

## **Kompressorid ja vaakumpumbad. Ohutusnõuded. Osa 2: Vaakumpumbad**

Compressors and vacuum pumps - Safety  
requirements - Part 2: Vacuum pumps

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 1012-2:1999 sisaldab Euroopa standardi EN 1012-2:1996 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 23.11.1999 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 1012-2:1999 consists of the English text of the European standard EN 1012-2:1996.</p> <p>This document is endorsed on 23.11.1999 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>Käesolev standard kehtib kõigi vaakumpumpade, vaakumpumpade komplektide ja vaakumpumbasüsteemide korral. Standard esitab nimekirja vaakumpumpadega seotud olulistest ohtudest ja määrab kindlaks vaakumpumpade konstruktsioonile, paigaldusele, töötamisele, korrashoiule ja lahtivõtmisele rakendatavad ohutusnõuded nende ettenähtud töötamisajal ning hilisema utiliseerimise ajal.</p>	<p><b>Scope:</b></p>
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ICS 23.160

**Võtmesõnad:** andmeplaat, informatsioon, inimteguri arvestamine konstrueerimisel, korrashoid, masina ohutus, määratlused, ohtlikud masinad, ohud, ohutusmeetmed, paigaldus, tõendamine, utiliseerimine, vaakumpumbad, õnnetuste ärahoidmine

Hinnagrupp N

ICS 23.140; 23.160

Descriptors: Compressors, vacuum pumps, safety requirements.

**English version**

**Compressors and vacuum pumps**

**Safety requirements**

**Part 2: Vacuum pumps**

Compresseurs et pompes à vide;  
prescriptions de sécurité. Partie 2:  
Pompes à vide

Kompressoren und Vakuumpumpen;  
Sicherheitsanforderungen. Teil 2:  
Vakuumpumpen

This European Standard was approved by CEN on 1996-03-13.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

## Contents

	Page
<b>Foreword</b> .....	3
<b>1 Scope</b> .....	3
<b>2 Normative References</b> .....	3
<b>3 Definitions</b> .....	5
<b>4 List of Hazards</b> .....	6
<b>5 Safety Requirements and/or Measures</b> .....	10
5.1 Mechanical safety.....	10
5.2 Electrical safety.....	11
5.3 Thermal safety.....	13
5.4 Noise.....	13
5.5 Radiation.....	13
5.6 Materials and substances processed or exhausted.....	14
5.7 Ergonomic principles in Machine Design.....	15
5.8 Failure of energy supply, breaking down of machinery parts and other functional disorders.....	16
5.9 Missing or incorrectly positioned safety related measures and means.....	16
5.10 Emergency stop.....	16
<b>6 Markings</b> .....	17
<b>7 Information for Use</b> .....	18
<b>8 Verification</b> .....	22
<b>ANNEX A (normative) Labels, signs and warnings</b> .....	24
<b>ANNEX ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives</b> .....	29

## Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 232 "Compressors - Safety" 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 October 1996, and conflicting standards shall be withdrawn at the latest by October 1996.

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

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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 supply".

Annexes A and ZA to this draft European Standard are informative.

The standard is divided in two parts:

- EN 1012-1 Compressors
- EN 1012-2 Vacuum Pumps

## 1 Scope

This standard is applicable to all vacuum pumps, vacuum pump combinations and vacuum pumping systems. The standard lists the significant hazards associated with vacuum pumps and specifies safety requirements applicable to the design, installation, operation, maintenance and dismantling of vacuum pumps during their foreseeable life and subsequent disposal.

The scope does not include pumps designed to pump continuously on open systems where the pump inlet pressure is above 75 kPa (750 mbar) absolute, (ie vacuum cleaners, ventilation fans).

Vacuum pumps intended for use in special applications shall also comply with any specific standards relating to those applications.

## 2 Normative References

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of the publications apply to this European standard only when they are incorporated in this standard by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1:1991	Safety of machinery - Basic concepts, general principles for design Part 1 : Basic terminology, methodology
EN 292-2 :1991	Safety of machinery - Basic concepts, general principles for design Part 2 : Technical principles and specifications
EN 294	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs
EN 418	Safety of machinery - Emergency stop equipment - Functional aspects
EN 563	Temperatures of touchable surfaces - Ergonomics data to establish temperature limit values for hot surfaces
EN 953	Safety of machinery - Guarding of machinery - Fixed and moveable guards
EN 1127-1	Safety of machinery - Fires and explosions - Part 1: Explosion prevention
EN 12076	Acoustics - Noise test code for compressors and vacuum pumps (Grade 2)
EN 50 014	Electrical apparatus for potentially explosive atmospheres - General requirements
EN 50 081-2	Electro magnetic compatibility - Generic emission Part 2 : Industrial environment
EN 50 082-2	Electro-magnetic compatibility - Generic immunity Part 2 : Industrial environment
EN 61310-1	Safety of Machinery - Indication, marking and actuation Part 1 : Requirements for visual, auditory and tactile signal (IEC 1310-1:1995)
EN 60 204-1	Electrical equipment of industrial machines Part 1 : General requirements
EN 60 529	Degrees of protection provided by enclosures
ENV 1070	Safety of machinery - Terminology
ISO 3266	Eyebolts for lifting purposes
ISO 3529	Vacuum Technology - Vocabulary
ISO 4126-1	Safety Valves - Part 1: General Requirements
ISO 4871	Acoustics - Declaration and verification of noise emission values of machinery and equipment
ISO 7000	Graphical symbols for use on equipment - Index and synopsis
ISO/TR 11688-1	Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning

IEC 417	Graphical symbols for use on equipment
IEC 1010-7	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements.

### 3 Definitions

For the purposes of this standard the definitions given in ENV 1070 and ISO 3529 apply. Definitions specifically needed for this standard are added below.

**3.1 vacuum:** An environment where the total pressure is below the prevailing atmospheric level.

NOTE: Vacuum is usually measured as the absolute pressure of the residual gas expressed as Pascals (Pa) or millibar (mbar). 1 mbar=100Pa.

**3.2 vacuum pump:** Device for creating, improving and/or maintaining a vacuum.

NOTE: Terms "vacuum pump" and "pump" have the same meaning throughout this standard.

**3.3 pump inlet:** Port by which gas to be pumped enters the pump.

**3.4 pump outlet:** Outlet or discharge port of a pump.

**3.5 maximum starting pressure:** Maximum inlet pressure at which the vacuum pump may be started.

**3.6 maximum outlet pressure:** Maximum pressure at the vacuum pump outlet specified by the manufacturer.

**3.7 throughput of a vacuum pump:** Quantity of gas flowing through the inlet of the vacuum pump, usually expressed as a pressure quantity product per unit time interval.

**3.8 pumped media:** All the substances which enter the vacuum pump i.e. gases, vapours, liquid mists and entrained solid particles.

**3.9 pump fluid:** Fluid essential for the operation of a vacuum pump.

**3.10 primary pump:** Pump that has a maximum outlet pressure equal or greater than ambient pressure.

**3.11 secondary pump:** Pump which has a maximum starting pressure or a maximum outlet pressure which is less than atmospheric pressure or is only efficient at lower pressures and is intended to operate in conjunction with a primary pump to produce pressures lower than could be achieved by the primary pump alone.

**3.12 pumping system:** Pump or a combination of pumps fitted with accessories for the sole purpose of producing a vacuum. The accessories could include pipework, valves, filters, coolers, control devices and any other equipment required to meet performance requirements.

**3.13 positive displacement pump:** Vacuum pump in which a volume filled with gas is cyclically