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**Karakterizacija blata - Postopek laboratorijskega kemijskega kondicioniranja**

Characterization of sludges - Laboratory chemical conditioning procedure

Charakterisierung von Schlämmen - Laborverfahren zur chemischen Konditionierung

Caractérisation des boues - Mode opératoire de conditionnement chimique en laboratoire

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ICS 13.030.20

English Version

## Characterization of sludges - Laboratory chemical conditioning procedure

Caractérisation des boues - Procédure de conditionnement chimique en laboratoire

Charakterisierung von Schlämmen - Laborverfahren zur chemischen Konditionierung

This Technical Report was approved by CEN on 28 February 2006. It has been drawn up by the Technical Committee CEN/TC 308.

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## Foreword

This Technical Report (CEN/TR 14742:2006) has been prepared by Technical Committee CEN/TC 308 "Characterization of sludge", the secretariat of which is held by AFNOR.

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.

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## **Introduction**

The laboratory assessment of sludge dewaterability is sensitive to the operating procedure adopted for the conditioning step. No generalized ranking of products in order of effectiveness can be given since the ranking changes with the sludge type, dosage of conditioning agent, degree of shearing and dewatering device.

This method gives a standardized procedure for the conditioning operation when selecting a conditioning product at laboratory scale.

An informative annex is also given in order to have some view of the industrial conditioning with mineral coagulants or with polyelectrolytes.

The test may give information about the energy needed for the procedure as far as determination of the mixing power is available.

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## 1 Scope

This Technical Report specifies a procedure for the chemical conditioning in laboratory of sludges.

This Technical Report is applicable to sludges and 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 applicable to sludge and sludge suspensions of 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 12176, *Characterisation of sludge — Determination of pH value*

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

EN 12832:1999, *Characterisation of sludges — Utilisation and disposal of sludges — Vocabulary (Trilingual version)*

EN 14701-1, *Characterisation of sludges — Filtration properties — Part 1: Capillary suction time (CST)*

EN 14701-2, *Characterisation of sludges — Filtration properties — Part 2: Determination of the specific resistance to filtration*

## 3 Terms and definitions

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

### 3.1

#### **chemical conditioning**

mixing of a chemical product with the sludge in order to increase its dewaterability

## 4 Principle

The procedure refers to the mixing of conditioning agents with a sludge in order to give reproducible results. The test is performed as a batch process. The sludge conditioned following this procedure should then undergo specific characterization tests which will give the information of the most suitable operating conditions: nature of the reagents, dosage, addition sequences.

NOTE Variables and/or parameters which can have significant effects are either chemical or physical.

The chemical parameters are the nature of the conditioning product, its concentration and dosage, the sludge pH and the type of water used for on site product preparation in the case of polyelectrolytes addition.

The physical parameters are the method of preparing the solution and its storage, the type of stirrer, the intensity and duration of stirring and the interval between the end of mixing and the dewatering procedure itself (see Annex A, informative).

The method of mixing the conditioning product into the sludge is particularly important since inadequate mixing leading to poor initial dispersion can give very poor performance: the majority of the product may react strongly on to the particles which it first meets and does not redisperse.

The conditioning procedure may concern the addition of more than one product. In that case, the addition sequence is another parameter that has to be carefully described.

## **5 Apparatus**

**5.1** Variable rotational speed stirrer/mixer (see Annex B informative). A magnetic stirrer is not recommended, as it does not give a homogenous and reproducible mixing.

**5.2** Conventional 200 ml – 1000 ml beakers.

**5.3** Volumetric pipettes.

**5.4** Analytical balance with a precision of at least 0,1 mg.

**5.5** pH-meter.

**5.6** Chronometer.

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## **6 Procedure**

**6.1** Measure the pH of the sludge to be tested (EN 12176) and, in case, adjust it depending on the conditioning agent to be used.

**6.2** Measure the dry residue of the sludge to be tested (EN 12880).

**6.3** Put a defined amount of sludge into a beaker (the amount of sludge should be between a quarter and a half of the capacity of the beaker).

**6.4** Start stirring at a rotational speed  $\omega_1$  and put chronometer on (see Annex A, informative).

**6.5** While stirring at the speed  $\omega_1$ , add a precise amount of conditioning agent using a volumetric pipette and report the time  $t_{b1}$  of the beginning of the introduction and the time  $t_{e1}$  of the end of the introduction (see Annex A, informative).

**6.6** Continue with stirring till the time  $t_{t1}$  when stirring is stopped (see Annex A, informative).

**6.7** Make the specific characterization test (for instance CST (EN 14701-1)), specific resistance to filtration (EN 14701-2) immediately after the conditioning procedure.

**6.8** Repeat steps 6.3 to 6.7, at least once, and calculate the average value of the specific characterization test.

**6.9** Repeat steps 6.3 to 6.8 for another stirring speed ( $\omega_2$  to  $\omega_n$ ).



**6.10** Repeat steps 6.3 to 6.8 for another sequence with other parameters (conditioning agent and dosage) and report the new conditions.

## 7 Test report

The test report should include all information concerning the test itself and the results of the subsequent characterization test. In particular, it must also include:

- a) Reference to this document;
- b) all information necessary for complete identification of the sludge sample;
- c) description of the stirrer;
- d) details of sample pre-treatment, if carried out;
- e) nature and preparation procedure of the chemical conditional agent;
- f) results of the determination according to Clause 6 (see Annex C, informative);
- g) any detail not specified in this document and any other factor which may have affected the results.

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