



# SLOVENSKI STANDARD

SIST EN 14702-1:2006

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Characterisation of sludges - Settling properties - Part 1: Determination of settleability  
(Determination of the proportion of sludge volume and sludge volume index)

Charakterisierung von Schlämmen - Absetzeigenschaften - Teil 1: Bestimmung der  
Absetzbarkeit (Bestimmung des Schlammvolumens und des Schlammvolumenindex)

Caractérisation des boues - Propriétés de sédimentation - Partie 1: Détermination de  
l'aptitude a la sédimentation (Détermination du volume de boues et de l'indice de boues)

[SIST EN 14702-1:2006](https://standards.iteh.ai/catalog/standards/sist/d9338fda-3bd2-4b41-920c-80c05addabad/sist-en-14702-1-2006)

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English Version

Characterisation of sludges - Settling properties - Part 1:  
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sludge volume and sludge volume index)

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Teil 1: Bestimmung der Absetzbarkeit (Bestimmung des  
Schlammvolumens und des Schlammvolumenindex)

This European Standard was approved by CEN on 3 February 2006.

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.

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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, 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.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN 14702-1:2006) has been prepared by Technical Committee CEN/TC 308 "Characterisation of sludges", the secretariat of which is held by AFNOR.

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 2006, and conflicting national standards shall be withdrawn at the latest by September 2006.

Another part of this European Standard is:

— Part 2: Determination of thickenability.

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

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## Introduction

Determination of the settleability via the determination of the proportion of sludge volume is an operational parameter and enables an assessment to be made (admittedly only within limits) of the dry matter content of a mixture of sludge and water. The value is used for calculating the rate of sludge settling and calculating the sludge volume index and to evaluate the performance of settling tanks.

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## 1 Scope

This document specifies a method for the determination of the settleability of sludge suspensions. This document is applicable to sludge suspensions from:

- storm water handling;
- urban wastewater collecting systems;
- urban wastewater treatment plants;
- treating industrial wastewater similar to urban wastewater (as defined in Directive 91/271 EEC);
- water supply treatment plants.

This method is also applicable to sludge suspensions from other origin.

## 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 872, *Water quality — Determination of suspended solids — Method by filtration through glass fibre filters*

EN 12880, *Characterization of sludges — Determination of dry residue and water content*

EN 1085:1997, *Waste water treatment — Vocabulary*  
<https://standards.iteh.ai/catalog/standards/sist/d9338fda-3bd2-4b41-920c-b6e65addabad/sist-en-14702-1-2006>

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1085:1997 and the following apply.

### 3.1

#### **settleability**

ability of sludge solids to separate from water by sedimentation under gravity

### 3.2

#### **settled sludge volume**

volume of the sludge solids suspension after settling under specified conditions  
 [7360, EN 1085:1997]

### 3.3

#### **sludge volume index**

sludge volume divided by the concentration of dry matter by mass in the sludge  
 [7370, EN 1085:1997]

## 4 Principle

The settled sludge volume and the sludge volume index are determined by a 30 min settling of a sludge suspension.

## 5 Interferences

In order to avoid modifying the settling process, the sludge/water mixture must not be too strongly shaken. The settling process can be disturbed by the walls of the vessel and the mutual interference between individual flocs, particularly when the proportion of sludge volume is high (greater than 250 ml/l). In such cases a new sample is prepared by dilution as described under 7.2. If the dissolved solids content is low and can be neglected in comparison to dry matter content, the total solids content should be determined and used for calculations. Interference also occurs when there are fairly large temperature differences between the temperature of the sample and the ambient temperature as a result of convection and formation of gas bubbles. With differences of more than 5 °C it is advisable to place the settling cylinder with the sample in a bucket filled with the sample fluid.

## 6 Apparatus

**6.1** graduated cylinder, nominal volume 1 000 ml, made of glass or transparent plastic, diameter 60 mm to 70 mm

**NOTE** In cases where the sludge volume after 30 min is less than 50 ml, an Imhoff cone of a volume of 1 l may be used.

**6.2** scoop, nominal volume 1 l

## 7 Procedure

### 7.1 General

A representative sample of a sludge suspension is taken by a scoop and immediately poured into the graduated cylinder up to the 1 000 ml mark. For this purpose, a scoop holding 1 l up to the edge should be used; this avoids possible settling in the scoop. Once the sample has stood for 30 min in one place without shaking, the sludge volume is read off at the surface level of the sludge (sludge-water interface). The determination shall be repeated if the sludge volume is greater than 250 ml/l.

For this purpose, the new sample shall be first of all diluted with water taken from the standing water of a sludge suspension or from water run off from a settling basin, in a volume ratio 1:1, 1:2 or 1:3. The value then read off for the sludge volume is multiplied by the dilution factor 2, 3 or 4 for the evaluation.

Gently homogenize the diluted sample by turning the closed cylinder two times overhead.

In reporting the result, the dilution used is that at which the value goes below 250 ml/l for the first time.

Determination shall be performed in duplicates.

### 7.2 Determination of solids concentration

**7.2.1** If the total dissolved solids concentration is less than 10 % of total solids, the concentration by mass of dry matter in sludge (g/l) has to be determined following EN 12880.

**7.2.2** If the total dissolved solids concentration is higher than 10 % of total solids, the concentration by mass of dry matter in sludge (g/l) has to be determined following EN 872.

## 8 Expression of results

The settled sludge volume  $V_S$  in ml/l is obtained as the sludge volume after settling divided by the volume of the initial sludge sample used.



The sludge volume index is calculated from the equation:

$$I_{sv} = \frac{V_S}{\rho_T} \quad \text{where}$$

$I_{sv}$  is the sludge volume index in millilitres per gram (ml/g);

NOTE 1 In technical literature this parameter is often named SVI.

$V_S$  is the sludge volume in millilitres per litre (ml/l) after 30 min settling, taken as an average of at least two measurements;

$\rho_T$  is the concentration of solids in sludge, in grams per litre (g/l) (see Clause 7).

NOTE 2 Values rounded to the nearest 10 ml/l are given for the proportion of sludge volume. If the sample has to be diluted, the sludge volume shall be read off in the diluted sample and the dilution factor shall be given in brackets after the reported value.

EXAMPLE 1 Original sample: Proportion of the settled sludge volume 180 ml/l

EXAMPLE 2 Diluted sample: Proportion of the settled sludge volume 510 ml/l (170 ml after 3 times dilution)

Values rounded to the nearest 1 ml/g are reported for the sludge volume index.

EXAMPLE 3 Sludge volume index 145 ml/g

## 9 Precision

Results of validation trials are summarized in Annex A (informative).

The repeatability standard deviation ranges from 0,066 ml/g (0,2 %) for digested sewage sludge, to 0,287 ml/g (1,2 %) for waterworks sludge, and to 4,370 ml/g (3,0 %) for activated sewage sludge.

Mean value is 1,574 ml/g (2,2 %). Minimum precision is 3,0 %.

The reproducibility standard deviation ranges from 0,131 ml/g (0,3 %) for digested sewage sludge, to 0,521 ml/g (2,2 %) for waterworks sludge, and to 7,304 ml/g (5,1 %) for activated sewage sludge.

Mean value is 2,652 ml/g (3,8 %). Minimum precision is 5,1 %.

## 10 Test report

The test report shall contain the following information:

- reference to this document;
- all information necessary for the complete identification of the sludge sample;
- details of sample preparation; e.g. dilution;
- results of the determination according to Clause 8;
- any details not specified in this document or which are optional and any other factor which may have affected the results.