



**NSAI**  
Standards

Irish Standard  
I.S. EN 1839:2017

# Determination of the explosion limits and the limiting oxygen concentration(LOC) for flammable gases and vapours

**I.S. EN 1839:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN 1839:2017 is the adopted Irish version of the European Document EN 1839:2017, Determination of the explosion limits and the limiting oxygen concentration(LOC) for flammable gases and vapours

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**EUROPEAN STANDARD**  
**NORME EUROPÉENNE**  
**EUROPÄISCHE NORM**

**EN 1839**

January 2017

ICS 13.230

Supersedes EN 14756:2006, EN 1839:2012

English Version

**Determination of the explosion limits and the limiting  
oxygen concentration(LOC) for flammable gases and  
vapours**

Détermination des limites d'explosivité des gaz et  
vapeurs et détermination de la concentration limite en  
oxygène (CLO) des gaz et des vapeurs inflammables

Bestimmung der Explosionsgrenzen und der  
Sauerstoffgrenzkonzentration (SGK) für brennbare  
Gase und Dämpfen

This European Standard was approved by CEN on 7 November 2016.

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-CENELEC Management Centre or to any CEN member.

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## **European foreword**

This document (EN 1839:2017) 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 document supersedes EN 14756:2006, and EN 1839:2012.

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of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by January 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN 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 Directives, see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**EN 1839:2017 (E)****Introduction**

The hazard of an explosion can be avoided by preventing the formation of explosive mixtures of gases and/or vapours with air. To do so, the explosion limits (also known as “flammability limits”) or the limiting oxygen concentration of the flammable substance need to be known. These limits depend mainly on:

- the properties of the flammable substance;
- temperature and pressure;
- size and shape of the test vessel;
- ignition source (type, energy);
- the criterion for self-propagating combustion;
- the inert gas (in case of the limiting oxygen concentration).

To obtain reliable and comparable results it is necessary to standardize the conditions for determining the explosion limits resp. the limiting oxygen concentration (i.e. apparatus and procedure). However, it is not possible to provide one single method that is suitable for all types of substances. For practical reasons, it is preferable to use apparatus that can also be used for the determination of other explosion characteristics. This European Standard, therefore, details two methods, namely, the tube method (method T) and the bomb method (method B). In general, the tube method gives a wider explosion range. Differences in the explosion limits and limiting oxygen concentration determined by the two methods can vary by up to 10 % relative.

For substances which are difficult to ignite, only a modified tube method is suitable. This is described in Annex A.

## 1 Scope

This European Standard specifies two test methods (method T and method B) to determine the explosion limits of gases, vapours and their mixtures, mixed with air or an air / inert gas mixture (volume fraction of the oxygen < 21 %) and the limiting oxygen concentration. This European Standard applies to gases, vapours and their mixtures at atmospheric pressure for temperatures up to 200 °C.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13237:2012, *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 following terms and definitions apply.

### 3.1

#### **flammable substance**

substance in the form of gas, vapour or mixtures of these, able to undergo an exothermic reaction with air or air / inert gas mixture when ignited

[SOURCE: EN 13237:2012, 3.37, modified]

### 3.2

#### **explosion range**

range of the concentration of a flammable substance or mixture of substances in air, within which an explosion can occur, respectively range of the concentration of a flammable substance or mixture of substances in mixture with air / inert gas, within which an explosion can occur, determined under specified test conditions

[SOURCE: EN 13237:2012, 3.22, modified]

Note 1 to entry: The explosion limits are not part of the explosion range

### 3.3

#### **lower explosion limit**

##### **LEL**

lowest concentration of the explosion range

[SOURCE: EN 13237:2012, 3.19.1, modified]

Note 1 to entry: Those concentrations are given at which an explosion just fails during the tests.

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