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Karaktärisering av avfall – Vägledning för proving av flampunkt

Test methods for environmental characterization of solid matrices – Guide to flash point testing

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This Technical Report is not a Swedish Standard. This document contains the English language version of CEN/TR 17309:2019, edition 1.

Upplysningar om sakinnehållet i detta dokument lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om nationell och internationell standard.

Information about the content of this document is available from the SIS, Swedish Standards Institute, telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about national and international standards.

Dokumentet är framtaget av kommittén Karaktärisering av avfall, mark och slam, SIS/TK 535.

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TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 17309

May 2019

ICS 13.220.40; 13.030.01

English Version

Test methods for environmental characterization of solid matrices - Guide to flash point testing

Caractérisation des déchets - Lignes directrices pour la détermination du point d'éclair

Prüfverfahren für die umweltbezogene Charakterisierung fester Matrices - Anleitung zur Prüfung des Flammpunkts

This Technical Report was approved by CEN on 19 November 2018. It has been drawn up by the Technical Committee CEN/TC 444.

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European foreword

This document (CEN/TR 17309:2019) has been prepared by Technical Committee CEN/TC 444 “Test methods for environmental characterization of solid matrices”, the secretariat of which is held by NEN.

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Introduction

Flash point values are used in transporting, storage, handling and safety regulations, as a classification property to define “flammable” and “combustible” materials. Precise definition of the classes is given in each particular regulation.

A flash point value can indicate the presence of highly volatile material(s) in a relatively non-volatile or non-flammable material and flash point testing can be a preliminary step to other investigations into the composition of unknown materials. For products material safety data sheets provide further information also for flash point, but e. g. material safety data sheets for waste do not exist.

It is not appropriate for flash point determinations to be carried out on potentially unstable, decomposable, or explosive materials, unless it has been previously established that heating the specified quantity of such material in contact with the metallic components of the flash point apparatus, within the temperature range required for the method, does not induce decomposition, explosion or other adverse effects.

Flash point values are not a constant physical-chemical property of material tested. They are a function of the apparatus design, the condition of apparatus used, and no general valid correlation can be guaranteed between results obtained by different test methods or with test apparatus different from that specified.

1 Scope

The flash point test can be summarised as a procedure where a test portion is introduced into a temperature controlled test cup and an ignition source is applied to the vapours produced by the test portion to determine if the vapour / air mixture is flammable or at what temperature the vapour / air mixture is flammable.

This document is not intended to be a comprehensive manual on flash point tests and the interpretation of test results, however it covers the key aspects on these subjects.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Outline

There are many, slightly different, definitions of flash point, however the following definition is widely used in standard test methods:

The flash point is the lowest temperature of the test portion, corrected to a barometric pressure of 101,3 kPa, at which the application of an ignition source causes the vapour of the test portion to ignite momentarily and the flame to propagate across the surface of the liquid under the specified test conditions.

It is important to realise that the value of the flash point is not a physical constant but it is the result of a flash point test and is dependent on the apparatus and procedure used. This fact is so important that a general statement similar to the following will be incorporated into all the main flash point methods:

Flash point values are not a constant physical-chemical property of materials tested. They are a function of the apparatus design, the condition of the apparatus used, and the operational procedure carried out. Flash point can therefore only be defined in terms of a standard test method, and no general valid correlation can be guaranteed between results obtained by different test methods or with test apparatus different from that specified.

Due to the importance of flash point test results for both safety and regulatory purposes, the test method identification should always be included with the test result.

In general specific products specifications indicate which standard test method should be employed.

5 Brief history

The discovery of petroleum and the increased use of flammable distillates in the 19th century, for lighting and heating in place of animal and vegetable oils, led to a large number of explosions and other fire related accidents.

Legislation, such as the UK Petroleum Act in 1862 and the German Petroleum Regulations in 1882, quickly spread around the world and led to the development of many types of test instruments. The

following list shows the dates when the major surviving instruments were in a form probably recognisable today:

— 1870 – 1880 Abel closed cup, Pensky-Martens closed cup

— 1910 – 1920 Tag closed cup, Cleveland open cup

6 Flash point, and sustained combustion and burning

The flash point is essentially the lowest temperature of the liquid or semi-solid at which vapours from a test portion combine with air to give a flammable mixture and 'flash' when an ignition source is applied.

Sustained combustion and burning tests are usually carried out with the test portion at a fixed temperature and tests whether vapour combustion and burning commences when an ignition source is applied and thereafter is continuous and where the heat produced is self sustaining and supplies enough vapours to combine with air and burn even after the removal of the ignition source.

7 The need of flash point tests

The fundamental reason for the requirement of flash point measurements is to assess the safety hazard of a liquid or semi-solid with regard to its flammability and then classify the liquid into a group. The lower the flash point temperature the greater the risk. This classification is then used to warn of a risk and to enable the correct precautions to be taken when using, storing or transporting the liquid.

Specifications quote flash point values for quality control purposes as well as for controlling the flammability risk.

A change in flash point may indicate the presence of potentially dangerous volatile contaminants or the adulteration of one product by another.

8 Selection of flash point method

8.1 First considerations

Firstly, if a flash point method has been specified in a product specification or regulation, then that method should be the first choice. If a number of alternative methods are specified then the choice will be influenced by availability and other factors such as sample size requirements, speed of testing or precision. In certain circumstances the choice of the stated referee method may be of special importance. Annex A gives an overview of the most common methods and their use in specifications and regulations.

When testing specifically for contamination or contaminants, certain test methods and procedures are more appropriate than others. In general an equilibrium test method is recommended for testing samples that may contain traces of volatile contaminants.

When selecting a flash point method for incorporation into a product specification or regulation, it is important that the product type is included in the scope of the test method and that the temperature range of the product is covered by the test method. If the product is not included in the scope then the test may be unsuitable for the product or the quoted precision does not apply. Where the scope of a test method is general or not suitable it is recommended to contact an appropriate standardization body for advice.

When testing chemicals, mineral products or corrosive materials it is recommended to check that the test cup material is suitable and will not produce flammable gases or be damaged by any possible chemical reaction.

NOTE For example alkaline liquids or samples with aluminium cause problems.