

# SVENSK STANDARD

## SS-EN 1012-1:2010

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### **Kompressorer och vakuumpumpar – Säkerhetskrav – Del 1: Luftkompressorer**

### **Compressors and vacuum pumps – Safety requirements – Part 1: Air compressors**

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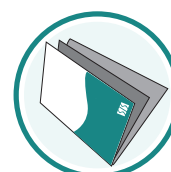
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Europastandarden EN 1012-1:2010 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 1012-1:2010.

Denna standard ersätter SS-EN 1012-1, utgåva 1.

The European Standard EN 1012-1:2010 has the status of a Swedish Standard. This document contains the official version of EN 1012-1:2010.

This standard supersedes the Swedish Standard SS-EN 1012-1, edition 1.

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EUROPEAN STANDARD

**EN 1012-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2010

ICS 23.080; 23.140; 23.160

Supersedes EN 1012-1:1996

English Version

## Compressors and vacuum pumps - Safety requirements - Part 1: Air compressors

Compresseurs et pompes à vide - Prescriptions de sécurité  
- Partie 1 : Compresseurs d'air

Kompressoren und Vakuumpumpen -  
Sicherheitsanforderungen - Teil 1: Kompressoren

This European Standard was approved by CEN on 30 July 2010.

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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 Management Centre has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN 1012-1:2010) has been prepared by Technical Committee CEN/TC 232 "Compressors, vacuum pumps and their systems", 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of an identical text or by endorsement, at the latest by March 2011, and conflicting national standards shall be withdrawn at the latest by September 2012.

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

This document supersedes EN 1012-1:1996.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

For relationship with EC Directive(s), see informative Annex ZA, which is an integral part of this document.

The responsibility of CEN/TC 232 includes coordination of safety standards with CEN/TC 182, "Refrigerating systems, safety and environmental requirements", and CEN/TC 234, "Gas infrastructure".

This document is in three parts:

- *Part 1: Air compressors;*
- *Part 2: Vacuum pumps;*
- *Part 3: Process compressors.*

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## Introduction

This document is a type C standard as stated in the introduction to EN ISO 12100-1.

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

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

This standard when published in 1996 applied to all types of compressors. The standard has now been divided into three parts with this part addressing compressors for compressed air, nitrogen and inert gases, a second part addressing vacuum pumps and a third part addressing compressors for process gases. It was considered a practical move so that if there were provisions that were laid down for compressors covered by CEN/TC 12 or ISO/TC 67, then any revision or amendments could be done to the process compressor part without affecting the provisions laid down for air compressors covered by this part of EN 1012.

Standards dealing with non-safety aspects of compressor units are:

- EN 61000-6-4 and EN 61000-6-2 for stationary compressor units;
- EN 13309 for skid-mounted and mobile compressor units on electromagnetic compatibility.



## 1 Scope

This part of EN 1012 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).

This part of EN 1012 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 also covers the general requirements relating to process gas compressors; for specific requirements see prEN 1012-3 which applies.

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

This part of EN 1012 does not cover requirements for compressors used in potentially explosive atmospheres.

This part of EN 1012 is not applicable to compressors which are manufactured before the date of publication of this document by CEN.

## 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.

EN 547-1, *Safety of machinery — Human body measurements — Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

EN 626-1:1994+A1:2008, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

EN 837-2, *Pressure gauges — Part 2: Selection and installation recommendations for pressure gauges*

EN 953:1997+A1:2009, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 982:1996+A1:2008, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983:1996+A1:2008, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 1005-2, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

EN 12021, *Respiratory protective devices — Compressed air for breathing apparatus*

EN 13445-5:2009, *Unfired pressure vessels — Part 5: Inspection and testing*

EN 13445-6, *Unfired pressure vessels — Part 6: Requirements for the design and fabrication of pressure vessels and pressure parts constructed from spheroidal graphite cast iron*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60204-11, *Safety of machinery — Electrical equipment of machines — Part 11: Requirements for HV equipment for voltages above 1000 V a.c. or 1500 V d.c. and not exceeding 36 kV (IEC 60204-11:2000)*

EN 61310-2:2008, *Safety of machinery — Indication, marking and actuation — Requirements for marking (IEC 61310-2:2007)*

EN ISO 2151:2008, *Acoustics — Noise test code for compressors and vacuum pumps — Engineering Method (Grade 2) (ISO 2151:2004)*

EN ISO 4126-1, *Safety devices for protection against excessive pressure — Part 1: Safety valves (ISO 4126-1:2004)*

EN ISO 11688-1, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

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

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

EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14121-1, *Safety of machinery — Risk assessment — Part 1: Principles (ISO 14121-1:2007)*

EN ISO 14122-1, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001)*

EN ISO 14122-2, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

EN ISO 14122-4, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2004)*

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

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

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

ISO 8573-2, *Compressed air — Part 2: Test methods for oil aerosol content*

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

ISO 8573-4, *Compressed air — Part 4: Test methods for solid particle content*

IEC 60417 (2002-10), *Graphical symbols for use on equipment*<sup>1)</sup>

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 apply. Terms and definitions specifically needed for compressors are listed below and in ISO 3857-1:1977 and ISO 3857-2:1977.

#### 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 Prime mover may be an electric motor, steam engine (turbine), etc.

NOTE 2 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 In many cases, this is referred to as effective pressure.

NOTE 2 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

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1) IEC 60417 is available only as a database which can be accessed, if necessary, by subscription through the IEC Website (see <http://www.graphical-symbols.info/graphical-symbols/equipment/db1.nsf/welcome?OpenPage>); those symbols relevant to this standard can be found in Annex A.