

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