
**Petroleum, petrochemical and natural
gas industries — Safety of machineries
— Powered elevators**

*Industries du pétrole, de la pétrochimie et du gaz naturel — Sécurité
des machines — Élévateurs motorisés*



This document is a preview generated by ERS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Abbreviated terms	5
5 Safety requirements and/or protective/risk reduction measures	5
5.1 General requirements for powered elevators	5
5.2 Mechanical strength	5
5.3 Safety design of powered elevators	5
5.3.1 General	5
5.3.2 Ergonomic design	5
5.3.3 Fastening methods and DROPS prevention of parts	5
5.3.4 Suspension points	6
5.3.5 Moving parts, pinch points and guards	6
5.4 Other protective measures	7
5.4.1 Risks due to surfaces, edges or angles	7
5.4.2 Size and type verification (errors of fitting)	7
5.4.3 Static electricity	7
5.4.4 Loss of stability	7
5.4.5 Explosion prevention	7
5.4.6 Controls	7
5.4.7 Elevator coating	7
5.4.8 Noise	8
5.5 Specific risks for powered elevators	8
5.5.1 General	8
5.5.2 External power source	8
5.5.3 Feedback signals	8
5.5.4 Danger zone	8
5.6 Stops for an assembly of machinery	9
5.6.1 General	9
5.6.2 Start of the movement	9
5.6.3 Normal stop	9
5.6.4 Operational stop	9
5.6.5 Emergency shutdown	9
5.7 Failure of power supply	10
5.8 Verification of safety requirements and/or protective/risk reduction measures	10
5.8.1 General	10
5.8.2 Service life	10
5.8.3 Fatigue life	10
5.8.4 Maintenance	10
6 Functions for preparing the elevator for a safe lift — Wrapping, securing, locking and verification	10
6.1 General	10
6.2 Black box approach	11
6.3 Wrapping	11
6.4 Securing	12
6.5 Locking	13
6.6 Verification of readiness for safe lift	13
7 Closed-ring powered elevator	14
7.1 Wrapping	14
7.2 Securing and locking	14

7.3	Verification	14
8	Instructions for use	14
8.1	General	14
8.2	Instruction handbook	14
9	Marking of powered elevators	17
Annex A	(informative) Relation between the clauses of European Directive on machinery (Directive 2006/42/EC) and this document	19
Annex B	(normative) Verification tests for powered elevators	23
Bibliography	25

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).

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).

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.

This document was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 4, *Drilling and production equipment*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 12, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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.

Introduction

This document is a type-C standard as stated in ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e. g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

Petroleum, petrochemical and natural gas industries — Safety of machineries — Powered elevators

1 Scope

This document specifies general safety requirements for the design, testing and production of powered elevators. The requirements are applicable for onshore and offshore applications of such elevators in the petroleum and petrochemical industries.

This document does not cover any other type of elevator. It is not applicable to the following types of products:

- remote control devices;
- lifting nubbins;
- lifting plugs;
- lifting subs;
- internal gripping devices;
- equipment for lifting tubular from and onto a vessel;
- elevator links or bails.

This list is not exhaustive.

This document is not applicable to powered elevators manufactured before the date of this publication.

NOTE [Annex A](#) provides the relation between the clauses of the European Directive on machinery (Directive 2006/42/EC) and this document, for potential significant hazards and the safety requirements dealing with them for powered elevators.

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

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13534, *Petroleum and natural gas industries — Drilling and production equipment — Inspection, maintenance, repair and remanufacture of hoisting equipment*

ISO 13535:2000, *Petroleum and natural gas industries — Drilling and production equipment — Hoisting equipment*

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

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

ISO 14120, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 80079-36, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements*

ISO 80079-37, *Explosive atmospheres — Part 37: Non-electrical equipment for explosive atmospheres — Non-electrical type of protection constructional safety “c”, control of ignition sources “b”, liquid immersion “k”*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

3.1 control system

system that responds to input signals from parts of the *elevator* (3.5), operators, external control equipment or any combination of these, and generates corresponding output signals to the elevator actuators, causing the elevator to perform in the intended manner

3.2 danger zone

space within, under and/or around machinery in which a person can be exposed to a hazard

[SOURCE: ISO 12100:2010, 3.11]

3.3 design verification

process of examining the result of a given design or development activity to determine conformity with specified requirements

[SOURCE: ISO/TS 29001:2010, 3.1.8]

3.4 DROPS dropped objects

industry-wide initiative focused on preventing dropped objects

Note 1 to entry: DROPS ultimate goal is delivering a second nature dropped objects prevention strategy across the industry.

3.5 elevator

lifting accessory to be used for lifting and handling of tubular in the on- and offshore drilling industry on or in the vicinity of the drill floor

3.6 fatigue life

number of stress cycles of a specific character that an *elevator* (3.5) sustains before failure of a specified nature occurs