SLOVENSKI STANDARD
oSIST prEN ISO 18623-1:2023

01-julij-2023

Kompresorji za zrak in sistemi na stisnjen zrak - 1. del: Varnostne zahteve za kompresorje za zrak (ISO/DIS 18623-1:2023)

Air compressors and compressed air systems - Part 1: Air compressor safety requirements (ISO/DIS 18623-1:2023)

Luftkompressoren und Druckluftsysteme - Luftkompressoren - Teil 1: Sicherheitsanforderungen (ISO/DIS 18623-1:2023)

Compresseurs à air et systèmes à air comprimé - Partie 1: Exigences de sécurité des compresseurs à air (ISO/DIS 18623-1:2023)

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23.160	Vakumska tehnologija	Vacuum technology

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Air compressors and compressed air systems —

Part 1:
Air compressor safety requirements

Compresseurs à air et systèmes à air comprimé —

Partie 1: Exigences de sécurité des compresseurs à air

ICS: 23.140

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Foreword

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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).

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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.

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This document was prepared by Technical Committee ISO/TC 118, Compressors and pneumatic tools, machines and equipment, Subcommittee SC 6, Air compressors and compressed air systems.

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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 organisations, 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.

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Air compressors and compressed air systems —

Part 1:
Air compressor safety requirements

1 Scope

This document is applicable to compressors and compressor units having an operating pressure greater than 0,5 bar and designed to compress air, nitrogen or inert gases. This document deals with all significant hazards, hazardous situations and events relevant to the design, installation, operation, maintenance, dismantling and disposal of compressors and compressor units when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4 of this document).

This document includes under the general term compressor units those machines which comprise:

— the compressor;

— a drive system;

— any component or device which is necessary for operation.

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This document covers compressors driven by any power media, including battery powered and which are fitted in or used with motor vehicles.

The significant hazards dealt with in the standard are identified in Annex A of this document.

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This document does not cover requirements for compressors and compressor units used in potentially explosive atmospheres.

This document is not applicable to compressors and compressor units which are manufactured before the date of publication of this standard.

This document does not cover compressors and compressor units for processing petroleum, petrochemicals, or chemicals within the scope of ISO/TC 67.

This document does not give performance levels or safety integrity levels for safety related parts of control systems.

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 2151:2004, *Acoustics — Noise test code for compressors and vacuum pumps — Engineering method (Grade 2)*

ISO 3857-1:1977, *Compressors, pneumatic tools and machines — Vocabulary — Part 1: General*

ISO 3857-2:1977, *Compressors, pneumatic tools and machines — Vocabulary — Part 2: Compressors*

ISO 4126-1:2013, *Safety devices for protection against excessive pressure — Part 1: Safety valves*

ISO 4126-1:2013/Amd 1:2016, *Safety devices for protection against excessive pressure — Part 1: Safety valves — Amendment 1*

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ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 7000:2019, *Graphical symbols for use on equipment — Registered symbols*

ISO 7010:2019, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 7010:2019/Amd 1:2020, *Graphical symbols — Safety colours and safety signs — Registered safety signs — Amendment 1*

ISO 7010:2019/Amd 2:2020, *Graphical symbols — Safety colours and safety signs — Registered safety signs — Amendment 2*

ISO 7010:2019/Amd 3:2021, *Graphical symbols — Safety colours and safety signs — Registered safety signs — Amendment 3*

ISO 7010:2019/Amd 4:2021, *Graphical symbols — Safety colours and safety signs — Registered safety signs — Amendment 4*

ISO 7010:2019/Amd 5:2022, *Graphical symbols — Safety colours and safety signs — Registered safety signs — Amendment 5*

ISO 7010:2019/Amd 6:2022, *Graphical symbols — Safety colours and safety signs — Registered safety signs — Amendment 6*

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ISO 8573-1:2010, *Compressed air — Part 1: Contaminants and purity classes*

ISO 8573-2:2018, *Compressed air — Contaminant measurement — Part 2: Oil aerosol content*

ISO 8573-3:1999, *Compressed air — Part 3: Test methods for measurement of humidity*

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ISO 8573-4:2019, *Compressed air — Contaminant measurement — Part 4: Particle content*

ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13732-1:2006, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

ISO 13732-3:2005, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces*

ISO 13766-1:2018, *Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 1: General EMC requirements under typical electromagnetic environmental conditions*

ISO 13766-2:2018, *Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 2: Additional EMC requirements for functional safety*

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

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ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 14122-1:2016, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means and general requirements of access*

ISO 14122-2:2016, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways*

ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders*

ISO 14123-1:2015, *Safety of machinery — Reduction of risks to health resulting from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

ISO 14163:1998, *Acoustics — Guidelines for noise control by silencers*

ISO 15534-1:2000, *Ergonomic design for the safety of machinery — Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery*

ISO 15667:2000, *Acoustics — Guidelines for noise control by enclosures and cabins*

ISO/TR 22100-3:2016, *Safety of machinery — Relationship with ISO 12100 — Part 3: Implementation of ergonomic principles in safety standards*

ISO 26800:2011, *Ergonomics — General approach, principles and concepts*

IEC 60204-1:2016, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

IEC 60204-1:2016/AMD1:2021, *Amendment 1 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

IEC 60204-11:2018, *Safety of machinery - Electrical equipment of machines - Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV*

IEC 60417-DB-12M:2002, *Graphical Symbols For Use On Equipment - 12-Month Subscription To Online Database Comprising All Graphical Symbols Published In IEC 60417*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments*

IEC 61000-6-4:2018, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

IEC 61310-2:2007, *Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking*

IEC 61310-3:2007, *Safety of machinery - Indication, marking and actuation - Part 3: Requirements for the location and operation of actuators*

IEC 62061:2021, *Safety of machinery - Functional safety of safety-related control systems*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010 apply. Terms and definitions specifically needed for compressors are given in ISO 3857-1:1977, ISO 3857-2:1977 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 General terms

3.1.1
compressor
part of a compressor unit that compresses a gas or vapour media to a pressure higher than that at the inlet

3.1.2
compressor unit
unit that comprises the compressor, a drive system and any component or device which is necessary for operation

3.1.3
drive system
system that consists of a prime mover and coupling mechanism

Note 1 to entry: Prime mover may be an electric motor, steam engine (turbine), etc.

Note 2 to entry: Coupling mechanism may be a drive belt, shaft, gears, etc.

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3.1.4
inert gas
chemically inactive gas which retains this characteristic even at elevated pressures

3.1.5
pressure
pressure relative to atmospheric pressure, i.e. gauge pressure

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Note 1 to entry: In many cases, this is referred to as effective pressure.

Note 2 to entry: The unit bar for pressure is used. 1 bar = 100 kPa.

3.1.6
liquid shock
excessive force resulting from an attempt to compress incompressible media

3.1.7
maximum allowable pressure
maximum pressure for which the compressor or compressor unit is designed, as specified by the manufacturer

Note 1 to entry: This is also identified as maximum allowable working pressure.

3.1.8
normal operating conditions
conditions considered to be when the compressor is properly maintained and operated within admissible limits, in particular; ambient temperature, as specified by the manufacturer when compressing the specified media

3.2 Specific terms

3.2.1
air compressor
compressor intended for compression of air, nitrogen or inert gases

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3.2.2
compressor assembly
assembly of compressor units and ancillary equipment to provide a compression facility that functions as an integrated whole

Note 1 to entry: The limits of the assembly are as defined by the manufacturer.

3.2.3
portable and skid mounted compressor

3.2.3.1
portable compressor unit
compressor unit which is wheel-mounted and can be towed on- and off-site

3.2.3.2
skid-mounted compressor unit
compressor unit which is mounted on skids and which can be towed short distances on-site or transported

3.2.3.3
gross mass
maximum specified mass of a skid-mounted or portable compressor unit (including tools, equipment and fuel)

Note 1 to entry: Tools and equipment includes for example concrete breakers, picks and hoses likely to be carried for a typical working application.

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3.2.4
process compressor
compressor intended for compression of all gases other than air, nitrogen or inert gases

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3.2.5
water-injected compressor
compressor design in which the compressed media and the water are mixed

4 Safety requirements and/or protective measures

4.1 General

The machine shall comply with the following safety requirements and/or protective measures and be verified in accordance with Clause 5 of this document. In addition, the machine shall be designed according to the principles of ISO 12100:2010 for relevant, but not necessarily significant hazards, which are not dealt with by this document.

When choices are necessary for the application of type B standards referred to in this Standard, i.e. listed in Clause 2 of this document, the manufacturer shall carry out an appropriate risk assessment for making these choices.

The measures adopted to comply with the requirements of this clause shall take account of the state-of-the-art when more effective technical means become available.

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