ISO 14520-1:2023-02 (E)

Gaseous fire-extinguishing systems - Physical properties and system design - Part 1: General requirements

Contents

Page

Foreword vi

Introduction viii

1 Scope 1

2 Normative references 2

3 Terms and definitions 3

4 Use and limitations 6
4.1 General 6
4.2 Extinguishants 6
4.2.1 General 6
4.2.2 Environmental properties 7
4.3 Electrostatic discharge 7
4.4 Compatibility with other extinguishants 7
4.5 Temperature limitations 7

5 Safety 8
5.1 Hazard to personnel 8
5.2 Safety precautions 8
5.2.1 General 8
5.2.2 For normally occupied areas 9
5.2.3 For normally unoccupied areas 10
5.2.4 For unoccupiable areas 10
5.3 Occupiable areas 10
5.4 Electrical hazards 11
5.5 Electrical earthing 12
5.6 Electrostatic discharge 12

6 System design 12
6.1 General 12
6.2 Extinguishant supply 12
6.2.1 Quantity 12
6.2.2 Quality 12
6.2.3 Container arrangement 12
6.2.4 Storage containers 13
6.3 Distribution 14
6.3.1 General 14
6.3.2 Piping 15
6.3.3 Fittings 15
6.3.4 Pipe and valve supports 15
6.3.5 Valves 16
6.3.6 Nozzles 16
6.3.7 Pressure reducing orifice assembly 17
6.4 Detection, actuation and control systems 17
6.4.1 General 17
6.4.2 Automatic detection 17
6.4.3 Operating devices 18
6.4.4 Control equipment 18

6.4.5 Operating alarms and indicators 19
6.4.6 Hold switches 19

7 Extinguishant system design 19
7.1 General 19
7.2 Specifications, plans and approvals 19
7.2.1 Specifications 19
7.2.2 Working documents 19
7.3 System flow calculations 20

7.3.1 General 20
7.3.2 A balanced and unbalanced system 20
7.3.3 Friction losses 21
7.3.4 Pressure drop 21
7.3.5 Elevation changes 22
7.3.6 Valves and fittings 22
7.3.7 Piping length 22
7.3.8 Drawings 22
7.3.9 Liquefied gases -- Specific requirements 22
7.4 Enclosures 22
7.5 Effects of noise 22
7.6 Extinguishant concentration requirements 23
7.6.1 Flame extinguishment 23
7.6.2 Inerting 24
7.7 Total flooding quantity 25
7.7.1 General 25
7.7.2 Liquefied gases 25
7.7.3 Non-liquefied gas 25
7.8 Altitude adjustment 26
7.9 Duration of protection 26
7.10 System performance 27
7.10.1 Discharge time 27
7.10.2 Extended discharge 27

8 Commissioning and acceptance 27
8.1 General 27
8.2 Tests 27
8.2.1 General 27
8.2.2 Enclosure check 27
8.2.3 Review of mechanical components 28
8.2.4 Review of enclosure integrity 29
8.2.5 Review of electrical components 29
8.2.6 Preliminary functional tests 30
8.2.7 System functional operational test 30
8.2.8 Remote monitoring operations (if applicable) 31
8.2.9 Control panel primary power source 31
8.2.10 Completion of functional tests 31
8.3 Completion certificate and documentation 31

9 Inspection, maintenance, testing and training 31
9.1 General 31
9.2 Inspection 32
9.2.1 General 32
9.2.2 Container 32
9.2.3 Hose 32
9.2.4 Enclosures 32
9.3 Maintenance 33
9.3.1 General 33
9.3.2 User's programme of inspection 33
9.3.3 Service schedule 33
9.4 Training 33

Annex A (normative) Working documents 34

Annex B (normative) Determination of flame-extinguishing concentration of gaseous extinguishants by the cup burner method 36

Annex C (normative) Fire extinguishment/area coverage fire test procedure for engineered and pre-engineered extinguishing units 42

Annex D (informative) Method of evaluating inerting concentration of a fire extinguishant 71

Annex E (normative) Door fan test for determining of minimum hold time 74

Annex F (informative) System performance verification 90

Annex G (normative) Safe personnel exposure guidelines 91

Annex H (informative) Flow calculation implementation method and flow calculation verification and testing for approvals 99

Annex I (informative) Scaling factors for Class B fuels other than heptane 103

Annex J (normative) Criteria for assessment of new extinguishants for inclusion in the ISO 14520 series 104

Bibliography 106