

**Design and manufacture of site built,  
vertical, cylindrical, flatbottomed steel  
tanks for the storage of refrigerated,  
liquefied gases with operating  
temperatures between -5°C and -165°C -  
Part 1: General**

Design and manufacture of site built, vertical,  
cylindrical, flat-bottomed steel tanks for the storage  
of refrigerated, liquefied gases with operating  
temperatures between 0 C and -165 C - Part 1:  
General

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 14620-1:2006 sisaldab Euroopa standardi EN 14620-1:2006 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 27.10.2006 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 14620-1:2006 consists of the English text of the European standard EN 14620-1:2006.</p> <p>This document is endorsed on 27.10.2006 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>This European Standard is a specification for vertical, cylindrical tanks, built on site, above ground and of which the primary liquid container is made of steel. The secondary container, if applicable, may be of steel or of concrete or a combination of both. An inner tank made only of pre-stressed concrete is excluded from the scope of this European Standard. This European Standard specifies principles and application rules for the structural design of the "containment" during construction, testing, commissioning, operation (accidental included), and decommissioning. It does not address the requirements for ancillary equipment such as pumps, pumpwells, valves, piping, instrumentation, staircases etc. unless they can affect the structural design of the tank.</p>	<p><b>Scope:</b></p> <p>This European Standard is a specification for vertical, cylindrical tanks, built on site, above ground and of which the primary liquid container is made of steel. The secondary container, if applicable, may be of steel or of concrete or a combination of both. An inner tank made only of pre-stressed concrete is excluded from the scope of this European Standard. This European Standard specifies principles and application rules for the structural design of the "containment" during construction, testing, commissioning, operation (accidental included), and decommissioning. It does not address the requirements for ancillary equipment such as pumps, pumpwells, valves, piping, instrumentation, staircases etc. unless they can affect the structural design of the tank.</p>
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ICS 23.020.10

Võtmesõnad:

English Version

**Design and manufacture of site built, vertical, cylindrical, flat-bottomed steel tanks for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and -165 °C -  
Part 1: General**

Conception et fabrication de réservoirs en acier à fond plat, verticaux, cylindriques, construits sur site, destinés au stockage de gaz réfrigérés, liquéfiés, dont les températures de service sont comprises entre 0 °C et -165 °C - Partie 1: Généralités

Auslegung und Herstellung standortgefertigter, stehender, zylindrischer Flachboden-Stahltanks für die Lagerung von tiefkalt verflüssigten Gasen bei Betriebstemperaturen zwischen 0 °C und -165 °C - Teil 1: Allgemeines

This European Standard was approved by CEN on 20 February 2006.

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, 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

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## Foreword

This European Standard (EN 14620-1:2006) has been prepared by Technical Committee CEN/TC 265 "Site built metallic tanks for the storage of liquids", 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 March 2007, and conflicting national standards shall be withdrawn at the latest by March 2007.

EN 14620 *Design and manufacture of site built, vertical, cylindrical, flat-bottomed steel tanks for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and -165 °C* consists of the following parts:

- Part 1: General;
- Part 2: Metallic components;
- Part 3: Concrete components;
- Part 4: Insulation components;
- Part 5: Testing, drying, purging and cool-down.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

## 1 Scope

This European Standard is a specification for vertical, cylindrical tanks, built on site, above ground and of which the primary liquid container is made of steel. The secondary container, if applicable, may be of steel or of concrete or a combination of both. An inner tank made only of pre-stressed concrete is excluded from the scope of this European Standard.

This European Standard specifies principles and application rules for the structural design of the “containment” during construction, testing, commissioning, operation (accidental included), and decommissioning. It does not address the requirements for ancillary equipment such as pumps, pumpwells, valves, piping, instrumentation, staircases etc. unless they can affect the structural design of the tank.

This European Standard applies to storage tanks designed to store products, having an atmospheric boiling point below ambient temperature, in a dual phase, i.e. liquid and vapour. The equilibrium between liquid and vapour phases being maintained by cooling down the product to a temperature equal to, or just below, its atmospheric boiling point in combination with a slight overpressure in the storage tank.

The maximum design pressure of the tanks covered by this European Standard is limited to 500 mbar. For higher pressures, reference can be made to EN 13445, Parts 1 to 5.

The operating range of the gasses to be stored is between 0 °C and –165 °C. The tanks for the storage of liquefied oxygen, nitrogen and argon are excluded.

The tanks are used to store large volumes of hydrocarbon products and ammonia with low temperature boiling points, generally called “Refrigerated Liquefied Gases” (RLG’s). Typical products stored in the tanks are: methane, ethane, propane, butane, ethylene, propylene, butadiene (this range includes the LNG’s and LPG’s).

NOTE Properties of the gases are given in Annex A.

The requirements of this European Standard cannot cover all details of design and construction because of the variety of sizes and configurations that may be employed. Where complete requirements for a specific design are not provided, the intention is for the designer, subject to approval of the purchaser’s authorized representative, to provide design and details that are as safe as those laid out in this European Standard.

This European Standard specifies general requirements for the tank concept, selection and general design considerations.

## 2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1991-1-4, *Eurocode 1: Actions on structures — Part 1-4: Wind actions*

EN 1991-1-6, *Eurocode 1: Actions on structures — Part 1-6: General actions — Actions during execution*

EN 1992-1-1:2004, *Eurocode 2: Design of concrete structures — Part 1-1: General rules and rules for buildings*

EN 1997-1:2004, *Eurocode 7: Geotechnical design — Part 1: General rules*

EN 1998-1:2004, *Eurocode 8: Design of structures for earthquake resistance — Part 1: General rules, seismic actions and rules for buildings*

ENV 1998-4:1998, *Eurocode 8: Design provisions for earthquake resistance of structures — Part 4: Silos, tanks and pipelines*

EN 14620-2:, *Design and manufacture of site built, vertical, cylindrical, flat-bottomed steel tanks for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and –165 °C — Part 2: Metallic components*

EN 14620-3:2006, *Design and manufacture of site built, vertical, cylindrical, flat-bottomed steel tanks for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and –165 °C — Part 3: Concrete components*

EN 14620-4, *Design and manufacture of site built, vertical, cylindrical, flat-bottomed steel tanks for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and –165 °C — Part 4: Insulation components*

EN 14620-5, *Design and manufacture of site built, vertical, cylindrical, flat-bottomed steel tanks for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and –165 °C — Part 5: Testing, drying, purging and cool-down*

### 3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

#### 3.1 action

a) set of forces (loads) applied to the structure (direct action)

b) set of imposed deformation or accelerations caused for example, by temperature changes, moisture variation, uneven settlement or earthquakes (indirect action)

#### 3.2 annular space

space between the inner shell and outer shell or wall of self-supporting tanks

#### 3.3 base slab

continuous concrete base supporting the tank (either on the ground or elevated)

#### 3.4 boil-off

process of vaporization of refrigerated liquid by heat conducted through the insulation surrounding the storage tank

#### 3.5 bund wall

low construction of earth or concrete surrounding the storage tank at a considerable distance to contain spilled liquid

#### 3.6 polymeric vapour barrier

reinforced or un-reinforced polymeric layer applied to the concrete to function as a product vapour, water vapour and in some cases as liquid barrier