# Natural stone test methods - Determination of the breaking load at dowel hole

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

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| Käesolev Eesti standard EVS-EN 13364:2002 sisaldab Euroopa standardi EN 13364:2001 ingliskeelset teksti.<br><br>Käesolev dokument on jõustatud 16.01.2002 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.<br><br>Standard on kättesaadav Eesti standardiorganisatsioonist. | This Estonian standard EVS-EN 13364:2002 consists of the English text of the European standard EN 13364:2001.<br><br>This document is endorsed on 16.01.2002 with the notification being published in the official publication of the Estonian national standardisation organisation.<br><br>The standard is available from Estonian standardisation organisation. |

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| **Käsitlusala:**<br>This present European Standard specifies a test method to determine the breaking load at the dowel hole of natural stones used for cladding or lining in building. | **Scope:**<br>This present European Standard specifies a test method to determine the breaking load at the dowel hole of natural stones used for cladding or lining in building. |

**ICS** 73.020, 91.100.15

**Võtmesõnad:** bore holes, breaking strength, capacitive loads, construction, determination, dowels, excavation, holes, interpretations, loading, materials testing, natural stone, natural stones, piercers, test specimens, testing

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 13364

November 2001

ICS 73.020; 91.100.15

English version

# Natural stone test methods - Determination of the breaking load at dowel hole

Méthodes d'essai pour pierre naturelle - Détermination de l'effort de rupture au niveau du goujon de l'agrafe

Prüfung von Naturstein - Bestimmung der Ausbruchlast am Ankerdornloch

This European Standard was approved by CEN on 29 September 2001.

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 Management Centre 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

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Ref. No. EN 13364:2001 E

# Contents

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 246, “Natural Stone”, the secretariat of which is held by UNI.

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 May 2002, and conflicting national standards shall be withdrawn at the latest by December 2002.

This European Standard is one of the series of standards for tests on natural stone.

Test methods for natural stone consist of the following parts:

EN 1925, *Natural stone test methods - Determination of water absorption coefficient by capillarity*.

EN 1926, *Natural stone test methods - Determination of compressive strength.*

EN 1936, *Natural stone test methods – Determination of real density and apparent density and of total open porosity.*

EN 12370, *Natural stone test methods - Determination of resistance to salt crystallisation.*

EN 12372, *Natural stone test methods - Determination of flexural strength under concentrated load.*

EN 12407, *Natural stone test methods – Petrographic description.*

prEN 12371, *Natural stone test methods - Determination of frost resistance.*

prEN 13161, *Natural stone test methods - Determination of flexural strength under constant moment.*

prEN 13373, *Natural stone test methods - Determination of geometric characteristics on units.*

prEN 13755, *Natural stone test methods - Determination of water absorption at atmospheric pressure.*

prEN 13919, *Natural stone test methods - Determination of resistance to ageing by $SO_2$ action in the presence of humidity.*

prEN 14066, *Natural stone test methods - Determination of thermal shock resistance.*

prEN ....(WI 00246011), *Natural stone test methods - Determination of thermal dilatation coefficient.*

prEN ....(WI 00246012), *Natural stone test methods - Determination of sound - speed propagation.*

prEN 14157, *Natural stone test methods - Determination of abrasion resistance.*

prEN 14205, *Natural stone test methods - Determination of Knoop hardness.*

prEN 14231, *Natural stone test methods - Determination of slip resistance by means of the pendulum tester.*

prEN ....(WI 00246018), *Natural stone test methods - Determination of static elastic modulus.*

prEN 14158, *Natural stone test methods - Determination of rupture energy.*

prEN 14147, *Natural stone test methods - Determination of resistance to ageing by salt mist.*

It is intended that other ENs should call up this EN 13364 as the basis of evaluation of conformity. (Nevertheless it is not intended that all natural stones products should be subjected regularly to all the listed tests. Specifications in other standards should call up only relevant test methods).

This European Standard has an annex A (normative).

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 test method to determine the breaking load at the dowel hole of natural stones used for cladding or lining in building.

## 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 (including amendments).

EN 10088-1, *Stainless steels – Part 1: List of stainless steels.*

EN 12390-4, *Testing hardened concrete – Part 4: Compressive strength - Specification for testing machines.*

EN 197-1, *Cement - Part 1: Composition, specifications and conformity criteria for common cements.*

## 3 Principle

This test consists of applying a force in a direction perpendicular to the face of a specimen through a dowel previously placed in an hole drilled in one of its sides and measuring the breaking load of the specimen.

## 4 Symbols

$d$ is the thickness of the test specimen, in millimetres

$d_1$ is the distance from the hole wall to the face where fracture occurs, in millimetres

$b_A$ is the maximum distance of the centre of the hole to the fracture edge on the face, in millimetres

$F$ is the individual breaking load, in newtons

$\overline{d}_1$ is the mean value of $d$, in millimetres

$\overline{F}$ is the mean value of $F$, in newtons

$\overline{b}_A$ is the mean value of $b_A$, in millimetres

## 5 Apparatus

**5.1** A balance capable of weighing the specimens with an accuracy of 0,01 % of their mass.

**5.2** A ventilated oven capable of maintaining a temperature of (70 ± 5) °C.

**5.3** A linear measuring device with an accuracy of 0,05 mm.

**5.4** A rotary drilling machine equipped with a diamond or tungsten carbide tipped bit.

**5.5** A testing machine of appropriate force in accordance with EN 12390-4 and calibrated according to this standard.

**5.6** A clamping device consisting of two metal plates having the shape and sizes shown in Figure 1.

**5.7** A device for applying loads perpendicular to the axis of the dowel (see Figure 2).