/spreader bar/body-support units.....</b>	<b>61</b>

**ISO 10535:2021(E)**

<b>Annex D (informative) Guidelines for colour coding for size of non-rigid body-support units.....</b>	<b>74</b>
<b>Bibliography.....</b>	<b>75</b>

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 173, *Assistive products*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 293, *Assistive products and accessibility*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 10535:2006), which has been technically revised.

The main changes are as follows:

- aspects on hoists with robotic features has been included;
- guidelines regarding compatibility of hoists/body-support units have been included;
- the informative annex on Inspection has been further developed;
- lowering of minimum capacity of a mobile hoist from 120 kg to 100 kg;
- requirement of emergency lowering device for mobile hoist and standing/raising hoists has been included.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

This corrected version of ISO 10535:2021 incorporates the following correction:

- in [4.2.5.2](#), the sentence "Electrically operated hoists shall conform to IEC 60601-1:2005+AMD1:2012, Clause 14 regarding electrical safety unless requirements are covered by this document." has been added at the beginning of the first paragraph.

## ISO 10535:2021(E)

### Introduction

It appears from studies that the nursing and caring profession involves many physically burdening factors in the caring for and nursing of persons with disabilities. A hoist offers a safe means of supportive lifting and moving, either assisted or independently.

This document specifies requirements and test methods that are relevant to hoists for the transfer of persons with disabilities. This document addresses further needs in terms of providing safety for both the person with a disability and the attendant, while taking into account the potential new development within robotic technology on hoist solutions.

# Assistive products — Hoists for the transfer of persons — Requirements and test methods

## 1 Scope

This document specifies requirements and test methods for hoists and body-support units intended for the transfer of persons with disabilities. The document applies to the following products classified in ISO 9999:—<sup>1)</sup>.

- 12 36 03 Mobile hoists for transferring a person in sitting position with sling seats;
- 12 36 04 Mobile hoists for transferring a person in standing position;
- 12 36 06 Mobile hoists for transferring a person in sitting position with solid seats;
- 12 36 09 Mobile hoists for transferring a person in lying position;
- 12 36 12 Stationary hoists fixed to walls, floor or ceiling;
- 12 36 15 Stationary hoists fixed to, or mounted in or on, another product;
- 12 36 18 Stationary free-standing hoists;
- 12 36 21 Body-support units for hoists.

This document covers different types of mobile and stationary hoists. Some of the requirements and test methods are general and others are only valid for specific product types.

[Annexes A, B](#) and [C](#) provide general recommendations.

This document does not apply to devices that transport persons between two levels (floors) of a building.

It does not include methods for the determination of ageing or corrosion of such hoists and units.

It does not include methods to qualify individual units prior to use.

The requirements of this document are formulated with regard to the needs of both the persons being hoisted and the attendant using the hoist.

## 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.

ISO 3746, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane*

ISO 3758, *Textiles — Care labelling code using symbols*

ISO 10993-1, *Biological evaluation of medical devices — Part 1: Evaluation and testing within a risk management process*

ISO 14971, *Medical devices — Application of risk management to medical devices*

---

1) Under preparation. Stage at the time of publication: ISO/FDIS 9999:2021.

**ISO 10535:2021(E)**

ISO 15223-1:2021, *Medical devices — Symbols to be used with information to be supplied by the manufacturer — Part 1: General requirements*

ISO 20417, *Medical devices — Information to be supplied by the manufacturer*

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

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

IEC 60601-1:2005+AMD1:2012+AMD2:2020, *Medical electrical equipment — Part 1: General requirements for basic safety and essential performance*

IEC 60601-1-2:2014, *Medical electrical equipment — Part 1-2: General requirements for safety — Collateral standard: Electromagnetic compatibility — Requirements and tests*

IEC 60601-1-11, *Medical electrical equipment — Part 1-11: General requirements for basic safety and essential performance - Collateral Standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

EN 853, *Rubber hoses and hose assemblies — Wire braid reinforced hydraulic type — Specification*

EN 854, *Rubber hoses and hose assemblies — Textile reinforced hydraulic type — Specification*

EN 1021-1, *Furniture — Assessment of the ignitability of upholstered furniture — Part 1: Ignition source smouldering cigarette*

EN 1021-2, *Furniture — Assessment of the ignitability of upholstered furniture — Part 2: Ignition source match flame equivalent*

EN 13480-3:2017, *Metallic industrial piping — Part 3: Design and calculation*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**