

SLOVENSKI STANDARD
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Karakterizacija blata - Dobra praksa za skupni sežig blat in komunalnih odpadkov

Characterisation of sludges - Good practice for combined incineration of sludges and household wastes

Charakterisierung von Schlämmen - Anleitung für die gute fachliche Praxis bei der gemeinsamen Verbrennung von Schlämmen und Haushaltsabfällen

Caractérisation des boues - Bonne pratique d'incinération combinée des boues et des déchets ménagers

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13.030.40	Naprave in oprema za odstranjevanje in obdelavo odpadkov	Installations and equipment for waste disposal and treatment

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August 2004

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English version

**Characterisation of sludges - Good practice for combined
incineration of sludges and household wastes**

Caractérisation des boues - Bonne pratique pour
incinération combinée des boues et des déchets ménagers

Charakterisierung von Schlämmen - Anleitung für die gute
fachliche Praxis bei der gemeinsamen Verbrennung von
Schlämmen und Haushaltsabfällen

This Technical Report was approved by CEN on 26 February 2004. It has been drawn up by the Technical Committee CEN/TC 308.

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Contents

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Requirements	7
4.1 General.....	7
4.2 Origin and knowledge of the materials intended for combined incineration	7
4.2.1 General aspects	7
4.2.2 Parameters relating to transport, storage and transfer	8
4.2.3 Parameters relating to combustion conditions and to gaseous and solid discharges	8
4.2.4 Case of sludge with additives	9
4.3 Requirements concerning transport, storage and transfer	9
4.3.1 General provisions concerning transport.....	9
4.3.2 Recommendations specific to transport.....	10
4.3.3 General provisions concerning storage.....	10
4.3.4 General provisions concerning transfer	11
4.4 Suitability of the incineration equipment	12
4.4.1 Incineration equipment	12
4.4.2 General considerations relating to the incineration	12
4.4.3 Particular recommendations for combined incineration	14
Annex A Various systems to input sludge into a household waste incineration plant	16
A.1 General.....	16
A.2 Sludge whose dry matter content < 35 %.....	16
A.3 Sludge whose dryness is > 65 %	16
A.4 Sludge whose dry matter content between 35 % to 65 %	17
A.5 Drying the sludge in the household waste incineration plant	17
Annex B Different furnace types	18
Bibliography	22

Foreword

This document (CEN/TR 13768:2004) has been prepared by Technical Committee CEN /TC 308, "Characterization of sludges", the secretariat of which is held by AFNOR.

This document supersedes CR 13768:2001.

Significant technical differences between this edition and CR 13768:2001 is taking account of the new Directive 2000/76/EC (incineration of waste).

The status of this document as CEN Technical Report has been chosen because the most of its content is not completely in line with practice and regulation in each member state. This document gives recommendations for a good practice concerning the combined incineration of sludges and household wastes but existing national regulations remain in force.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Report: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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CEN/TR 13768:2004 (E)**Introduction**

All of the recommendations of this document constitute a framework within which the combined incineration process can be proposed in addition to and/or as a substitution for field spreading, waste site disposal (landfilling), specific incineration (see TR 13767), or any other process.

Combined incineration should abide by the European Directive 2000/76/EC (Incineration of waste) and should comply with the relevant regulations and recommendations in force within each member state to reduce as far as possible negative effects on the environment such as pollution of the air, ground, surface and underground water, and on human and animal health. This concern therefore relates to: the pre-treatment of the sludge in plants, the transfer of the material to the treatment centre, the actual destruction process, the treatment of gaseous discharge into the atmosphere, the future of the different by-products stemming from combustion and the treatment of the liquid effluents possibly resulting from the process.

Anyway, priority should be given to reduction of pollutants at the origin and or to recovery of valuable substances (phosphorus, potassium...) in sludge and derived products if technically and economically feasible.

As part of a process and company quality approach, the relevant issues are therefore :

- exploiting the operating data and the statutory inspections carried out ;
- rendering the process reliable, optimising and of perpetuating it, as well as guaranteeing a permanent development ;
- maintaining a climate of confidence between the authorities, the sludge producers, the transporters, the incineration plant and waste disposal site operators and to allow the services to be provided on a contractual basis.

When necessary, a distinction can be made between existing facilities and new incineration plants.

1 Scope

This document gives indication for dealing of the combined incineration treatment of sludge and household waste.

This document is applicable to sludges described in the scope of CEN/TC 308 i.e. specifically derived from :

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

but excluding hazardous sludges from industry.

Annex A gives information on various systems to input sludge into a household waste incineration plant.

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 1085, *Wastewater treatment – Vocabulary*.

<https://standards.iteh.ai/catalog/standards/sist/7ff123c9-502d-400a-ba79-182022a00000/tp-cen-tr-13768-2005>

EN 12832, *Characterization of sludges – Utilization and disposal of sludges – Vocabulary*

EN 13965-1, *Characterization of waste – Terminology – Part 1 : Materials related terms and definitions*.

EN 13965-2:2004, *Characterization of waste – Terminology – Part 2 : Management related terms and definitions*.

3 Terms and definitions

For the purposes of this document, the following terms and definitions given in EN 12832 and EN 1085 and the following in accordance with EN 13965-1 and 2 except for the definition of combined incineration apply :

3.1

household waste

waste arising in households

[see EN 13965-1]

3.2

incineration

treatment by combustion

NOTE In contrast to pyrolysis, incineration is carried out with full supply of oxygen

[see EN 13965-2]

3.3

household waste incineration plant

all of the equipment required for the thermal conversion by incineration of household waste with or without energy recovery

CEN/TR 13768:2004 (E)**3.4****combined incineration of sludge and household waste**

incineration of sludge and household waste in a same combustion chamber

3.5**pyrolysis**

thermal treatment with limited supply of oxygen

[3.40 of EN 13965-2:2004]

3.6**thermolysis**

one of the methods of application of pyrolysis

3.7**charge preparation**

the operation of preparing sludge that can be necessary prior to entering the furnace

3.8**incinerator furnace**

specific part of the incineration plant where the combustion reactions that destroy the organic matter take place, generating gaseous effluent and solid residues

3.9**boiler (heat exchanger)**

specific part of the incineration plant where heat exchange takes place in view of recovering energy and of cooling down the fumes

3.10**waste gas treatment**

any physical or chemical process aimed at cleaning the flue gas resulting from the thermal treatment with the regard to their discharge into the atmosphere

3.11**bottom ash**

combustion residue arising at the bottom of combustion furnaces

[see EN 13965-1]

3.12**fly ash**

solid material that is entrained in a flue gas stream

[see EN 13965-1]

NOTE See waste Directive 91/156/EEC.

3.13**energy recovery**

activity to use combustible waste as a means to generate energy through direct incineration with recovery of heat

[see EN 13965-2]

NOTE See packaging Directive (94/62/EEC).

3.14**storage center (landfill)**

waste disposal site for the deposit of the waste onto or into land

3.15**leachate**

liquid percolating through the deposited waste and emitted from or contained within a landfill

3.16**recycling**

activity in a production process to process waste materials for the original purpose or for other purposes, excluding energy recovery

NOTE See packaging Directive 94/62/EEC

[see EN 13965-2]

4 Requirements**4.1 General**

As a general rule, the criteria, which lead the decision-makers to choose combined incineration, are similar to those which lead them to construct or to extend incineration plants for household waste only.

The local recommendations take into account :

- impossibility to introduce or pursue any other process or to have at one's disposal an alternative to existing solutions, throughout whole or part of the year, in particular in the case of technical shutdown and particularly if the incineration plant only has one treatment unit ;
- geographical context, the client population and therefore the potential input material (waste + sludge) as well as the expected developments ;
- proximity of the sewage treatment plant/incineration plant and the local road network ;
- extent to which the incineration plants are used (dimensioning of furnaces, charge levels, filling) ;
- variations due to seasonal activity and production peaks both in sludge and household waste.

4.2 Origin and knowledge of the materials intended for combined incineration**4.2.1 General aspects**

Considering, in the spirit of this guide, combined incineration as one of the channels for sludge treatment, two approaches are possible :

the treatment site accepts over the course of time materials of different origin, type, behaviour and quantity and it should be readily adaptable in order to always guarantee optimum destruction ;

the treatment site (due to its design, for example) cannot offer any flexibility. Two cases then present themselves :

- a quantitative or qualitative limitation will be demanded on the site ;

CEN/TR 13768:2004 (E)

- a reflection, taking into account the technical and economic constraints, should be conducted in order to examine the influence of any modification in sludge production, so as to achieve a perfect material/process match.

There should be the opportunity for process evolution to comply with new constraints, particularly arising from changes in legislation. Finally, it is worthwhile specifying that incineration plants are installations which, for reasons of technical availability and maintenance, operate between 7000 h and 8000 h per year. It will therefore be advisable to provide for a selective and appropriate organisation (alternative elimination or storage channel) with the water treatment site administrator during the furnace shutdown periods, whether of short duration (minor maintenance operations, incident) or of long duration (programmed stoppage for major yearly overhauling). This latter comment is particularly important in the case of a plant equipped with one incineration line only. Under these conditions, it is then a question of specifying certain physico-chemical properties of the "sludge material" which can influence the combined incineration process with a view to making provision for the necessary installations, the behaviour and flexibility of the equipment to be implemented as well as the possible additional maintenance and wear. The methods for sampling and controlling the follow-ups as well as their validity will conform to the requirements suggested by all of the players of the process, from the producer up to the final disposer.

Prior knowledge of the parameters given below will greatly help determine what equipment has to be considered both for adapting the new combined incineration activity at existing plants not planned for this purpose and for designing new incineration plants.

The operational departments of the incineration plants reserve the right to refuse a sludge, which can present one or more "abnormal" parameters, e.g. a particularly high content of one or more trace elements and for which the unit's equipment :

- will not allow to respect prescriptions of the directive 2000/76/EC
- will not allow to guarantee compliance with current emission thresholds ;
- will generate bottom ash and fly ash whose deterioration of the quality will no longer allow a disposal in conformity to the provisions in force (regulation and/or current technical-economic conditions). We will point out that too high contents of phosphorous pentoxide (P_2O_5) in the bottom ash and ash cause a drop in their melting point.

4.2.2 Parameters relating to transport, storage and transfer

It is a question of :

- origin of sludge ;
- type of sludge ;
- dry substance content ;
- viscosity and rheological behaviour on delivery and on recovery ;
- stability when piled, heap angle ;
- risks of the material and its parameters changing with time, during transport and storage (varying stability, rheological change, fermentation, smells) ;
- pH value.

4.2.3 Parameters relating to combustion conditions and to gaseous and solid discharges

These elements permits to anticipate the consequences on the combustion chamber functioning and on discharges :

- dry matter content ;

- organic matter content, organic micropollutants or volatile matter index ;
- higher or lower calorific value ;
- content of :
 - carbon ;
 - hydrogen ;
 - oxygen ;
 - nitrogen ;
 - sulfur ;
 - chlorine ;
- phosphorous :
 - as far as the nature of the gaseous discharge into the atmosphere is concerned, particular attention will be paid to compliance with national regulatory provisions and with Directive 2000/76/EC requirements. A periodic monitoring of toxic metals of sludges should be carried out to ascertain the standards of incineration plants are respected.

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4.2.4 Case of sludge with additives

Lime-treated sludge.

In order to slow down fermentation, lime is frequently added to the sludge. The limed sludge may have a positive impact on transport and storage, however, on the other hand, combustion can be affected by it: the life cycle of the refractories can be reduced due to alkaline degradation at these temperature levels, and additional clogging occur in the furnace's boiler unit. Furthermore, the resulting quantities of bottom ash and ash are increased in the proportions considered.

- Other important types of additives : FeCl_3 , polymers, organic flocculants, phosphate removal products, etc.

To date, the impact of these additives has not been sufficiently quantified to enable recommendations to be made.

For all of these three categories of parameters, a distinction will be made between those parameters which are worthwhile knowing for satisfactory combined incineration on a routine basis and the additional parameters which, although having little or no influence, can prove useful for optimising the process.

It will be particularly important to determine the ranges within which change is acceptable and/or unacceptable. Among all of these parameters, a selection of those, which should be regularly monitored and/or inspected, should be proposed.

4.3 Requirements concerning transport, storage and transfer

4.3.1 General provisions concerning transport

The "transport" system should be designed so as to guarantee maximum containment and limited nuisance due to smells. The transport vehicle driver should have in his possession the consignment note stating the origin, quality, quantity and destination of the sludge being transported.

Transport should not give rise to any accidental spillage of sludge onto the roadways and the various manoeuvring areas. In the event of the travelling distances being long, modification of the sludge should be taken into consideration.