

**KLAASPLASTIST (GRP) ALLMAAMAHUTID.  
HORISONTAALSED SILINDRILISED MAHUTID  
VEDELADE NAFTABAASILISTE KÜTUSTE ÜLERÕHUTA  
SÄILITAMISEKS. OSA 1: NÕUDED JA KATSEMEETODID  
ÜHEKORDSE SEINAGA MAHUTITELE**

**Underground tanks of glass-reinforced plastics (GRP) -  
Horizontal cylindrical tanks for the non-pressure  
storage of liquid petroleum based fuels - Part 1:  
Requirements and test methods for single wall tanks**

**EESTI STANDARDI EESSÕNA****NATIONAL FOREWORD**

See Eesti standard EVS-EN 976-1:2000 sisaldab Euroopa standardi EN 976-1:1997 ingliskeelset teksti.	This Estonian standard EVS-EN 976-1:2000 consists of the English text of the European standard EN 976-1:1997.
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Descriptors: Tanks, fuel storage.

**English version**

Underground tanks of glass-reinforced plastics (GRP)  
**Horizontal cylindrical tanks for the non-pressure  
storage of liquid petroleum based fuels**

Part 1: Requirements and test methods for single wall tanks

Réservoirs enterrés en plastiques  
renforcés de verre (PRV) – Réservoirs  
cylindriques horizontaux pour le  
stockage sans pression de carburants  
ou combustibles pétroliers liquides –  
Partie 1: Prescriptions et méthodes  
d'essai pour réservoirs à simple paroi

Unterirdische Tanks aus textilglas-  
verstärkten Kunststoffen (GFK) –  
Liegende zylindrische Tanks für die  
drucklose Lagerung von flüssigen  
Kraftstoffen auf Erdölbasis – Teil 1:  
Anforderungen und Prüfverfahren  
für einwandige Tanks

This European Standard was approved by CEN on 1997-06-21.

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 210 "GRP tanks and vessels", the secretariat of which is held by DIN.

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 January 1998, and conflicting national standards shall be withdrawn at the latest by January 1998.

The 4 parts of this European Standard cover the construction and installation requirements of horizontal, cylindrical GRP tanks used for the underground non-pressure storage of petroleum based fuels, e.g. petrol and diesel fuel storage in service stations, heating oil storage for buildings.

The 4 parts are :

Part 1 : Requirements and test methods for single wall tanks

Part 2 : Transport, handling, storage and installation of single wall tanks

Part 3 : Requirements and test methods for double wall tanks

Part 4 : Transport, handling, storage and installation of double wall tanks

The Standard is written in different parts in order to clearly define the involvement and responsibilities of different parties in the construction of the tank, its installation and the assurance of a good, safe performance during use.

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

This Part 1 of European Standard EN 976 specifies the requirements and associated test methods for horizontal, cylindrical single wall tanks made of glass reinforced thermosetting resins (hereafter called tanks), and for their accessories, used for the underground non-pressure storage of liquid petroleum based fuels.

The tanks specified by this European Standard are tanks with one or more compartments and with or without the possibility of leak detection.

This European Standard covers two types of tanks, type A with manway, type B without manway and two classes of tank stiffness, class 1 and class 2. It also covers two grades of tanks, grade 1 for use with all petroleum based fuels and grade 2 limited to use with diesel fuels and heating oils.

## 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 61 : 1977	Glass reinforced plastics - Determination of tensile properties
EN 63 : 1977	Glass reinforced plastics - Determination of flexural properties - Three point method
EN 590 : 1993	Automotive fuels - Diesel - Requirements and methods of test
EN 637 : 1994	Plastics piping systems - Glass-reinforced plastics components - Determination of the amounts of constituents using the gravimetric method
prEN 977	Underground tanks of glass-reinforced plastics (GRP) - Method for one side exposure to fluids
prEN 978	Underground tanks of glass-reinforced plastics (GRP) - Determination of factor $\alpha$ and factor $\beta$ .
ISO 844 : 1978	Cellular plastics - Compression test for rigid materials
ISO 1922 : 1981	Cellular plastics - Determination of shear strength of rigid materials.

## 3 Materials

### 3.1 General

The tanks are made of thermosetting resins incorporating reinforcement materials and processing agents and possibly fillers and/or additives.

The specific materials selection is based on the finished tank meeting all the requirements of this European Standard.

### 3.2 Resins

The thermosetting resins used shall be unsaturated polyester and phenylacrylate (vinylester) resins.

### 3.3 Reinforcement materials

The reinforcement shall be E-type glass with a sizing allowing bonding between glass and resin. The glass may be in the form of cut or uncut rovings, mats or fabrics.