

STN	Stanovenie medzí výbušnosti plynov a pár a stanovenie medznej koncentrácie kyslíka (MKK) pre horľavé plyny a pary.	STN EN 1839 38 9722
------------	--	---------------------------------------

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

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 05/17

Obsahuje: EN 1839:2017

Oznámením tejto normy sa od 11.01.2018 ruší
STN EN 14756 (38 9726) z mája 2007

STN EN 1839 (38 9722) z augusta 2013

124692

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2017

Podľa zákona č. 264/1999 Z. z. o technických požiadavkách na výrobky a o posudzovaní zhody a o zmene a doplnení niektorých zákonov v znení neskorších predpisov sa slovenská technická norma a časti slovenskej technickej normy môžu rozmnožovať alebo rozširovať len so súhlasom slovenského národného normalizačného orgánu.

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.

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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Test methods	9
4.1 General.....	9
4.2 Method T (“tube” method).....	10
4.2.1 Detailed method.....	10
4.2.2 Reagents and materials.....	10
4.2.3 Apparatus.....	11
Table 1 — Maximum permissible uncertainty of measurement for the amount of test substance in the test mixture.....	12
Figure 1 — Scheme of the ‘tube’ apparatus for determining the explosion limits resp. Limiting oxygen concentration	12
4.2.4 Preparation of the test mixture	13
4.2.5 Procedure.....	13
4.3 Method B (“bomb” method).....	14
4.3.1 Principle	14
4.3.2 Reagents and materials.....	14
4.3.3 Apparatus.....	14
4.3.4 Preparation of the test mixture	16
4.3.5 Procedure.....	17
4.3.6 Determination of explosion limits.....	17
4.3.7 Determination of the limiting oxygen concentration	18
4.4 Determination of the limiting oxygen concentration	18
4.4.1 Metering devices and additional equipment	18
4.4.2 Procedure.....	19
Figure 2 — Short procedure scheme for the determination of the LAC	20
Figure 3 — Extended procedure scheme for the determination of the LAC.....	21
4.5 Recording of results	22
4.5.1 General.....	22
4.5.2 Determination of explosion limits.....	22
4.5.3 Determination of the limiting oxygen concentration	23
5 Verification.....	23
6 Test report.....	23
Annex A (normative) Method for determination of the explosion limits and limiting oxygen concentration of substances that are difficult to ignite	25
A.1 Background	25
A.2 Explanation	25
A.2.1 Explosion criterion — flame detachment.....	25

A.2.2	Degree of halogenation.....	25
A.3	Apparatus	25
A.3.1	Test vessel	25
A.3.2	Reagents and materials	26
A.3.3	Ignition source.....	26
A.3.4	Equipment for preparing the test mixture	26
A.4	Safety equipment.....	26
A.5	Preparation of the test mixture.....	26
A.6	Procedure	27
A.6.1	Determination of LEL and UEL.....	27
A.6.2	Determination of LOC.....	27
Annex B (informative)	Conversion of the values for the explosion limits	28
B.1	Abbreviations and symbols.....	28
B.2	Substance characteristics of air.....	28
B.3	Definitions.....	29
B.4	Mixture preparation	29
B.5	Conversion	30
Table B.1	Formulas for the conversion.....	31
Annex C (informative)	Examples to describe flame detachment	32
Annex D (informative)	Example of recommended evaporator equipment.....	33
Figure D.1	Evaporator equipment for producing test mixtures from liquid flammable substances	33
Annex E (normative)	Safety measures	35
E.1	General	35
E.2	General safety measures	35
E.3	Additional safety measures concerning the tube method	35
Annex F (informative)	Examples of the determination of the LOC	36
F.1	Example 1: determination of the <i>LOC</i> – short procedure	36
Figure F.1	Determination of the <i>LAC</i> of a ternary system of n-hexane, air and nitrogen at 100 °C and ambient pressure	36
F.2	Example 2: determination of the <i>LOC</i> – extended procedure	36
Figure F.2	Determination of the <i>LAC</i> of a ternary system of hydrogen, air and nitrogen at 20 °C and ambient pressure.....	37
Annex G (normative)	Verification.....	38
Table G.1	Data for verification of the apparatus with respect to the lower explosion limit	38
Table G.2	Data for verification of the apparatus with respect to the upper explosion limit.....	38
Annex H (informative)	Example of a form expressing the results	40

Annex I (informative) Significant Changes between this European Standard and EN 1839:2012 and EN 14756:2006	42
Table I.1 — The significant changes with respect to EN 1839:2012 and EN 14756:2006.....	42
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/34/EU aimed to be covered	43
Table ZA.1 — Correspondence between this European Standard and Annex II of Directive 2014/34/EU	43
Bibliography	44

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.

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*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN