SLOVENSKI STANDARD
SIST EN 14701-4:2010

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Karakterizacija blata - Lastnosti filtriranja - 4. del: Določevanje prepustnosti kosmičenega blata

Characterization of sludges - Filtration properties - Part 4: Determination of the drainability of flocculated sludges

Charakterisierung von Schlämmen - Filtrationseigenschaften - Teil 4: Bestimmung der Entwässerbarkeit geflockter Schlämme

Caractérisation des boues - Propriétés de filtration - Partie 4: Détermination de l'aptitude a l'égouttage des boues floculées

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Characterization of sludges - Filtration properties - Part 4: Determination of the drainability of flocculated sludges

Caractérisation des boues - Propriétés de filtration - Partie 4: Détermination de l'aptitude à l'égouttage des boues floculées

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Foreword

This document (EN 14701-4:2010) has been prepared by Technical Committee CEN/TC 308 “Characterization 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of an identical text or by endorsement, at the latest by July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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.

EN 14701, *Characterisation of sludges — Filtration properties*, consists of the following parts:

— *Part 1: Capillary suction time (CST)*

— *Part 2: Determination of the specific resistance to filtration*

— *Part 3: Determination of the compressibility*

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, Croatia, 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.

Introduction

The determination of drainability of flocculated sludges is an important parameter for evaluating their suitability to be thickened by means of a draining process. It also gives indications for the choice of flocculant or their dosage in view of the thickening of the sludge through a filtering medium. These easy and quick tests are the best means to narrow the number of products to be tested in full scale experiments and to adapt the pre-treatment to the sludge variability.

The results obtained are the mass of filtrate collected in a standard time or the time required to recover a given volume of filtrate (commonly 50 % of the water content of the sludge), the maximum volume of filtrate and the corresponding wet and dry mass of the sludge, the undissolved solids remaining in the filtrate and the best flocculant and its optimum dose in the case of comparative tests.

1 Scope

This European Standard specifies a method for the determination of drainability of flocculated sludges. It is applicable to sludge and sludge suspensions from:

a) storm water handling;

b) urban wastewater collecting systems;

c) urban wastewater treatment plants;

d) treating industrial wastewater similar to urban wastewater (as defined in Directive 91/271/EEC);

e) 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 12832:1999, *Characterization of sludges — Utilization and disposal of sludges — Vocabulary*

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

CEN/TR 14742, *Characterization of sludges — Laboratory chemical conditioning procedure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12832:1999 and the following apply.

3.1
drainability
ability of treated sludge to separate from sludge liquor by gravity filtration

3.2
flocculation
coagulation by means of inorganic or organic flocculants (polyelectrolytes)

4 Sludge conditioning

For flocculation, the sludge shall be sampled already flocculated or mixed with flocculant in repeatable and quantified conditions according to CEN/TR 14742 for a laboratory preparation.

5 Principle

A given volume of flocculated sludge is poured in a filter cell equipped with a known filtering medium, the mass of filtrate collected is recorded versus time and the corresponding wet and dry mass of the sludge retained on the filtering medium and the undissolved solids remaining in the filtrate are measured.

6 Apparatus

Ordinary laboratory apparatus and the following (see informative Annex A):

6.1 Transparent tube (e.g. glass, polyethylene) of 150 mm diameter and of about 200 mm height, supported by a system composed of a filtering medium tightened in a device equipped with an appropriate sealing joint.

6.2 Filtering medium whose characteristics shall be the same as that used in the full scale drainage device and in comparative tests.

6.3 Filtrate draining device fixed under the filtering medium.

6.4 Beaker for the filtrate collection.

6.5 Weighing balance with an accuracy of at least 0,1 g connected to a computer to continuously record the cumulative mass of filtrate collected over time. The software shall be able to record data every 0,5 s.

6.6 Apparatus for the determination of dry solids content of the sludge retained on the filtering medium.

6.7 Apparatus for the determination of suspended solids in the filtrate.

NOTE To allow a correct interpretation of data, the comparison of flocculation conditions should be made with the same test equipment.

7 Procedure

a) Prepare the balance and the software to record the mass of filtrate as soon as the first drops of filtrate are collected.

b) Measure the water content of the flocculated sludge.

c) Gently pour (without shaking) (1 ± 0,2) l of flocculated sludge (record the exact mass) in the centre of the cell for the sludge to recover the whole surface of the filtering medium.

d) Record the cumulative mass of filtrate collected over time every 0,5 s at least during the first 30 s.

e) Stop the test when the mass of filtrate to initial mass of sludge ratio is constant to within 0,1 g or after 10 min.

f) Measure the concentration of suspended solids in the filtrate (see EN 872) and the wet and dry mass of the sludge retained on the filter medium (see EN 12880).

g) Repeat steps a) to f) for at least twice if repeatability measurements are needed.

8 Expression of results

Plot adimensional mass versus time:

$$\frac{M}{M_0} = f(t)$$

where

M is the mass of filtrate, in grams (g);

M_0 is the initial mass of sludge, in grams (g);

t is the time of experiment, in seconds (s).

Record the following data obtained for each test:

a) Adimensional mass of filtrate recovered at t = 30 s, t = 90 s and at the end of the test;

b) Time necessary to collect a volume of filtrate corresponding to 50 % of the water content of the sludge;

c) Dryness of the cake retained on the filtering medium;

d) Dry mass of suspended solids per unit volume of filtrate.

NOTE The optimal operating conditions of the drainage process are those for which the drainage is the fastest to remove the maximal drainable quantity of water, the mass of wet and dry solids retained on the filter medium is the highest, and the mass of suspended solids in the filtrate is the lowest.

9 Test report

The test report shall contain at least the following information:

a) Reference to this document;

b) Identification of the sludge (origin, type, identification, concentration, method of sampling and storage);

c) Identification of the flocculation conditions and preparation;

d) Characteristics of sludge and filtering medium (initial mass and water content of sludge, reference and supplier of the filtering medium);

e) Adimensional mass recovered versus time with at least the volume of filtrate collected at t = 30 s, at t = 90 s and at the end of the test;

f) Time, in seconds (s), corresponding to the collection of 50 % of the initial water content of the sludge;

g) Dry mass of the suspended solids per unit volume of filtrate (in milligrams per litre (mg/l));

h) Dryness (mass fraction in percent (%)) of sludge cake retained on the filtering medium;

i) Any detail not specified in this document or which are optional and any other factor which may have affected the results.