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 4: Insulation components

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 4: Insulation components

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 14620-4:2006 sisaldab Euroopa standardi EN 14620-4:2006 ingliskeelset teksti. Käesolev dokument on jõustatud 27.10.2006 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 14620-4:2006 consists of the English text of the European standard EN 14620-4:2006. This document is endorsed on 27.10.2006 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This European Standard specifies the requirements for materials, design and installation of the insulation of refrigerated liquefied gas (RLG) storage tanks. RLG storage tanks store liquefied gas with a low boiling point, i.e. below normal ambient temperature. The concept of storing such products in liquid form and in non-pressurized tanks therefore depends on the combination of latent heat of vaporization and thermal insulation. Consequently thermal insulation for RLG storage tanks is not an ancillary part of the containment system (as for most ambient atmospheric hydrocarbon tanks) but it is an essential component and the storage tank cannot operate without a properly designed, installed and maintained insulation system.	**Scope:** This European Standard specifies the requirements for materials, design and installation of the insulation of refrigerated liquefied gas (RLG) storage tanks. RLG storage tanks store liquefied gas with a low boiling point, i.e. below normal ambient temperature. The concept of storing such products in liquid form and in non-pressurized tanks therefore depends on the combination of latent heat of vaporization and thermal insulation. Consequently thermal insulation for RLG storage tanks is not an ancillary part of the containment system (as for most ambient atmospheric hydrocarbon tanks) but it is an essential component and the storage tank cannot operate without a properly designed, installed and maintained insulation system.

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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 4: Insulation components

Conception et fabrication de réservoirs en acier à fond plat, verticaux, cylindriques, construits sur site, destinés au stockage des gaz réfrigérés, liquéfiés, dont les températures de service sont comprises entre 0 °C et -165 °C - Partie 4: Constituants isolants

Auslegung und Herstellung standortgefertigter, stehender, zylindrischer Flachboden-Stahltanks für die Lagerung von tiefkalt verflüssigten Gasen bei einer Betriebstemperatur zwischen 0 °C und -165 °C - Teil 4: Dämmung

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

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

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Contents

Foreword

This European Standard (EN 14620-4:2006) 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 specifies the requirements for materials, design and installation of the insulation of refrigerated liquefied gas (RLG) storage tanks.

RLG storage tanks store liquefied gas with a low boiling point, i.e. below normal ambient temperature.

The concept of storing such products in liquid form and in non-pressurized tanks therefore depends on the combination of latent heat of vaporization and thermal insulation.

Consequently thermal insulation for RLG storage tanks is not an ancillary part of the containment system (as for most ambient atmospheric hydrocarbon tanks) but it is an essential component and the storage tank cannot operate without a properly designed, installed and maintained insulation system.

The main functions of the insulation in RLG storage tanks are:

— to maintain the boil off below the specific limits;

— to protect the non low temperature parts/materials of the tank (mainly the outer tank) by maintaining these parts at their required ambient temperature;

— to limit the cool-down of the foundations/soil underneath the tank to prevent damage by frost heave;

— to prevent/minimize condensation and icing on the outer surfaces of the tank.

A wide range of insulation materials is available. However the material properties differ greatly amongst the various generically different materials and also within the same generic group of materials.

Therefore within the scope of this European Standard, only general guidance on selection of materials is given.

NOTE For general guidance on selection of materials see Annex A.

This European Standard deals with the 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.

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 826:1996, *Thermal insulating products for building applications — Determination of compression behaviour*

EN 1604, *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions*

EN 1606, *Thermal insulating products for building applications — Determination of compressive creep*

EN 1607, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*

EN 1608, *Thermal insulating products for building applications — Determination of tensile strength parallel to faces*

EN 1609, *Thermal insulating products for building applications — Determination of short term water absorption by partial immersion*

EN 12066, *Installations and equipment for liquefied natural gas — Testing of insulating linings for liquefied natural gas impounding areas*

EN 12086, *Thermal insulating products for building applications — Determination of water vapour transmission properties*

EN 12087, *Thermal insulating products for building applications — Determination of long term water absorption by immersion*

EN 12088, *Thermal insulating products for building applications — Determination of long term water absorption by diffusion*

EN 12090:1997, *Thermal insulating products for building applications — Determination of shear behaviour*

EN 12091, *Thermal insulating products for building applications — Determination of freeze-thaw resistance*

EN 12667, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Products of high and medium thermal resistance*

EN 12939, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Thick products of high and medium thermal resistance*

EN 13468, *Thermal insulating products for building equipment and industrial installations — Determination of trace quantities of water soluble chloride, fluoride, silicate, sodium ions and pH*

EN 13471, *Thermal insulating products for building equipment and industrial installations — Determination of the coefficient of thermal expansion*

EN 14620-1:2006, *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 1: General*

EN ISO 62, *Plastics — Determination of water absorption (ISO 62:1999)*

EN ISO 3582, *Flexible cellular polymeric materials — Laboratory assessment of horizontal burning characteristics of small specimens subjected to a small flame (ISO 3582:2000)*

EN ISO 4590, *Rigid cellular plastics — Determination of the volume percentage of open cells and closed cells (ISO 4590:2002)*

EN ISO 4624, *Paints and varnishes — Pull-off test for adhesion (ISO 4624:2002)*

ISO 844, *Rigid cellular plastics — Determination of compression properties*

ISO 4897, *Cellular plastics — Determination of the coefficient of linear thermal expansion of rigid materials at sub-ambient temperatures*

ISO 8301, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Heat flow meter apparatus*

ISO 8302, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Guarded hot plate apparatus*