

DIN EN 15967:2011-10 (E)

Determination of maximum explosion pressure and the maximum rate of pressure rise of gases and vapours

Contents		Page
Foreword		4
Introduction		5
1	Scope	6
2	Normative references	6
3	Terms and definitions	6
4	Test method	7
4.1	Principle	7
4.2	Apparatus	7
4.2.1	General	7
4.2.2	Test vessel	7
4.2.3	Equipment for preparing the test mixture	8
4.2.4	Ignition system	8
4.2.5	Pressure measuring system	9
4.2.6	Temperature measuring device	10
4.2.7	Safety aspects	10
4.3	Preparation and preservation of test samples	10
4.4	Procedure	11
4.4.1	Preparation of the test mixture	11
4.4.2	Determination of the explosion pressure p_{ex} , the maximum explosion pressure p_{max} , the rate of explosion pressure rise $(dp/dt)_{ex}$ and the maximum rate of explosion pressure rise $(dp/dt)_{max}$	12
4.5	Expression of results	14
4.5.1	Common aspects	14
4.5.2	Explosion pressure and maximum explosion pressure	15
4.5.3	Rate of pressure rise and maximum rate of pressure rise	15
4.6	Test report	16
Annex A (normative) Verification of maximum explosion pressure values		18
Annex B (normative) Verification of maximum rate of pressure rise		19
Annex C (normative) Smoothing of pressure-time curves		22
Annex D (informative) Conversion of the values for the flammable substance content		25
D.1	Abbreviations and symbols	25
D.2	Substance characteristics of air	25
D.3	Definitions	26
D.4	Preparation of the test mixture	26
Annex E (informative) Example of an evaporator equipment for liquid flammable substances		29
Annex F (informative) Example for test report form		31
Annex G (informative) Significant technical changes between this European Standard and the previous editions		34

Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 94/9/EC	35
Annex ZB (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	36
Bibliography	37
Figures Figure B.1 -- Plot of the rate of explosion pressure rise (dp/dt)_{ex} as a function of the test vessel volume V for H₂-air mixtures (xH₂ 35 mol %)	20
Figure B.2 -- Plot of the rate of explosion pressure rise (dp/dt)_{ex} as a function of the test vessel volume V for CH₄-air mixtures (xCH₄ 10 mol %)	20
Figure B.3 -- Plot of the rate of explosion pressure rise (dp/dt)_{ex} as a function of the test vessel volume V for NH₃-air mixtures (xNH₃ 23 mol %)	21
Figure C.1 -- Example of a raw p(t) curve showing oscillations	23
Figure C.2 -- Example of a raw p(t) curve showing oscillations	23
Figure C.3 -- Schematic diagram showing the variation of (dp/dt)_{ex} as a function of a smoothing parameter .24 Figure E.1 -- Evaporator equipment for producing test mixtures from liquid flammable substances	29
Tables Table 1 -- Rules for rounding up (dp/dt)_{ex} and (dp/dt)_{max} values	16
Table A.1 -- Values a for verification of the apparatus	18
Table B.1 -- Values a for verification of the apparatus b	19
Table D.1 -- Formulas for the conversion	28
Table G.1 -- The significant changes with respect to EN 13673-1:2003 and EN 13673-2:2005	34
Table ZA.1 -- Correspondence between this European Standard and Directive 94/9/EC	35
Table ZB.1 -- Correspondence between this European Standard and Directive 2006/42/EC	36