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Utgåva 1

**Flexibla tätskikt – Bitumen-, plast- och  
gummibaserade tätskikt för tak – Bestämning av  
motstånd mot genomgång av rötter**

**Flexible sheets for waterproofing – Bitumen,  
plastic and rubber sheets for roof waterproofing –  
Determination of resistance to root penetration**

ICS 91.100.50

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English Version

Flexible sheets for waterproofing - Bitumen, plastic and rubber  
sheets for roof waterproofing - Determination of resistance to  
root penetration

Feuilles souples d'étanchéité - Feuilles d'étanchéité de  
toiture, bitumineuses, plastiques et élastomères -  
Détermination de la résistance à la pénétration des racines

Abdichtungsbahnen - Bitumen-, Kunststoff- und  
Elastomerbahnen für Dachabdichtungen - Bestimmung des  
Widerstandes gegen Durchwurzlung

This European Standard was approved by CEN on 23 May 2007.

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## **Foreword**

This document (EN 13948:2007) has been prepared by Technical Committee CEN/TC 254 “Flexible sheets for waterproofing”, 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of an identical text or by endorsement, at the latest by December 2007, and conflicting national standards shall be withdrawn at the latest by December 2007.

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

## EN 13948:2007 (E)

### Introduction

This European Standard has been prepared by the Technical Committee CEN/TC 254 to determine the resistance to root penetration of flexible sheets for roof waterproofing.

This European Standard is based on a method developed by the Association FLL (Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau ( <http://www.f-l-l.de/english.html> ), Bonn, Germany).

## 1 Scope

This European Standard specifies a method to determine the resistance of roof waterproofing sheets to root penetration.

This European Standard relates exclusively to sheets. It is not possible to test a system comprising several different sheets.

This European Standard does not contain any evaluation of the sheet to be tested in respect of its environmental requirements.

## 2 Normative references

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

EN 13037, *Soil improvers and growing media — Determination of pH*

EN 13038, *Soil improvers and growing media — Determination of electrical conductivity*

EN 13651, *Soil improvers and growing media — Extraction of calcium chloride/DTPA (CAT) soluble nutrients*

## 3 Terms and definitions

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

### 3.1

#### **root penetration**

roots that have grown into and/or through the surface or joints of a sheet under test where the underground parts of the plants have actively created cavities and thus damaged the sheet

## 4 Principle

The protection against root penetration of a sheet is tested in containers where the sheet is under exposure to roots under specified conditions.

The test specimens of the sheet are installed in 6 test containers. The sheet shall have four wall corner joints, two base corner joints and one central T joint (see Figure 2). Additionally there shall be two control containers without sheets providing a comparison of the vitality of the plants in the test and control containers throughout the whole test period.

The containers receive a layer of growing substrate and a dense covering of vegetation. This produces a high growing pressure from the roots, emphasised by a limited amount of fertiliser and a moderate watering.

The test and control containers are exposed in a climate-controlled greenhouse, in which the parameters having an influence on the growing of the plants can be controlled.

The growing period is 2 years as this period is the minimum time necessary to obtain reliable results.

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After the testing period, the growing substrate is taken away and the behaviour of the test samples is assessed to observe if any root penetration has occurred.

### 5 Apparatus

#### 5.1 Greenhouse

The greenhouse shall be capable of regulating the temperature and ventilation. The minimum of the internal temperature shall be  $(18 \pm 2)$  °C in the daytime and  $(16 \pm 2)$  °C at night. The greenhouse shall be ventilated when the internal temperature reaches  $(22 \pm 2)$  °C. A temperature exceeding 35 °C should be avoided.

NOTE The natural light conditions in Central Europe associated with the indicated temperatures give favourable conditions for the growth of the test plants throughout the year. No shading of the plants in summer or artificial light in winter is necessary. In the case where the tests are performed under significant different light conditions (i.e. North or South of Europe), the light and the shading may be adapted in order to allow the plants to grow properly.

Each 800 mm × 800 mm container requires an area of approximately 2 m<sup>2</sup>, taking into account the requirements for clearance as specified in 7.2.

#### 5.2 Test and control containers

6 test containers and 2 control containers are needed for testing one single sheet.

The inside dimensions of the test containers shall be at least 800 mm × 800 mm × 250 mm. It may be necessary, for installation purposes, to have larger containers. The containers shall be fitted with transparent bases to allow the observation of the roots, which may have passed through the sheet during the testing period, without taking away the growing substrate. The base shall be blacked out (with a foil for example) to avoid the growing of algae in the moisture layer. For the water supply to the moisture layer, the containers shall have a filler pipe, pointing obliquely upwards, with a diameter of 35 mm, ending near the base tray (see Figure 1).