SLOVENSKI STANDARD
SIST EN 977:2000

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Podzemni rezervoarji iz armiranega poliestra - Postopek za preskus ene strani na vpliv tekoļ ine

Underground tanks of glass-reinforced plastics (GRP) - Method for one side exposure to fluids

Unterirdische Tanks aus textilglasverstärkten Kunststoffen (GFK) - Prüfanordnung zur einseitigen Beaufschlagung mit Fluiden

Réservoirs enterrés en plastiques renforcés de verre (PRV) - Méthode d'exposition unilatérale d'une plaque aux fluides

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English version

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CEN

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

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Contents

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of an identical text or by endorsement, at the latest by January 1998, and conflicting national standards shall be withdrawn at the latest by January 1998.

This standard is drafted in support of EN 976-1 and EN 976-3, Horizontal cylindrical tanks for the non-pressure storage of liquid petroleum based fuels - Part 1 : Requirements and test methods for single wall tanks - and Part 3 : Requirements and test methods for double wall tanks, in order to assess the chemical resistance of the GRP tank laminate.

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 European Standard specifies a method for the one side exposure to fluids of samples of tanks of glass reinforced thermosetting resins for the underground storage of liquids.

2 Principle

The inner surface of test specimens taken from the tank wall are exposed at a specified temperature for a given period of time to the liquid and vapour phase of a test liquid.

3 Apparatus

Modifications in the construction of the apparatus as given hereafter are allowed, provided that the essence of the test is not affected.

The apparatus (see figure 1) consists of a glass cylinder with a diameter of 140 to 150 mm and a height of 150 mm..

The cylinder contains two connections at an angle of 45°, one for a backflowcooler (1) and one for the adjustment of a thermometer (2).

Further parts are the joint for the backflowcooler and the backflowcooler itself. These parts are not given in figure 1 since they are readily available items.

The glass parts of the apparatus shall be made of glass resistant to temperature changes.

Two test specimens serve as top and bottom of the glass cylinder.

They are sealed against the polished rims of the cylinder with rings, e.g. PTFE.

The sealing is adapted to the shape of the samples.

The test specimens are clamped to the glass cylinder between two flanges by means of six threaded rods with butterfly nuts.

It is recommended to apply a spacer ring between each pressure flange and the test specimen. (These spacer rings are not detailed in figure 1).

The glass cylinder is heated from the outside with an automatic controlled heating system. The temperature is measured in the test liquid. The heating system shall be capable of keeping the temperature of the test liquid to within 1 K of the specified temperature.

4 Test parameters

The test parameters (temperature, exposure time and test liquid composition) are given by the relevant product standard.

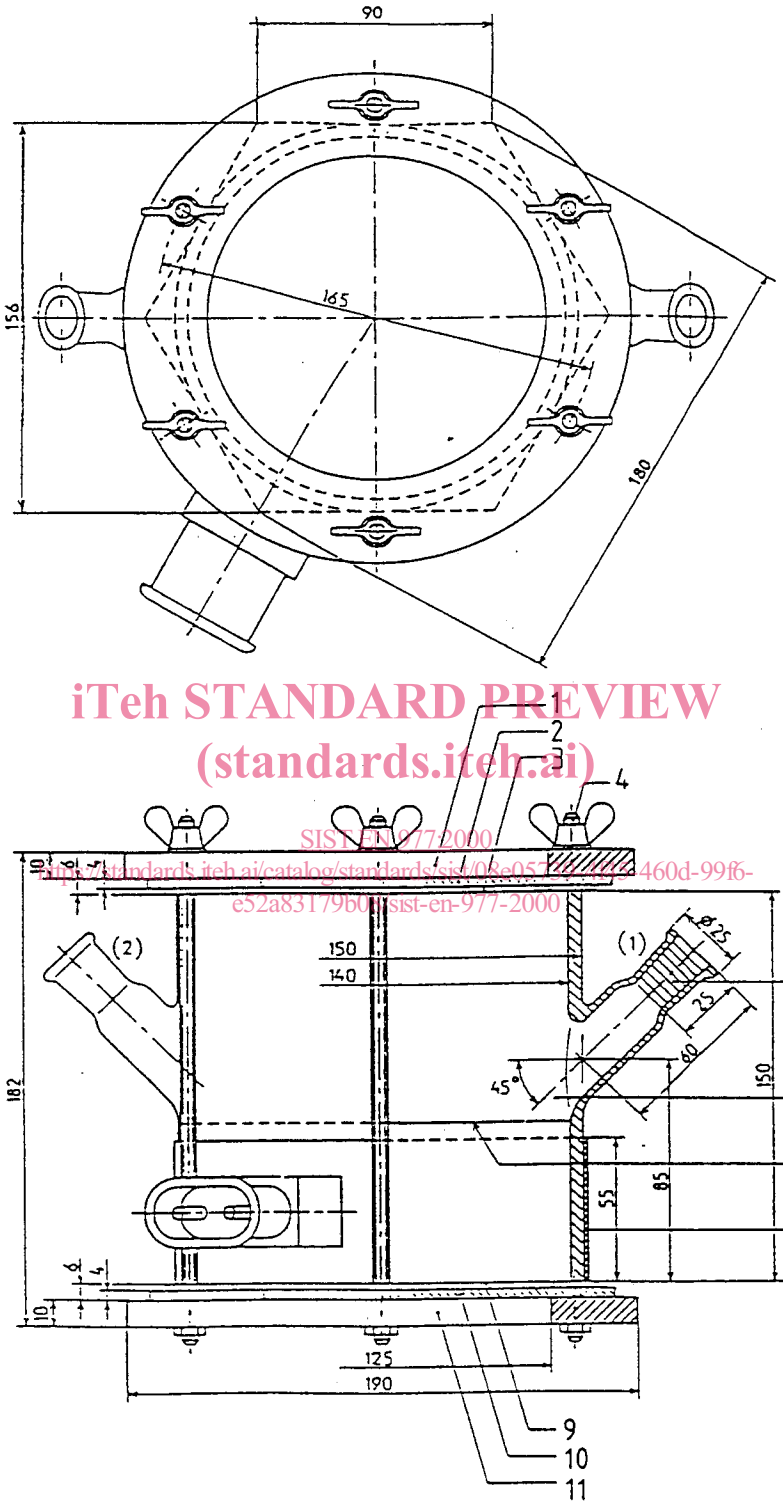
5 Test specimens

Take three representative hexagonal test specimens from the tank wall.

Reserve one of the test specimens for the determination of the initial value(s) of the characteristic(s) defined by the relevant product standard, the other two for exposure to the liquid and vapour phase of the test liquid.

Mark the longitudinal and circumferential direction of the cylindrical part on the outside of the test specimen.

Dimensions in mm



1 Flange
2 Test specimen (gas phase)
3 Gasket (e.g. PTFE)
4 Six threaded studs M6 x 200 with butterfly nuts
5 Connection tube
6 Glass cylinder
7 Liquid level
8 Heathing element
9 Gasket (e.g. PTFE)
10 Test specimen (liquid phase)
11 Flange

Figure 1 : Apparatus for exposure to liquids

In case of a sandwich construction the test specimens are taken from the inner GRP laminate.

NOTE : If a different exposure apparatus is used, different form and dimensions of test specimens may be necessary.

6 Procedure

6.1 Clamp two test specimens in the apparatus with the inner layer to the inside. When necessary, adapt the rings to the shape of the test specimens.

6.2 Fill half of the glass cylinder with the test liquid (approximately 1200 ml in case of the figure 1 cylinder).

6.3 Increase gradually the temperature of the liquid to the specified temperature.

Maintain that temperature to within 1 K over the complete exposure period.

6.4 During the test, replace the test liquid as required by the relevant product standard.

6.5 At the end of the exposure time cool the test liquid down to (23 ± 5) °C and remove the liquid from the cylinder.

6.6 Take the two test specimens out of the apparatus and rinse them with distilled water. Remove non water soluble liquids with a solvent that does not affect the test specimen (e.g. white spirit).

NOTE : Mechanical cleaning of the test specimens is not allowed, given the risk of damaging the surface.

6.7 Dry the test specimens in air at a temperature of (23 ± 5) °C.

6.8 Determine on the exposed test specimens the characteristic(s) as required by the relevant product standard within 24 h of removal of the test specimens from the test apparatus.

7 Test report

The test report shall at least indicate

a) a reference to this European Standard;

b) the full identification of the tank from which the test specimens are taken

- name of producer and production place;
- build up of the material, name and type of the material;
- tank marking, including production code;
- dimensions of the test sample;

c) any deviation from the exposure apparatus as specified in this European Standard;

d) the test parameters (test temperature, exposure time, drying time and test liquid composition);

e) individual values and mean values of the characteristic(s) determined on exposed and unexposed test specimens, as well as the change of the mean value in percentage;

f) any deviation from the test procedure specified in this Standard;

g) any details, which have not been provided for by this test procedure, and any accidental circumstances which might have affected the results;

h) the date(s) of testing.