

# DIN EN 14972-1:2021-06 (E)

## Fixed firefighting systems - Water mist systems - Part 1: Design, installation, inspection and maintenance

Contents	Page
European foreword .....	7
Introduction .....	9
1 Scope .....	10
2 Normative references .....	10
3 Terms, definitions and abbreviations .....	11
3.1 Terms and definitions .....	11
3.2 Abbreviations .....	18
4 Design .....	18
4.1 Design principal .....	18
4.1.1 General .....	18
4.1.2 General requirement .....	18
4.1.3 Full scale fire testing procedures .....	18
4.2 Design, installation, operation and maintenance manual .....	19
4.2.1 General .....	19
4.2.2 Content of the DIOM manual .....	19
4.3 Water mist systems using gas for their operation .....	21
4.4 Use of additives .....	21
4.5 Design parameters .....	21
4.6 Water and gas supply .....	21
4.6.1 Pumped systems requirements .....	21
4.6.2 Self-contained systems requirements .....	21
4.7 Compartment protection .....	21
4.7.1 General .....	21
4.7.2 Compartment .....	21
4.7.3 Fire hazard .....	22
4.7.4 Design requirements .....	22
4.8 Requirements for different types of water mist deluge systems .....	22
4.8.1 Local application systems .....	22
4.8.2 Local application systems with multiple hazards .....	22
4.8.3 Volume protection water mist systems .....	22
4.8.4 Zoned protection systems .....	22
4.8.5 Activation and control .....	22
4.9 Design of water mist automatic nozzle systems .....	23
4.9.1 Extent of protection .....	23
4.9.2 Permitted exceptions within a building .....	23
4.9.3 Material reaction .....	23
4.9.4 System design .....	23
4.9.5 Nozzle selection and positioning .....	28
4.9.6 Alarm device .....	28
4.9.7 Test connection .....	28
4.9.8 Air velocity and openings .....	28
4.10 Design of water mist deluge system .....	29
4.10.1 Nozzle selection and positioning .....	29
4.10.2 Air velocity and openings .....	29
4.10.3 Automatic shut-down .....	29
4.11 Fire detection and fire alarm systems activating the water mist system .....	29

4.11.1	<b>General requirements .....</b>	29
4.11.2	<b>Fire detection and fire alarm systems continuity .....</b>	29
4.11.3	<b>Avoiding false alarms by water mist discharge .....</b>	30
4.11.4	<b>Manual activation .....</b>	30
4.11.5	<b>Electrical detection and activation .....</b>	30
4.11.6	<b>Non-electrical detection .....</b>	31
4.12	<b>Hydraulic and pneumatic calculations .....</b>	31
4.13	<b>Water, propellant and atomizing gas supply design .....</b>	31
4.13.1	<b>General .....</b>	31
4.13.2	<b>Connection to public or town mains .....</b>	31
4.13.3	<b>Flow requirement .....</b>	32
4.13.4	<b>Maximum and minimum water pressure .....</b>	32
4.13.5	<b>Discharge operating time .....</b>	32
4.13.6	<b>Type of water supply .....</b>	34
4.13.7	<b>Availability .....</b>	35
4.13.8	<b>Housing of equipment for water supplies .....</b>	39
<b>5</b>	<b>Installation .....</b>	39
5.1	<b>General .....</b>	39
5.1.1	<b>DIOM manual .....</b>	39
5.1.2	<b>Electrical safety .....</b>	39
5.1.3	<b>High Voltage live electrical equipment .....</b>	40
5.1.4	<b>Electrical clearances .....</b>	40
5.2	<b>Nozzle .....</b>	40
5.2.1	<b>General .....</b>	40
5.2.2	<b>Automatic nozzle .....</b>	41
5.2.3	<b>Open nozzle .....</b>	41
5.3	<b>Pipe .....</b>	42
5.3.1	<b>General .....</b>	42
5.3.2	<b>Protection against mechanical damages .....</b>	42
5.3.3	<b>Protection against corrosion .....</b>	42
5.3.4	<b>Protection in seismic areas .....</b>	42
5.3.5	<b>Protection against freezing for wet pipes .....</b>	42
5.3.6	<b>Accessibility of the pipe work .....</b>	42
5.3.7	<b>Pipe bending .....</b>	42
5.3.8	<b>Water supply pipes .....</b>	43
5.3.9	<b>Pipe support .....</b>	43
5.3.10	<b>Drainage .....</b>	44
5.4	<b>Gas and water containers (where provided) .....</b>	44
5.4.1	<b>General .....</b>	44
5.4.2	<b>Location .....</b>	44
5.4.3	<b>Accessibility .....</b>	44
5.4.4	<b>Fixing .....</b>	44
5.4.5	<b>Manifolds .....</b>	44
5.4.6	<b>Temperature .....</b>	45
5.5	<b>Strainers and filters .....</b>	45
5.5.1	<b>Strainers .....</b>	45
5.5.2	<b>Nozzle filter .....</b>	45
5.5.3	<b>System filters .....</b>	45
5.6	<b>Valves .....</b>	45
5.6.1	<b>General .....</b>	45
5.6.2	<b>Identifications .....</b>	45
5.6.3	<b>Accessibility .....</b>	45
5.6.4	<b>Securing and monitoring valves .....</b>	45
5.6.5	<b>Shut-off valves .....</b>	45
5.6.6	<b>Control valves .....</b>	46
5.6.7	<b>Check and non-return valves .....</b>	46
5.7	<b>Pressure gauges .....</b>	46
5.8	<b>Test connection .....</b>	46
5.8.1	<b>Test connection for automatic water mist systems .....</b>	46
5.8.2	<b>Test connection for water mist deluge system .....</b>	46
5.9	<b>Electrical installation .....</b>	46

5.9.1	Electrical power supply .....	46
5.9.2	Fire detection and fire alarm system .....	46
5.10	System monitoring and alarms .....	46
5.10.1	General .....	46
5.10.2	Alarms .....	47
5.10.3	Remote signalling .....	47
5.11	Water mist system supply, including additives .....	48
5.11.1	General .....	48
5.11.2	Water quality .....	48
5.11.3	Additives .....	48
5.11.4	Water supply .....	48
5.11.5	Test devices .....	51
<b>6</b>	<b>Water mist system components .....</b>	<b>51</b>
6.1	General .....	51
6.1.1	Requirements for components .....	51
6.1.2	Pressure rating .....	51
6.2	Nozzle .....	51
6.3	Piping and fittings .....	52
6.3.1	Pipework .....	52
6.3.2	Fittings .....	52
6.4	Flexible hoses .....	53
6.4.1	Hose length .....	53
6.4.2	Hoses to be used in areas exposed to fire class B fires .....	53
6.4.3	Hose rating .....	53
6.5	Pipe supports .....	53
6.6	Valves .....	53
6.6.1	Shut-off valves .....	53
6.6.2	Pressure regulating valves .....	54
6.6.3	Check and non-return valves .....	54
6.6.4	Drain/fill valves .....	54
6.6.5	Safety valves .....	54
6.7	Control valves .....	54
6.7.1	General .....	54
6.7.2	Strainers and filters .....	54
6.8	Flow switches and flow transmitters .....	55
6.9	Pressure switches and pressure transmitters .....	55
6.10	Supply components for self-contained systems .....	55
6.10.1	General .....	55
6.10.2	Excess pressure .....	55
6.10.3	Pressure container marking .....	55
6.10.4	Design temperature .....	55
6.10.5	Gas cylinders and actuation valve .....	55
6.10.6	Cylinders and storage containers for water .....	55
<b>7</b>	<b>Main pumps for water mist systems .....</b>	<b>56</b>
7.1	General .....	56
7.2	Pump set .....	56
7.2.1	Operation .....	56
7.2.2	Overpressure .....	56
7.2.3	Centrifugal pumps .....	56
7.2.4	Positive displacement pumps .....	56
7.2.5	Pump driver .....	56
7.2.6	Pump Cooling .....	56
7.2.7	Pump set anchoring .....	56
7.2.8	Positive displacement pump filters .....	57
7.2.9	Pump set coupling .....	57
7.2.10	Valves and accessories .....	57
7.2.11	Suction pipe .....	57
7.2.12	Discharge pipe .....	58
7.2.13	Pump set rating .....	58
7.2.14	Pump set operation .....	58

7.2.15	Electrically driven pump sets .....	59
7.2.16	Diesel engine driven pump sets .....	61
8	Testing, acceptance and commissioning .....	65
8.1	Acceptance test for water mist systems .....	65
8.2	Test criteria .....	65
8.3	Site commissioning test .....	66
8.4	Completion certificate and documents .....	66
9	Inspection and maintenance .....	67
9.1	Inspection .....	67
9.1.1	Inspection schedule .....	67
9.1.2	User's program of inspection .....	67
9.2	Inspection and maintenance routines .....	67
9.2.1	Weekly routine .....	67
9.2.2	Monthly routine .....	68
9.2.3	Quarterly routine .....	68
9.2.4	Half-yearly routine .....	69
9.2.5	Annual inspection .....	69
9.2.6	Three-yearly routine .....	70
9.2.7	Five-yearly routine .....	70
9.2.8	Ten-yearly routine .....	71
9.2.9	Maintenance schedule .....	71
9.2.10	User's program of monitoring .....	71
9.2.11	Training .....	71
10	Documentation .....	71
10.1	Installation documentation .....	71
10.2	Documentation for acceptance of design, installation and commissioning .....	72
<b>Annex A (informative) Guideline for developing representative fire test protocols for water mist systems .....</b>		<b>74</b>
A.1	General .....	74
A.2	Evaluation of the fire hazard .....	74
A.3	Evaluation of the compartment conditions .....	75
A.4	Determining the performance objective .....	76
A.5	Setting up the fire test procedure .....	76
A.6	Carrying out the test .....	78
A.7	Documentation and interpretation of test results .....	78
A.8	Example for fire test report .....	78
<b>Annex B (informative) Area of operation for typical automatic nozzle water mist systems .....</b>		<b>80</b>
B.1	General .....	80
B.2	Typical system component layouts .....	80
B.2.1	System components gridded layout .....	80
B.2.2	System components terminal layout .....	81
B.2.3	System components looped layout .....	81
B.3	AOs to be determined by full hydraulic calculation .....	82
B.4	Most unfavourable and most favourable AO demands and the pump supply curve .....	84
B.5	Calculating the number of nozzles and actual area of AO .....	85
B.6	Method of calculating the area per nozzle .....	87
B.6.1	Regular spacing .....	87
B.6.2	Irregular spacing .....	88
B.7	Shape of the AO .....	90
B.7.1	General .....	90
B.7.2	Shape of the hydraulically most unfavourable location .....	91
B.7.3	Shape of the hydraulically most favourable location .....	94
B.8	Length of the AO .....	96
B.9	Relocation of section valves .....	97
B.10	Calculating the nozzles operating in the most unfavourable AO .....	97
<b>Bibliography .....</b>		<b>99</b>