

**Lihtsad leekkuumutusega õhu või
lämmastiku surveanumad. Osa 1:
Üldotstarbelised surveanumad**

Simple unfired pressure vessels designed to contain air or nitrogen - Part 1: Pressure vessels for general purposes

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 286-1:2000 sisaldab Euroopa standardi EN 286-1:1998 + AC:2002 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 13.10.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 286-1:2000 consists of the English text of the European standard EN 286-1:1998 + AC:2002.</p> <p>This document is endorsed on 13.10.2000 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>Käsitlusala: This part of this European Standard applies to the design and manufacture of welded, simple unfired pressure vessels manufactured in series, with a single compartment, here-in-after referred to as vessels, the essential safety requirements of which are given in Annex G.</p>	<p>Scope: This part of this European Standard applies to the design and manufacture of welded, simple unfired pressure vessels manufactured in series, with a single compartment, here-in-after referred to as vessels, the essential safety requirements of which are given in Annex G.</p>
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ICS 23.020.30

Võtmesõnad:

English version

**Simple unfired pressure vessels designed to
contain air or nitrogen**

Part 1: Pressure vessels for general purposes

Réipients à pression simples, non
soumis à la flamme, destinés à
contenir de l'air ou de l'azote –
Partie 1: Réipients pour usage
général

Einfache unbefeuerte Druckbehälter
für Luft oder Stickstoff – Teil 1:
Druckbehälter für allgemeine Zwecke

This European Standard was approved by CEN on 1997-11-30.

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.

The European Standards exist 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, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 54 "Unfired pressure vessels", the secretariat of which is held by BSI.

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 August 1998, and conflicting national standards shall be withdrawn at the latest by August 1998.

It is the revision of the standard adopted by CEN in 1991. Main changes concern:

- scope;
- materials;
- weld joint design;
- calculations coefficient;
- flange calculations;
- reinforcement of openings;
- supports;
- testing and inspection;
- instruction and marking;
- corrosion allowance.

Although the requirements of this standard support the essential safety requirements of the Simple pressure vessel Directive 87/404/EEC, that directive does not make compliance with this standard mandatory. This standard includes an interpretation of the conformity assessment requirements of the directive and thus the national implementing legislation. These interpretations cannot be taken as having any formal status and carry the risk of misinterpretation. Users of this standard should, therefore, refer to the applicable national legislation for the definitive conformity assessment requirements. A further revision of this standard is being prepared to remove any misleading provisions.

This standard 'Simple unfired pressure vessels designed to contain air or nitrogen' is one of a series of four. The other standards cover :

Part 2 : pressure vessels for air braking equipment and auxiliary systems for motor vehicles and their trailers ;

Part 3 : steel pressure vessels designed for air braking equipment and auxiliary pneumatic equipment for railway rolling stock ;

Part 4 : aluminium alloy pressure vessels designed for air braking equipment and auxiliary pneumatic equipment for railway rolling stock.

This Part of this European Standard has been prepared for use in conjunction with the informative annex G of this European Standard.

No rules of construction can be written in sufficient detail to ensure good workmanship and construction. Each manufacturer is responsible for taking every necessary step to make sure that the quality of workmanship and construction is such as to ensure compliance with good engineering practice. Aspects of quality assurance are dealt with in various clauses and annexes of this standard, for example in clause 10, Testing, and annexes A, Verification, B, Declaration of conformity - surveillance ; C, Design and manufacturing schedule, D, Type examination ; E, Content of manufacturing record, all of which form part of this standard. These are minimum requirements, having taken into account EN ISO 9002 *Quality systems - Model for quality assurance in production, installation and servicing* and EN ISO 9003 *Quality systems - Model for quality assurance in final inspection and test*, but it is not implied that a quality system in accordance with EN ISO 9002 and EN ISO 9003 is necessary.

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).

The general layout of the standard was not changed and accordingly is not in full conformity with the recent CEN rules for harmonised standards.

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

1 Scope

1.1 This Part of this European Standard applies to the design and manufacture of welded, simple unfired pressure vessels manufactured in series, with a single compartment, here-in-after referred to as vessels, the essential safety requirements of which are given in annex G.

It only applies to vessels that :

- a) include fabrication by welding, but some designs can entail the use of bolts ;
- b) have a simple geometry enabling simple-to-use production procedures. This is achieved by either
 - 1) a cylindrical part of circular cross section closed by outwardly dished and/or flat ends which revolve around the same axis as the cylindrical part ; or
 - 2) two outwardly dished ends revolving around the same axis ;
- c) have branches not larger in diameter than 0,5 of the diameter of the cylinder to which they are welded.

1.2 It applies to vessels which are intended to contain air or nitrogen which are not intended to be fired and which operate within the following constraints :

- a) subjected to an internal gauge pressure greater than 0,5 bar ;
- b) the parts and assemblies contributing to the strength of the vessel under pressure to be made either of non-alloy quality steel or of non-alloy aluminium or non-age hardening aluminium alloys ;

NOTE: In this part of the Standard, the use of "aluminium" covers non-alloy aluminium and aluminium alloys.

- c) the maximum working pressure is not greater than 30 bar. The product of the maximum working pressure and the capacity of the vessel ($PS \cdot V$) is greater than 50 bar.l but does not exceed 10 000 bar.l. Below 50 bar.l use of this standard is considered to fulfil the requirements of sound engineering practice ;
- d) the minimum working temperature is not lower than -50 °C and maximum working temperature not higher than 300 °C for steel and 100 °C for aluminium or aluminium alloy vessels.

It does not apply to vessels specifically designed for nuclear use, to vessels specifically intended for installation in or the propulsion of ships and aircraft, or to fire extinguishers.

The standard does not apply to transportation vessels nor to vessels which also contain substances other than air or nitrogen which could adversely effect their safety. For vessels to contain compressed air for braking systems of road vehicles and their trailers see also EN 286-2. For vessels to contain compressed air for braking systems of rail mounted vehicles see also EN 286-3 and EN 286-4.

1.3 It applies to the vessel proper, from the inlet connection to the outlet connection and to all other connections required for valves and fittings. If bosses/pipes are used the requirements specified herein begin or end at the weld where flanges, if used, would have been fitted.

1.4 For the purposes of calculations required to be made in accordance with this standard, dimensions are in millimetre, pressures are in bar (except otherwise specified), stresses are in newton per square millimetre and temperatures are in degree Celsius.

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 these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- EN 287-1 Approval testing of welders : Fusion welding - Part 1 : Steels.
- EN 287-2 Approval testing of welders : Fusion welding - Part 2 : Aluminium and aluminium alloys.
- EN 288-2 Specification and approval of welding procedures for metallic materials - Part 2 : Welding procedure specification for arc welding.
- EN 288-3 Specification and approval of welding procedures for metallic materials - Part 3 : Welding procedure tests for arc welding of steels.
- EN 288-4 Specification and approval of welding procedures for metallic materials - Part 4 : Welding procedure tests for arc welding of aluminium and its alloys.
- EN 473 Qualification and certification of NDT personnel - General principles
- EN 485-2 Aluminium and aluminium alloys - Sheet, strip and plates - Part 4: Tolerances on shape and dimensions for cold rolled products
- EN 573-3 Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition
- EN 573-4 Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 4: Forms of products
- EN 754-2 Aluminium and aluminium alloys - Wrought products - Cold drawn rod/bar and tubes - Part 2: Mechanical properties
- EN 755-2 Aluminium and aluminium alloys - Wrought products - Extruded rod/bar, tube and profile - Part 2: Mechanical properties
- EN 875 Welding - Welded joints in metallic materials - Specimen location and notch orientation for impact tests
- EN 910 Welding - Welded butt joints in metallic materials - Bend tests
- EN 1418 Welding personnel - Approval testing of welding personnel for fully mechanized and automatic welding of metallic materials
- EN 1435 Non destructive examination of welds - Radiographic examination of welded joints
- EN 10002-1 Metallic materials - Tensile testing - Part 1 : Method of test (at ambient temperature).
- EN 10028-2 Flat products made of steels for pressure purposes - Part 2: Non-alloy and alloy steels with specified elevated temperature properties

- EN 10204 Metallic products - Types of inspection documents
- EN 10207 Steels for simple pressure vessels - Technical delivery requirements for plates, strips and bars.
- EN 10216-1 Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non alloy steels with specified room temperature properties (based on ISO 9329-1)
- EN 10217-2 Welded steel tubes for pressure purposes - Technical delivery conditions - Part 2: Unalloyed and alloyed steels with specified elevated temperature properties (based on ISO 9330-2)
- EN 10222-4 Steel forgings for pressure purposes - Part 4: Weldable fine grain steel with high proof strength
- EN 10226-1 Pipe threads where pressure tight joints are made on the thread - Part 1: Designation, Dimensions and tolerances
- EN 20898-1 Mechanical properties of fasteners - Part 1 : Bolts, screws and studs.
- EN 20898-2 Mechanical properties of fasteners - Part 2 : Nuts with specified proof load values.
- EN 25817 Arc-welded joints in steel - Guidance on quality level for imperfections
- EN 30042 Arc-welded joints in aluminium and its weldable alloys - Guidance on quality levels for imperfections
- EN ISO 2409:1994 Paints and varnishes - Cross-cut test
- ISO 228-1 Pipe threads where pressure tight joints are not made on the threads - Part 1 : Designation, dimensions and tolerances.
- ISO 3057 Non destructive testing - Metallographic replica techniques of surface examination
- ISO 7005-1 Metallic flanges - Part 1 : Steel flanges.
- ISO 7253:1996 Paints and varnishes - Determination of resistance to neutral salt spray