DIN EN 16265:2016-05 (E)

Pyrotechnic articles - Other pyrotechnic articles - Ignition devices

Contents

Page

European foreword 6

1 Scope 7

2 Normative references 7

3 Terms and definitions 8
3.1 General terms 8
3.2 Technical terms 8

4 Categories and types of ignition devices 14
4.1 Generic types 14
4.2 Subtypes 14
4.3 Conditions determining whether an article is P1 or P2 16
4.3.1 Igniters 16
4.3.2 Components for pyrotechnic trains 16
4.3.3 Pyrotechnic cords and fuses 16
4.3.4 Delay fuses 16
4.3.5 Fuzes 17

5 Requirements 17
5.1 Verification of construction and design 17
5.1.1 General 17
5.1.2 Incompatible substances 17
5.1.3 Igniters 17
5.1.4 Delay fuses 18
5.1.5 Fuzes and components for pyrotechnic trains 18
5.2 Verification of labelling and instructions for use 18
5.3 Verification of specified functioning characteristics 18
5.3.1 General 18
5.3.2 Igniters 18
5.3.3 Components of pyrotechnic trains 19
5.3.4 Delay fuses, pyrotechnic cords and fuses 19
5.3.5 Fuzes 20
5.4 Thermal stability 20
5.5 Safety features 20
5.6 Sensitivity to normal, foreseeable handling and transportation 20
5.7 Resistance to moisture 21
5.8 Resistance to mechanical damage 21
5.8.1 Leading wires of electric igniters and electrically triggered fuzes 21
5.8.2 Leading optical fibre of optical igniters and optically triggered fuzes 21
5.8.3 Crush test 22
5.8.4 Pyrotechnic cords and fuses 22
5.9 All-Fire / No-Fire levels of igniters 22
5.10 Series firings of electric igniters 23
5.11 Electrical characteristics 23
5.12 Electrostatic discharge 23
5.13 Sensitivity of pyrotechnic composition 23
5.14 Type testing 23
5.14.1 General 23

DINEN16265:2016-05 EN 16265:2015 (E) 5.14.2 Number of items to be tested 23

5.14.3 Test report 25
5.15 Batch testing 25
5.15.1 General 25
5.15.2 Sampling plans 25
5.15.3 Sample size for small batches (destructive tests) 26
5.15.4 Nonconformities 27
5.15.5 Labelling and instructions for use 28
5.15.6 Test report 28
5.15.7 Acceptance or rejection of a batch 28

6 Test methods 29
6.1 General 29
6.2 Apparatus 29
6.2.1 Calliper 29
6.2.2 Ruler 29
6.2.3 Balance 29
6.2.4 Climatic chamber 29
6.2.5 Sound level meter 29
6.2.6 Electric firing sources 29
6.2.7 Time-measuring equipment 30
6.2.8 Optical sensors 30
6.2.9 Pressure sensors 30
6.2.10 Video camera 30
6.2.11 Stills photographic camera 30
6.2.12 Microphone 30
6.2.13 Shock apparatus 30
6.2.14 Drop-test apparatus 30
6.2.15 Ohmmeters 30
6.2.16 ESD generator 31
6.2.17 Magnifying equipment 31
6.2.18 Transparent type size sheet 31
6.3 Test methods 31
6.3.1 Construction 31
6.3.2 Verification of design 31
6.3.3 Verification of labelling and instructions for use 32
6.3.4 Initiation (or reaction) time 32
6.3.5 Closed vessel test 33
6.3.6 Aspect of flame or flow of reacting species 35
6.3.7 Fire transmission 37
6.3.8 Linear burning rate or delay time 38
6.3.9 Thermal conditioning 41
6.3.10 Mechanical conditioning 41
6.3.11 Mechanical impact (drop test) 42
6.3.12 Resistance of leading wires to abrasion 43
6.3.13 Resistance of leading wires or fibres to traction 50
6.3.14 Crush test 52
6.3.15 Resistance of cords and fuses to tension 54
6.3.16 Series firing of electric igniters 55
6.3.17 Electrical resistance of electric igniters 56
6.3.18 Insulation resistance of electric igniters 56
6.3.19 Electrostatic discharge 57
6.3.20 Sensitivity testing 59
6.3.21 Water immersion test 63
6.3.22 Determination of the detonative / non- detonative characteristics 63
6.3.23 Visual examination 64

7 Minimum labelling requirements and instructions for use 64
7.1 General 64
7.2 Labelling requirements 64
7.2.1 Name and type 64
7.2.2 CE marking and identification number 64

7.2.3 Category and registration number 64
7.2.4 Age limit and specialist knowledge labelling 65
7.2.5 Net Explosive Content 65
7.2.6 Details on manufacturer or importer 65
7.2.7 "Use by" date 65
7.2.8 Printing 65
7.2.9 Marking of very small items 66
7.2.10 Ignition input 66
7.3 Instructions for use 66

Annex A (informative) Bruceton method 68

A.1 General 68
A.2 Procedure 68
A.3 Calculation of results 68
A.4 Values at 95 % confidence level 69
A.5 Example 70
A.6 Curves of G and H functions 72
A.7 Table of Student-t distribution 72

Annex B (informative) Dichotomic (or Langlie) method 74

B.1 General 74
B.2 Procedure 74
B.3 Calculation of results 75
B.4 Values at 95 % confidence level 78
B.5 Example 79

Annex C (informative) Mechanical Conditioning (Shock Apparatus) 83

Annex D (informative) Mechanical Impact Test (Drop Test) 86

Annex E (informative) Adjustment of the ESD generator 87

E.1 Apparatus 87
E.2 Procedure 88

Annex F (informative) Specification of grinding steel for wire abrasion test 89

F.1 Type 89
F.2 Material 89
F.3 Dimensions 89
F.4 Availability of abrasive strips (informative) 91

DINEN16265:2016-05 EN 16265:2015 (E) Annex G (normative) Determination of the duration of accelerated ageing test to demonstrate the correct functioning at the "use by " date 92

Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2007/23/EC on the placing on the market of pyrotechnic articles 95

Annex ZB (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2013/29/EU on the placing on the market of pyrotechnic articles 97

Bibliography 98