

# SVENSK STANDARD

## SS-EN 15794:2009

Fastställt/Approved: 2009-11-02  
Publicerad/Published: 2009-11-18  
Utgåva/Edition: 1  
Språk/Language: engelska/English  
ICS: 14.380; 75.160.20

---

### **Explosiv atmosfär – Bestämning av explosionspunkt hos brännbara vätskor**

### **Determination of explosion points of flammable liquids**

This preview is downloaded from [www.sis.se](http://www.sis.se). Buy the entire standard via <https://www.sis.se/std-71620>

# Hitta rätt produkt och ett leveranssätt som passar dig

## Standarder

Genom att följa gällande standard både effektiviserar och säkrar du ditt arbete. Många standarder ingår dessutom ofta i paket.

## Tjänster

Abonnemang är tjänsten där vi uppdaterar dig med aktuella standarder när förändringar sker på dem du valt att abonnera på. På så sätt är du säker på att du alltid arbetar efter rätt utgåva.

e-nav är vår online-tjänst som ger dig och dina kollegor tillgång till standarder ni valt att abonnera på dygnet runt. Med e-nav kan samma standard användas av flera personer samtidigt.

## Leveranssätt

Du väljer hur du vill ha dina standarder levererade. Vi kan erbjuda dig dem på papper och som pdf.

## Andra produkter

Vi har böcker som underlättar arbetet att följa en standard. Med våra böcker får du ökad förståelse för hur standarder ska följas och vilka fördelar den ger dig i ditt arbete. Vi tar fram många egna publikationer och fungerar även som återförsäljare. Det gör att du hos oss kan hitta över 500 unika titlar. Vi har även tekniska rapporter, specifikationer och "workshop agreement".

Matriser är en översikt på standarder och handböcker som bör läsas tillsammans. De finns på [sis.se](http://sis.se) och ger dig en bra bild över hur olika produkter hör ihop.

## Standardiseringsprojekt

Du kan påverka innehållet i framtida standarder genom att delta i någon av SIS ca 400 Tekniska Kommittéer.

# Find the right product and the type of delivery that suits you

## Standards

By complying with current standards, you can make your work more efficient and ensure reliability. Also, several of the standards are often supplied in packages.

## Services

Subscription is the service that keeps you up to date with current standards when changes occur in the ones you have chosen to subscribe to. This ensures that you are always working with the right edition.

e-nav is our online service that gives you and your colleagues access to the standards you subscribe to 24 hours a day. With e-nav, the same standards can be used by several people at once.

## Type of delivery

You choose how you want your standards delivered. We can supply them both on paper and as PDF files.

## Other products

We have books that facilitate standards compliance. They make it easier to understand how compliance works and how this benefits you in your operation. We produce many publications of our own, and also act as retailers. This means that we have more than 500 unique titles for you to choose from. We also have technical reports, specifications and workshop agreements.

Matrices, listed at [sis.se](http://sis.se), provide an overview of which publications belong together.

## Standardisation project

You can influence the content of future standards by taking part in one or other of SIS's 400 or so Technical Committees.

Europastandarden EN 15794:2009 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 15794:2009.

The European Standard EN 15794:2009 has the status of a Swedish Standard. This document contains the official English version of EN 15794:2009.

! © Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

■ © Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplýsingar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplýsingar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

SIS Förlag AB, SE 118 80 Stockholm, Sweden. Tel: +46 8 555 523 10. Fax: +46 8 555 523 11.  
E-mail: [sis.sales@sis.se](mailto:sis.sales@sis.se) Internet: [www.sis.se](http://www.sis.se)



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 15794**

October 2009

ICS 75.160.20

English Version

## Determination of explosion points of flammable liquids

Détermination des points d'explosion des liquides  
inflammables

Bestimmung von Explosionspunkten brennbarer  
Flüssigkeiten

This European Standard was approved by CEN on 22 September 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 United Kingdom.



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

**Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
Foreword.....	4
Introduction .....	5
<b>1 Scope .....</b>	<b>6</b>
<b>2 Normative references .....</b>	<b>6</b>
<b>3 Terms and definitions .....</b>	<b>6</b>
<b>4 Principle of the test method .....</b>	<b>6</b>
<b>5 Test equipment .....</b>	<b>6</b>
<b>5.1 Reagents and Materials.....</b>	<b>6</b>
<b>5.1.1 Flammable liquid: .....</b>	<b>6</b>
<b>5.1.2 Sampling and Storage.....</b>	<b>6</b>
<b>5.2 Apparatus .....</b>	<b>7</b>
<b>5.3 Test vessel.....</b>	<b>8</b>
<b>5.4 Heating / cooling chamber.....</b>	<b>8</b>
<b>5.5 Ignition source .....</b>	<b>8</b>
<b>5.6 Stirrer .....</b>	<b>8</b>
<b>5.7 Barometer .....</b>	<b>9</b>
<b>5.8 Safety advice .....</b>	<b>9</b>
<b>6 Test procedure .....</b>	<b>9</b>
<b>6.1 General.....</b>	<b>9</b>
<b>6.2 Details .....</b>	<b>9</b>
<b>6.2.1 Step 1 .....</b>	<b>9</b>
<b>6.2.2 Step 2 .....</b>	<b>9</b>
<b>6.2.3 Step 3 .....</b>	<b>9</b>
<b>6.2.4 Step 4 .....</b>	<b>10</b>
<b>6.2.5 Step 5 .....</b>	<b>10</b>
<b>7 Expression of results .....</b>	<b>10</b>
<b>8 Verification of the apparatus .....</b>	<b>11</b>
<b>9 Test report .....</b>	<b>11</b>
<b>Annex A (informative) Safety advice .....</b>	<b>12</b>
<b>Annex B (informative) Estimation of explosion points.....</b>	<b>13</b>
<b>B.1 General.....</b>	<b>13</b>
<b>B.2 Pure substances .....</b>	<b>13</b>
<b>B.3 Mixtures of flammable components only .....</b>	<b>13</b>
<b>Annex C (normative) Criteria for flame detachment.....</b>	<b>15</b>
<b>Annex D (normative) Verification .....</b>	<b>16</b>
<b>Annex E (informative) Example for a form expressing the results .....</b>	<b>17</b>
<b>Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 94/9/EC .....</b>	<b>18</b>
<b>Bibliography .....</b>	<b>19</b>

**Figures**

<b>Figure 1 — Explosion point apparatus; schematic</b> .....	<b>7</b>
<b>Figure C.1 — Flame detachment</b> .....	<b>15</b>
<b>Figure C.2 — Halo (UNDETACHED FLAME)</b> .....	<b>15</b>

**Tables**

<b>Table D.1 — Data for verification of the apparatus</b> .....	<b>16</b>
<b>Table ZA.1 — Correspondence between this European Standard and Directive (Add the reference and title of the Directive)</b> .....	<b>18</b>

## Foreword

This document (EN 15794:2009) has been prepared by Technical Committee CEN/TC 305 "Potentially explosive atmospheres - Explosion prevention and protection", the secretariat of which is held by DIN.

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 April 2010, and conflicting national standards shall be withdrawn at the latest by April 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.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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, 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

Flammable liquids can give rise to an explosion hazard as a result of evaporation generating an explosive gas and/or vapour mixture with air. One way of eliminating the explosion hazard is to prevent explosive mixtures of gases and/or vapours with air from being formed. In order to assess the likelihood of an explosive mixture being formed the explosion point of the flammable liquid is required. The explosion point depends mainly on:

- the properties (e.g. explosion limits, vapour pressure, chemical composition including impurities of the flammable liquid);
- pressure;
- size, shape, and percentage fill of the test vessel;
- ignition source (type, energy);
- the criterion for self-propagating combustion.

The explosion point of a liquid is normally lower than its flashpoint. For pure substances the difference can be up to 10 K. In the case of mixtures the difference can be up to 25 K. Some liquids which do not exhibit a flash point may have explosion limits and thus have an explosion point.

To obtain reliable and comparable results it is therefore necessary to standardize the conditions (apparatus and procedure) under which the explosion points are to be determined.

## 1 Scope

This European Standard specifies a test method to determine the explosion points of flammable liquids in air. This European Standard applies to flammable liquids at atmospheric pressure and at temperatures in the range from - 50 °C to 300 °C.

This European standard must not be applied to explosives or materials which, under the test conditions, are thermally unstable liquids (e.g. polymerizing/oxidizing materials).

## 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 13237:2003, *Potentially explosive atmospheres – Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13237:2003 apply.

## 4 Principle of the test method

The test sample is placed in a cylindrical vessel and heated up to a specified temperature. After having reached equilibrium conditions between the liquid phase and the gas phase at the set temperature ignition is initiated using a series of induction sparks. It is observed whether a flame detachment or a temperature rise occurs. The temperature of the test apparatus is raised or lowered stepwise, until just no ignition is observed.

## 5 Test equipment

### 5.1 Reagents and Materials

#### 5.1.1 Flammable liquid:

The flammable liquid may be:

- a single liquid or a defined mixture of liquids;
- a process sample (of known or unknown composition).

When a pure liquid or a mixture of defined composition is used, the purity of each liquid shall be 99,8 % mol. or better. In the case of a mixture or a process sample of undefined composition the sample should be characterised so that the origin as well as the related process conditions can be identified.

#### 5.1.2 Sampling and Storage

Sampling should be carried out if possible according to the procedures given in EN ISO 3170, EN ISO 3171, EN ISO 15528 or an equivalent National Standard.

Sufficient sample volume for testing shall be placed in a tightly sealed container appropriate to the material being sampled. At the beginning of the tests, the sample container shall be filled to between 85 % and 95 % of its capacity.

The samples shall be stored in conditions that minimize vapour loss and pressure build up to avoid losing volatile components.

If possible, the sample should be stored in its container either at ambient temperature, or about 5 K below the test starting temperature (expected explosion point), whichever is the lower temperature. The sample shall be maintained at this temperature, or lower, until all tests on the sample are completed.

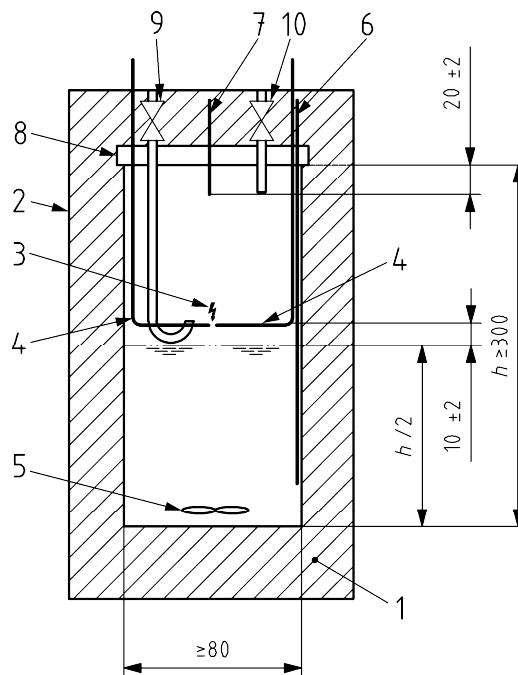
Viscous liquids, liquids which crystallise on cooling, polymerize or separate are to be stored at just above the temperature at which this occurs.

Sample containers are to be kept closed before and after sampling to avoid alterations of the sample (e.g. evaporation of volatile constituents/impurities).

## 5.2 Apparatus

Apparatus see Figure 1

Dimensions in millimetres



### Key

- |   |  |    |   |
|---|--|----|---|
| 1 | Heating chamber with air circulation and temperature regulator | 6  | Thermocouple determining the explosion point and checking the equilibrium |
| 2 | Test vessel  | 7  | Thermocouple for ignition detection and checking equilibrium              |
| 3 | Ignition source (spark)  | 8  | Tightly fitting lid allowing for pressure relief                          |
| 4 | Electrodes   | 9  | Inlet valve   |
| 5 | Stirrer  | 10 | Outlet valve  |

**Figure 1 — Explosion point apparatus; schematic**