

# **SLOVENSKI STANDARD**

## **SIST EN 1097-5:2008**

**01-september-2008**

**Nadomešča:**

**SIST EN 1097-5:2000**

---

### **Preskusi mehanskih in fizikalnih lastnosti agregatov - 5. del: Določevanje vode s sušenjem v prezračevanem sušilniku**

Tests for mechanical and physical properties of aggregates - Part 5: Determination of the water content by drying in a ventilated oven

Prüfverfahren für mechanische und physikalische Eigenschaften von Gesteinskörnungen - Teil 5: Bestimmung des Wassergehaltes durch Ofentrocknung

Essais pour déterminer les caractéristiques mécaniques et physiques des granulats - Partie 5: Détermination de la teneur en eau par séchage en étuve ventilée

**Ta slovenski standard je istoveten z: EN 1097-5:2008**

---

#### **ICS:**

|           |                                |                                |
|-----------|--------------------------------|--------------------------------|
| 91.100.15 | Mineralni materiali in izdelki | Mineral materials and products |
|-----------|--------------------------------|--------------------------------|

**SIST EN 1097-5:2008**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 1097-5:2008

<https://standards.iteh.ai/catalog/standards/sist/78f7ee13-87b7-4fed-86c2-d171cd057ea1/sist-en-1097-5-2008>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 1097-5**

March 2008

ICS 91.100.15

Supersedes EN 1097-5:1999

English Version

**Tests for mechanical and physical properties of aggregates -  
Part 5: Determination of the water content by drying in a  
ventilated oven**

Essais pour déterminer les caractéristiques mécaniques et  
physiques des granulats - Partie 5: Détermination de la  
teneur en eau par séchage en étuve ventilée

Prüfverfahren für mechanische und physikalische  
Eigenschaften von Gesteinskörnungen - Teil 5:  
Bestimmung des Wassergehaltes durch Ofentrocknung

This European Standard was approved by CEN on 4 February 2008.

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

CEN members are the national standards bodies of 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.

<https://standards.iteh.ai/catalog/standards/sist/781/ee13-87b7-4fed-86c2-d171cd057ea1/sist-en-1097-5-2008>



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

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

## Contents

Page

|                                                                                                                                                   |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Foreword.....                                                                                                                                     | 3  |
| 1 Scope .....                                                                                                                                     | 4  |
| 2 Normative references .....                                                                                                                      | 4  |
| 3 Terms and definitions .....                                                                                                                     | 4  |
| 4 Principle.....                                                                                                                                  | 4  |
| 5 Apparatus .....                                                                                                                                 | 5  |
| 6 Preparation of test portion.....                                                                                                                | 5  |
| 7 Procedure .....                                                                                                                                 | 6  |
| 8 Calculation and expression of results.....                                                                                                      | 6  |
| 9 Test report.....                                                                                                                                | 7  |
| Annex A (normative) Variations to the determination of the water content by drying in a ventilated oven for use with lightweight aggregates ..... | 8  |
| Annex B (informative) Example of calculation of the water content by drying in a ventilated oven.....                                             | 9  |
| Annex C (informative) Precision .....                                                                                                             | 10 |
| Bibliography .....                                                                                                                                | 11 |

SIST EN 1097-5:2008  
<https://standards.iteh.ai/catalog/standards/sist/78f7ee13-87b7-4fed-86c2-d171cd057ea1/sist-en-1097-5-2008>

## Foreword

This document (EN 1097-5:2008) has been prepared by Technical Committee CEN/TC 154 "Aggregates", 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 September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1097-5:1999.

This Standard forms part of a series of tests for mechanical and physical properties of aggregates. Test methods for other properties of aggregates are covered by parts of the following European Standards:

EN 932, Tests for general properties of aggregates

EN 933, Tests for geometrical properties of aggregates

EN 1367, Tests for thermal and weathering properties of aggregates

EN 1744, Tests for chemical properties of aggregates

EN 13179, Tests for filler aggregate used in bituminous mixtures

The other parts of EN 1097 are:

Part 1: Determination of the resistance to wear (micro-Deval)

Part 2: Methods for the determination of resistance to fragmentation

Part 3: Determination of loose bulk density and voids

Part 4: Determination of the voids of dry compacted filler

Part 6: Determination of particle density and water absorption

Part 7: Determination of the particle density of filler - Pycnometer method

Part 8: Determination of the polished stone value

Part 9: Determination of the resistance to wear by abrasion from studded tyres - Nordic test

Part 10: Determination of water suction height

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 the United Kingdom.

## EN 1097-5:2008 (E)

## 1 Scope

This standard describes the reference method used for type testing and in cases of dispute for the determination of the water content of aggregates by drying in a ventilated oven. For other purposes, in particular factory production control, other methods may be used provided that an appropriate working relationship with the reference method has been established.

## 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 932-2, *Tests for general properties of aggregates - Part 2: Methods for reducing laboratory samples*

EN 932-5, *Tests for general properties of aggregates - Part 5: Common equipment and calibration*

## 3 Terms and definitions

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

### 3.1 aggregate size

designation of aggregate in terms of lower ( $d$ ) and upper ( $D$ ) sieve sizes. This designation accepts the presence of some particles which will be retained on the upper sieve (oversize) and some which will pass the lower sieve (undersize)

### 3.2 test portion

sample used as a whole in a single test

### 3.3 constant mass

successive weighings after drying at least 1 h apart not differing by more than 0,1 %

**NOTE** In many cases constant mass can be achieved after a test portion has been dried for a pre-determined period in a specified oven at  $(110 \pm 5) ^\circ\text{C}$ . Test laboratories can determine the time required to achieve constant mass for specific types and sizes of sample dependent upon the drying capacity of the oven used.

## 4 Principle

The oven-drying method provides a measure of the total free water present in a test portion of aggregate. The water can be from the surface of the aggregate and from water accessible pores within the aggregate particles.

A test portion is weighed and then placed in a ventilated drying oven at  $(110 \pm 5) ^\circ\text{C}$ . Successive weighings are used to determine the constant mass of the dried test portion. At all stages of handling and preparation before the start of the test, the laboratory sample and subsequent test portion are protected from loss or gain of water.

The water content is determined as the difference in mass between the wet and the dry mass and is expressed as a percentage of the dry mass of the test portion.

A variation on the method for use with lightweight aggregates is specified in Annex A.

## 5 Apparatus

**5.1 All apparatus**, unless otherwise stated, shall conform to the general requirements of EN 932-5.

**5.2 Container**, large enough to store the test portion before testing. The container shall be non-corrodible and closed so as to prevent the loss of water.

NOTE 1 The following may be suitable:

- a) watch glasses with clips;
- b) petri dishes or tins with lids;
- c) plastic sacks or bags with suitable closures;
- d) buckets with lids.

NOTE 2 Long term storage of the test portion in a plastic sack or bag should be avoided.

**5.3 Heat resistant stirrer**, such as a knife, spatula or a shovel.

**5.4 Balance**, of suitable capacity, with an accuracy of 0,1 % of the mass of the test portion.

**5.5 Ventilated drying oven**, thermostatically controlled to maintain a temperature of  $(110 \pm 5) ^\circ\text{C}$ .

NOTE 1 For temperature sensitive aggregates the drying temperature should be reduced to  $(40 \pm 5) ^\circ\text{C}$ .

NOTE 2 The air movements within the oven induced by a ventilation system should not cause the loss of fine particles.

**5.6 Desiccator with desiccant**. As an alternative to the desiccator a closed cabinet containing desiccant may be used for the cooling stage.

NOTE Silica gel with colour indicator and calcium chloride are suitable desiccants.

**5.7 Tray(s)**, heat resistant and of sufficient size and number to suit the test portion.

NOTE For small test portions, tins and watch glasses can be suitable.

## 6 Preparation of test portion

The laboratory sample shall be reduced as specified in EN 932-2 to produce a test portion.

Calculate the minimum mass of the test portion from the value of the upper ( $D$ ) sieve size, in millimetres (see 3.1) as follows:

- if  $D \geq 1,0$  mm, the minimum mass (in kilograms) shall be  $0,2 D$ ;
- if  $D < 1,0$  mm, the minimum mass shall be 0,2 kg.

Immediately after preparing the test portion, place it in a clean and dry container (see 5.1.1) unless the determination is carried out straight away.

## EN 1097-5:2008 (E)

## 7 Procedure

Clean and dry sufficient tray(s) to contain the test portion during drying. Weigh and record the mass of the tray(s) ( $M_2$ ).

Spread the test portion out on the tray(s).

Weigh the tray(s) containing the moist test portion and determine the mass of the test portion ( $M_1$ ) by subtracting the mass of the trays ( $M_2$ ).

Place the tray(s) in the oven at  $(110 \pm 5) ^\circ\text{C}$  until constant mass has been achieved.

To establish whether constant mass ( $M_3$ ) has been achieved, proceed as follows with each tray:

Cool the tray to room temperature. If necessary use a desiccator or a closed cabinet as described in 5.6. Determine the mass of the test portion ( $M_{d1}$ ) by subtracting the mass of the tray ( $M_2$ ).

Return the tray with the test portion to the oven for at least 1 h, cool to room temperature and repeat the determination of the mass of the test portion ( $M_{di}$ ). If  $M_{di}$  is less than 0,1% different from  $M_{d1}$ , constant mass is assumed achieved. If the difference is 0,1 % or more, return the tray with the test portion to the oven and repeat this procedure until the difference between two successive determinations is less than 0,1 %. If more than one tray is used,  $M_3$  is the sum of the values of  $M_{di}$ .

NOTE For fine aggregates, it is permissible to aid the evaporation of water during heating by occasionally stirring. Keep the stirrer in the tray(s) until the test portion is dry to avoid the loss of solid material.

Once constant mass has been achieved, report the final value of  $M_{di}$  as  $M_3$ .

## 8 Calculation and expression of results

<https://standards.iteh.ai/catalog/standards/sist/78f7ee13-87b7-4fed-86c2->

The value of the water content ( $w$ ) is the mass of water in the test portion expressed as a percentage of the mass of the dry test portion.

Calculate the water content  $w$  in accordance with the following equation:

$$w = \frac{M_1 - M_3}{M_3} \times 100 \quad (1)$$

where

$M_1$  is the mass of the test portion, in grams;

$M_3$  is the constant mass of the dried test portion, in grams.

Express the result to the nearest 0,1 %.

NOTE 1 A typical example of the calculation of water content is given in Annex B.

NOTE 2 A statement on the precision of the test is given in Annex C.

## 9 Test report

### 9.1 Required data

The test report shall include the following information:

- a) reference to this European Standard (EN 1097-5:2008);
- b) identification of the sample;
- c) identification of the laboratory;
- d) type and nominal size of the aggregate;
- e) result of the water content of test portion  $w$ .

### 9.2 Optional data

The test report can include the following information:

- a) name and location of the sample source;
- b) each weighing data;
- c) description of the sampling procedure;
- d) mass of the dried test portion;
- e) date of the test.

SIST EN 1097-5:2008  
<https://standards.iteh.ai/catalog/standards/sist/78f7ee13-87b7-4fed-86c2-d171cd057ea1/sist-en-1097-5-2008>