

ICS 75.080

English Version

Petroleum products and other liquids - Guide to flash point testing

Produits pétroliers et autres liquides - Guide pour
détermination du point d'éclair

Mineralölerzeugnisse und andere Flüssigkeiten - Leitfaden
zur Bestimmung des Flammpunktes

This Technical Report was approved by CEN on 14 May 2005. It has been drawn up by the Technical Committee CEN/TC 19.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This Technical Report (CEN/TR 15138:2005) has been prepared by Technical Committee CEN/TC 19 “Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin”, the secretariat of which is held by NEN.

Introduction

This Technical Report has been written under the guidance and with the assistance of the CEN/TC 19 / TC 139 (ISO/TC 28 / TC 35) Joint Working Group for Flash Point Methods and the Energy Institute Flammability Panel ST B 4 with the aim of assisting laboratory managers and technicians, regulators, specification writers and industry in the use, specification and application of flash point tests for liquids and semi-solids.

The work is based on standards produced by the following organizations:

- CEN/TC 19 "Petroleum products, lubricants and related products"
- CEN/TC 139 "Paints and varnishes"
- ISO/TC 28 "Petroleum products"
- ISO/TC 35 "Paints and varnishes"
- ASTM D01.22 "Health and Safety"
- ASTM D02.08 B "Flammability Section"
- DIN Deutsches Institut für Normung
- EI ST B 4 Flammability Panel

1 Scope

This Technical Report 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.

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.

2 Outline

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

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 conditions of test.

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.

3 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

4 Flash and fire 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. Fire point, combustibility and sustained burning tests all use open cup instruments.