



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 18623-1:2014**  
**01-oktober-2014**

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**Kompresorji za zrak in sistemi na stisnjen zrak - Kompresorji za zrak - 1. del:  
Varnostne zahteve (ISO/DIS 18623-1:2014)**

Air compressors and compressed air systems - Air compressors - Part 1: Safety requirements (ISO/DIS 18623-1:2014)

**iTeh STANDARD PREVIEW**

Compresseurs à air et systèmes à air comprimé - Compresseurs à air - Partie 1:  
Prescriptions de sécurité (ISO/DIS 18623-1:2014)

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**Ta slovenski standard je istoveten z: prEN ISO 18623-1 rev**

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**ICS:**

23.140	Kompresorji in pnevmatični stroji	Compressors and pneumatic machines
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# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 18623-1

ISO/TC 118/SC 6

Secretariat: SIS

Voting begins on:  
2014-04-14Voting terminates on:  
2014-07-14

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## Air compressors and compressed air systems — Air compressors —

### Part 1: Safety requirements

*Compresseurs à air et systèmes à air comprimé — Compresseurs à air —  
Partie 1: Prescriptions de sécurité*

ICS: 23.140

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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 18623-1 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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This second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

ISO 18623 consists of the following parts, under the general title *Air compressors and compressed air systems — Air compressors*:

- <https://standards.iteh.ai/catalog/standards/sist/52386cf4-4676-4902-a32d-4bbe6efcd7d9/ksist-pren-iso-18623-1-2015>
- Part 1: *Safety requirements*
  - Part 2: *Good practice*

## Introduction

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

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 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.

This International Standard classifies and makes available general information on practices, specific requirements, and recommendations covering safety for air compressors, their drives, and auxiliaries. Safety requirements, recommendations, and suggestions described in this Standard provide guidance to those who design, produce, install, maintain, and/ or operate air compressors.

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# Air compressors and compressed air systems — Air compressors — Part 1: Safety requirements

## 1 Scope

This part of ISO 18623 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 standard 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).

This part of ISO 18623 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.

This part 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.

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

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

It does not cover compressors and compressor units for processing petroleum, petrochemicals, or chemicals within the scope of ISO TC67.

## 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 2151:2008, *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 - Safety valves*

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

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- ISO 4414:2010, *Hydraulic fluid power. General rules and safety requirements for systems and their components*
- ISO 8573-1:2010, *Compressed air — Part 1: Contaminants and purity classes*
- ISO 8573-2:2007, *Compressed air — Part 2: Test methods for oil aerosol content*
- ISO 8573-3:1999, *Compressed air — Part 3: Test methods for measurement of humidity*
- ISO 8573-4:2001, *Compressed air — Part 4: Test methods for solid particle content*
- ISO 12100:2010, *Safety of machinery - General principles for design – Risk assessment and risk reduction*
- ISO 13849-1:2006, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*
- ISO 13850:2006, *Safety of machinery – Emergency stop – Principles for design*
- ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs*
- ISO 14120, *Safety of machinery. Guards. General requirements for the design and construction of fixed and movable guards*
- ISO 14122-1:2001, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels*
- ISO 14122-2:2001, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways*
- ISO 14122-3:2001, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*
- ISO 14122-4:2004, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders*
- 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*
- IEC 60204-1:2005+A1:2008, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*
- IEC 60204-11: 2000, *Safety of machinery - Electrical equipment of machines - Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1 500 V d.c. and not exceeding 36 kV*
- IEC 61310-2:2007, *Safety of machinery. Indication, marking and actuation - Requirements for marking*
- EN 626-1:1994+A1:2008, *Safety of machinery. Reduction of risks to health from Hazardous substances emitted by machinery - Principles and specifications for machinery manufacturers*
- EN 1005-2:2003+A1:2008, *Safety of machinery. Human physical performance - Manual handling of machinery and component parts of machinery*
- EN 13445-5:2009 +A4:2013: *Unfired pressure vessels - Inspection and testing*

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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 listed below and in ISO 3857-1:1977 and ISO 3857-2:1977.

#### 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.

#### 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

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

#### 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.

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### 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.

### 3.2.4

#### process compressor

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

### 3.2.5

#### water-injected compressor

compressor design in which the compressed media and the water are mixed

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## 4 Safety requirements and/or protective measures

### 4.1 General

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The machine shall comply with the following safety requirements and/or protective measures and be verified in accordance with Clause 5. In addition, the machine shall be designed according to the principles of ISO 12100 for relevant but not 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, 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.

### 4.2 Mechanical safety

#### 4.2.1 Guards

##### 4.2.1.1 General

When fixed guards have to be removed for periodic maintenance or repair their fixing systems shall remain attached to the guard or machinery when the guards are removed.

##### 4.2.1.2 Cutting and severing, friction and abrasion

All moving parts shall be enclosed within the permanent compressor casing or compressor unit cover, enclosure or canopy. When this is not possible, separate guards shall be provided to prevent contact with all rotating and reciprocating parts to minimize the risk of cutting and severing, friction and abrasion to personnel in accordance with Clause 5 of ISO 14120 and ISO 13857 for safety distances.

#### 4.2.1.3 Bodily contact

Guards shall be sufficiently rigid so as not to deflect excessively as a result of bodily contact. Such deflections shall not result in contact with moving parts, or that the deflection should not result in permanent deformation of the guard. The provisions for rigidity of guards shall be in accordance with 5.4.3 of ISO 14120.

#### 4.2.1.4 Ejection of parts

Moving parts shall be designed and mounted in such a way that in all foreseeable modes of operation the risk of ejection of parts is minimised. Where the risk assessment identifies a remaining risk of ejection, e.g. a drive belt from a belt driven compressor, then the impact resistance for guarding shall be in accordance with 5.4.2 of ISO 14120.

#### 4.2.1.5 Entry to inlet ducts and enclosures

Atmospheric inlets and inspection openings in inlets shall be provided with protective devices, so that persons cannot be drawn in or danger zones reached when the compressor is running. For this purpose, any openings shall comply with Table 4 of ISO 13857:2008 for upper limbs and Table 7 of ISO 13857:2008 for lower limbs, when applicable.

Openings giving access to moving parts creating a risk of trapping or shearing shall be prevented by either:

- total enclosure with an interlocked means of access, e.g. door, cover, etc. such that the compressor is shut down when the access is opened and cannot be started until the access is closed; or
- total enclosure without interlock when access to moving parts, e.g. fan belts, barring gear, timing marks, etc., shall be prevented by local guarding; or
- without total enclosure when access to moving parts, e.g. fan belts, barring gear, timing marks, etc., shall be prevented by local guarding.

Where service, maintenance or inspection activities require access within the enclosure doors whilst the compressor is still operational, consideration shall be given to the additional hazards created and the measures taken shall be in accordance with 6.3.2.4 of ISO 12100:2010. The provisions of 6.3.3 shall also be applied.

Where whole body access is required to inlet ducts and enclosures for service, maintenance or inspection the provisions of ISO 15534-1 shall be followed when determining the minimum dimensions of openings for such whole body access.

Where whole body access is required to inlet ducts for service, maintenance or inspection, a guard shall be fitted to prevent unauthorised access. The guard shall be:

- interlocked such that when the guard is opened the compressor is shut-down and cannot be restarted until the guard is closed; and
- unintentional closure of the guard is prevented by the use of a trapped key interlock or a padlock where the only key for the trapped key or the padlock is retained by the person entering the inlet duct.

Where it is foreseeable that the compressor will remain operational during whole body access to the inlet duct for service, maintenance or inspection, the design of the inlet duct shall be such that the air flow at the entrance to the inlet duct shall be  $\leq 2,5\text{m/s}$  and in addition a protective grid shall be installed inside the duct to prevent personnel being drawn into the compressor.

A safe system of work shall also be identified in accordance with 6.4.1.

#### 4.2.2 Fluid injection

The risk of fluid (gas or liquid) injection into the human body shall be minimized by: