
Water Mist is a form of active fire protection that, like all extinguishing technologies, can be effective in the protection of certain, but not all risks.

The questions herein are intended to elicit information that could be useful in providing evidence of the “equivalence” of such systems to alternative fixed firefighting systems and their associated published and recognised standards.

It is recommended that one of these forms be completed for each risk to be protected by water mist system(s). This form is to be used to capture and record some of the data required to support a reasonable claim of “equivalence” and to provide evidence of sound engineering practice. In Fire Engineering Documents ‘equivalency’ must be demonstrated BOTH in terms of firefighting capability AND reliability.

Do not use this form for building compartment protection systems, either of the ‘Deluge’ open-head type, or ‘thermally-actuated’ closed-head type (separate forms are available for these systems, IQ 1 & IQ 3, respectively).

Form: IQ 2

Version 4.0 April 2020

IQ 2

Water Mist Questionnaire: Local Application Protection

To be completed at the design and proposal stage of suppression system planning

Issued by: **Ins. Co./Trade Ass/AHJ name in here**

DOCUMENT SCOPE: Local Application Protection

For the purposes of this exercise ‘Local Application’ refers to installations protecting individual items of equipment whose correct function has NO RELIANCE upon any properties of, or even the existence of, the building compartment boundaries in which the protected item may be located.

NOTE: COMPLETION GUIDANCE NOTES

Completion of this form neither guarantees system performance nor system acceptance by the issuer. It is strongly recommended that each completed form and supporting data be reviewed by an independent expert.

IMPORTANT NOTICE

This document has been developed through the RISCAuthority and published by the Fire Protection Association (FPA). RISCAuthority membership comprises a group of UK insurers that actively support a number of expert working groups developing and promulgating best practice for the protection of people, property, business and the environment from loss due to fire and other risks. The technical expertise for this document has been provided by the Technical Directorate of the FPA, external consultants, and experts from the insurance industry who together form the various RISCAuthority Working Groups. Although produced with insurer input it does not (and is not intended to) represent a pan-insurer perspective. Individual insurance companies will have their own requirements which may be different from or not reflected in the content of this document.

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COMPLETION GUIDANCE NOTES:

This questionnaire is designed to elicit technical information required to underpin a satisfactory fire protection system design. As such, it covers many areas of system design. To avoid confusion as to what information is required at each question, it is suggested that the questionnaire is read in its entirety prior to commencing completion.

Where multiple discrete suppression systems are proposed it will simplify the process of completing the questionnaire, to complete a separate questionnaire for each system.

In all cases, if insufficient space is provided to answer the questions in the questionnaire, continue on separate sheets. If separate sheets are used, indicate this is the case and record the document number, title, issue number and date at the location of the question.

IMPORTANT NOTE

Failure to be able to provide answers to any of the questions might demonstrate there to be a shortfall in the knowledge and evidence that FPA / RISCAuthority consider to be appropriate to the implementation of a quality suppression / extinguishing system.

Scoring matrix for completion by Insurer / Trade Association or AHJ

The Table below is for completion by the Insurer / Trade Association or AHJ and NOT by those proposing or designing the watermist system. The matrix is made visible to ensure those completing the form to assist them understand in advance the key elements considered fundamental to the delivery of a quality watermist systems.

Questions – For the risks described:	Answer
1. Is watermist, as described in this completed form, the ideal suppression technology to use?	Yes / No
2. Are the extent of coverage and maximum area(s) of operation appropriate to the fire threat(s)?	Yes / No
3. Are the referenced standards, approvals, and third-party bodies appropriate to this protection scenario?	Yes / No
4. Where required in fire engineered solutions, has ‘equivalency’ for BOTH <u>Performance</u> (ability to put out fire) and <u>Reliability</u> (ability to actuate and perform optimally upon a fire starting over time) been demonstrated against i.e. a BS Sprinkler System.	Yes / No
5. Does the fire test evidence provided adequately ensure system capability in terms of the risk (realistic of the protection scenario), scale, detection method, ceiling height, fuels, ventilation etc.?	Yes / No
6. Where actuation is by thermally-sensitive bulb – has the test evidence been produced on the same basis and at the same scale (height and area)?	Yes / No
7. With reference to 5 – has due consideration been given to all operating modes of the equipment or compartment (i.e. normal, in maintenance, fault, in cleaning, dirty (grease build up etc.) temporary / backlog storage etc.) to ensure system 100% viability?	Yes / No
8. Is the detection method and equipment appropriate to ensuring the system actuates before the fire grows to a size that might be ‘unmanageable’ or result in excessive damage?	Yes / No
9. Are the interlocks with fuel, ventilation, conveyancing etc. appropriate to ensuring the system has the best opportunity to function correctly?	Yes / No
10. Within the discharge period, will the temperature of all fuels, and surfaces in contact with them, be below the Auto Ignition Temperature of the fuel to ensure re-ignition by this mechanism does not occur.	Yes / No

11. Have sufficient measures been taken to mitigate single-point failure modes?	Yes / No
12. Are water supplies adequate in terms of duration, resilience, and protection from freezing?	Yes / No
13. Have sufficient measures been taken to ensure watermist heads will not block either by particulate contamination, corrosion, mineral deposit, or foreign coating?	Yes / No
14. Are all components of the system approved by a 3 rd party certifying body?	Yes / No
15. Is the 'performance objective' of the system correctly assessed together with an appreciation of any follow-on actions required to satisfactorily bring the fire threat to a conclusion?	Yes / No
16. Where the performance objective is 'suppression' or 'control' rather than extinguishment – are procedures to ensure necessary follow-on actions occur robust?	Yes / No
17. Where manual operation of the system is an option have appropriate instructions been given to the end-user and are means in place (training and signage) to ensure this is appropriately communicated?	Yes / No
18. Is the hydraulic design correct and is the effective duration correctly calculated for the least hydraulically favourable head?	Yes / No
19. Have roles and responsibilities for all decisions of design and installation of the system been correctly identified?	Yes / No
20. Is the 3-year watermist head function test period understood and programmed into the system's maintenance schedule	Yes / No
21. In the event that the system manufacturer has ceased trading, has the resupply of parts that might need replacing (following system operation, damage, or failed test) that are specific to the certification of the system (such as the watermist heads [3-years]) been considered and a plan for this eventuality made?	Yes / No

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Terminology

The following terms may be used on an interchangeable basis:

- Water mist head / Nozzle
- Building compartment / Compartment / Room

1. Location

1a. Full address(s) of premises with risk(s) to be protected:

2. Roles and responsibilities – System design

2a. Entity responsible
for the design of the
water mist system

Company or
organisation's name

Responsible person's
name & job title

Company or
organisation's Address

3. Roles and responsibilities – System Installation

3a. Entity responsible
for the installation of the
water mist system (if
different to question 2a
above)

Company or
organisation's name

Responsible person's
name & job title

Company or
organisation's Address

4. Description of the water supply		
Water source: (please tick)	Town main	
	Stored water	
	Stored water relying on infill	
Stored water volume (if applicable)	dm ³	
Infill rate (if applicable)	dm ³ /min	
Date and time of infill pressure and flow rate test:		
Results of infill pressure and flow rate test:		
Flow rate	dm ³ /min	
Flowing pressure	Bar	
System water supply pressure at commencement of discharge:	Bar	
System water supply pressure at end of effective discharge ¹ :	Bar	
Give details of water supply quality and any special treatment required (e.g. potable water, filtered water, de-mineralised water, or any other requirements):		
Give full details of any water additives required and proportioning method or devices (composition, MSDS, required concentration, shelf life, approvals, disposal, etc.):		
Provide details of any required energy source for water supplies:		
Where electrical power supplies are used reference (drawing number, title, date, issue number) the circuit diagrams provided which identify sources, interdependencies and all isolation means:		

¹ Pressure at end of effective discharge – The minimum pressure below which the least hydraulically favourable nozzle will no longer supply extinguishing media at a rate that will meet the performance objective as outlined in Question 10; as proven by supporting experimental fire tests detailed in Question 17.

Identify all water supply connections, for fire protection or other purposes, which may draw water from the supply and how the demands are managed:

If the water supply is connected to two or more local application systems or zones provide details of how the water supplies are managed and how many local application systems or zones can be supported in simultaneous operation:

Are freezing conditions ever likely to occur that could affect the water mist protection system? Is the user aware of the need to prevent the equipment experiencing conditions where freezing of firefighting media could occur? How is this to be communicated to them?

5. Water mist component supplier(s)

5a. Give the name and address of the water mist component supplier(s):

6. Water mist component details for critical and key components

Note: System Installation Standards and approvals are dealt with at 15.

Component (Make / Model)	Approval details (standard and 3 rd party certifying body)
Pumps:	
Water storage cisterns or vessels:	
Compressed gas supplies:	
Valves:	
Actuators:	
Pipework and fitting (include details of materials of construction):	
Pipe fixings:	
Nozzles – give details at 7:	
Detectors:	
Other components critical to system function (not already detailed in this section or section 12):	

7. Nozzles / Watermist Heads		
7a. Type of nozzles: (please tick)	Open nozzles	
	Open nozzle with protective covers	
	Automatically activated nozzles (i.e. thermally activated bulbs)	
	Automatically activated nozzles with protective covers	
7b. Do all of the nozzles used on the system have identical hydraulic and distribution characteristics?		Yes / No
7c. List the nozzle k factors used:		
<p>7d. Record the smallest cross-sectional area found in any nozzle water way:</p> <p>Calculate the diameter of the largest sphere that will pass through the waterway and its cross sectional area:</p>		
7e. Record the number of nozzles present on the system:		
7f. Record the maximum number of nozzles that will discharge water during operation in a fire:		
7g. If the system is zoned, give details of the zones (nozzles per zone, number(s) of zones expected to operate simultaneously):		

7h. If the number of operating nozzles (see at 7f) is less than the number of nozzles on the system (see at 7e) explain the design rationale for this number of operating nozzles:

7i. If more than one nozzle model, type or size are used on the system explain why different nozzles are used and describe the measures taken that ensure the correct nozzles are fitted at each location (the nozzle selection should be consistent with the supporting fire test evidence):

7j. Corrosion resistance and material compatibility. Give details of the materials used in the nozzles (metal type and classification). Confirm it is compatible with extinguishing agent and any chemicals it will be exposed to in the protected risk:

7k. 3-year functional watermist head testing requirement. BS 8489-12016 demands that the function of watermist heads is tested every 3-years (for sprinklers this is 25 years). This requirement demands the removal of 20 heads, or 1% of the system population, whichever is greater. Give details of:

How will the system stay in service following head removal?

What will be the cost associated with the purchase of replacement heads?

7l. In the event of the system manufacturer ceases trading, has the resupply of parts that might need replacing (following system operation, damage, or failed test) that are specific to the certification of the system (such as the watermist heads [3-years]) been considered and a plan for this eventuality made?

[Note: in sprinkler systems the heads are interchangeable between manufacturers' products and the approvals / certification of the system can be retained]

Commentary: Sections 8, 9 and 12 in particular highlight the critical need for the fire protection system supplier, equipment supplier and end user to all co-operate in describing and evaluating the risk and in response develop a cohesive and holistic risk management strategy, which recognises the relationship between the area or object(s) to be protected, the water mist system, other essential fire protection measures and the actions of the user.

8. Fire hazard assessment and protection details

8a. General description of the object or process, area or volume requiring protection:

8b. Give the reasons why a suppression system is required; state if there is a history or potential for fires:

8c. Identify combustible and hazardous materials within the space or area to be protected. Include an estimate of the quantity of materials involved. (All combustible materials within the protected space or area should be identified, including goods, raw materials or ingredients, process or cooking media, conveyance systems, packaging, bearers and any combustible parts of machinery):

8d. Identify any hazardous materials which are not combustible but may be involved in a fire:

8e. Are any combustible material surfaces within the water mist protected area or volume likely to be shielded from the direct impingement of water droplets (shielding from the equipment or goods in any foreseeable condition)?

8f. Identify all powered machinery, equipment and energy sources (fuel, heat, motive, process, etc.) with any relationship to the protected equipment, space or volume. Give details of how these functions effects the performance of the suppression system (control of these systems will be described in 13):

8g. Identify natural or forced ventilation pathways within, to or from the protected space or area. Give details of how this effects the performance of the suppression system (control of these systems will be described in 13):

8h. Give details of any automated movement of combustible materials, including combustible components of any transportation or conveyance system within the protected space (If a process requiring protection involves automated transport of combustible materials or flammable liquid flows within the protected space (e.g. a conveyor), state velocities and mass flow rates): Give details of how this effects the performance of the suppression system (control of these systems will be described in 13):

8i. Identify any known potential ignition sources (identify equipment or processes that generate high temperatures, use naked flames, sources of fuel or energy, etc.):

8j. Give the external dimensions of the water mist protected object, space or area:

8k. Is the protection system designed to work in all operating (and non-operating) modes of the equipment (i.e. in all operational modes, in maintenance mode, in cleaning mode, in anticipated fault conditions (determined by fault handling capability of the protected equipment and the answers to question 8b), etc.):

8l. What steps are taken to compensate for any adverse operating conditions the protected equipment creates (such as build-up of dirt, grease, contaminants, vibrations, etc.):

8m. Is the protected risk an attended or unattended item (or both)? Are any actions expected of the user with respect to the protected risk upon discovery of a fire (i.e. manual suppression system release, de-activation of any associated equipment, etc.)? How are these design considerations documented and communicated to the user?

9. Compartment details

9a. Detail the dimensions of the compartment(s) in which the local application system and the protected objects, space or area are located:

9b. Detail the nature of the compartment construction and fire separation from other parts of the works (e.g. construction methods and fire resistance rating):

9c. Other than the protected object, space or area described in 8 what other activities take place within the compartment(s) detailed at 9a. (Include details of processes or stored goods within the compartment and their location relative to the protected object, space or area):

9d. Give details of any other fire safety provisions protecting the compartment(s) described in 9a to 9c (identify any fixed automatic fire protection such as fire detection, gaseous or sprinkler protection which is additional to the object or space protection):

10. Performance objective of the water mist system as detailed in this questionnaire

Objective: (please tick)	Fire control	
	Fire extinguishment	
	Fire suppression	
	Other	

10a. If 'other', describe here:

10b. If 'Fire Extinguishment' is not the performance objective describe below what additional actions are required to fully mitigate the fire threat and how this has been communicated to the end-user

11. Effective water discharge time

11a. What is the minimum duration of effective water discharge² for the assumed maximum number of nozzles operating (if zoned, provide details for all zones and combinations):

11b. Provide the methodology used to determine the effective water discharge time:

(Continue on separate sheets if necessary. If separate sheets are used record the document number, title, issue number and date here)

12. System activation

12a. If the system uses automatically activated individual nozzles describe the method of actuation and their thermal sensitivity rating:

² Pressure at end of effective discharge – The minimum pressure below which the least hydraulically favourable nozzle will no longer supply extinguishing media at a rate that will meet the performance objective as outlined in Question 10; as proven by supporting experimental fire tests detailed in Question 16.

12b If the system is a deluge or pre-action system describe the detection system used to activate the water mist system and provide a piping and instrumentation diagram (P&ID) which includes the detection system. Provide details of the operating logic of the detection and control system. Where the detection system relies on electronic components such as detectors and control panels, identify which standards are fully or partially complied with and details of any third party certification held. Provide details of the sensitivity of the detection system:

12c Give details of alarms (include full configuration details: logic, delays or states (i.e. pre-alarm), repeaters, location of sounders and transmission of alarms, etc.):

12d If there is automated movement of combustible materials (see 8h) describe how smouldering or burning materials in motion will be detected and the actions that follow:

12e. Provide an estimate of the fire size(s) or condition(s) that will result in detection:

12f. Can the system be manually operated?

Yes / No

If 'yes' provide details of the manual controls, the considerations this gives rise to in terms of the end users 'SOPs' (Standard Operating Procedures) and how these considerations will be effectively communicated to the end user:

12g. Can the system be manually disabled?	Yes / No
<p>If 'no' provide details of any maintenance considerations this creates.</p> <p>If 'yes' provide details of the controls to disable the system, including: the level of control over system disablement, considerations this gives rise to in terms of the end users 'SOPs' (Standard Operating Procedures), when it is appropriate or necessary to disable the system, the impact this has on the protected area or volume's safe operation, mitigating steps that should be taken when the system is disabled and the means by which all these considerations effectively communicated to the end user.</p>	
<p>12h. Identify all dependencies³ and interdependencies⁴ between the water mist system, the protected space, object or area, services, compartmentation or structure.</p>	

³ Dependencies – controlled by another

⁴ Interdependencies – dependent on each other

13. Ventilation and Interlocks

13a. Provide details of ventilation systems (including smoke ventilation) present in the compartment in which the water mist protected equipment is situated. Will any ventilation system be operational during water mist system operation? Give details of any interlock controls. (Continue on separate sheets if necessary. If separate sheets are used record the document number, title, issue number and date here)

13b. Possible natural and natural forced (wind) ventilation sources. Provide details of doors, windows, shutters, other openings, and any necessary controls upon their use.

13c. Provide a full description describing any interlocks provided to enable the system to perform optimally:

Electrical power	Yes / No / NA
Gas supply	Yes / No / NA
Other fuels	Yes / No / NA
Forced ventilation (fans)	Yes / No / NA
Natural ventilation (doors and windows)	Yes / No / NA
Ductwork dampers and fire barriers (physical barriers to block fire spread)	Yes / No / NA
Conveyors (to stop spread of fire by transport systems)	Yes / No / NA
Rotating machinery	Yes / No / NA
Hot machinery	Yes / No / NA
Other _____	Yes / No / NA
Other _____	Yes / No / NA

14 System design

14a. During the effective water discharge time is the flow through the pipework a single phase liquid (water only) or a two phase liquid gas mixture (water and pressurising gas)

Phase:	Single phase liquid	
(please tick)	Two phase liquid and gas mixture	

14b How are pipes sized and how are flows through the pipework and nozzles determined:

14c. What is the design water flux rate for the system?

14d. What is the minimum allowable water flux rate and over what area or volume?

14e. By what means were the water flux rate requirements (stated for 13c and 13d) determined:

14f. How are the water flux rates generated by the installed system to be verified:

14g. Where two phase flow is involved how are the discharges of the two phases balanced or regulated between nozzles on the system, ensuring a proportional distribution of water between all the nozzles:

15. Compliance	Delete applicable
15a. Is the system required as part of the strategy to meet statutory health and safety or building regulatory requirements?	Yes / No
15b. Are any trade-offs / compensatory features proposed as a result of the presence of the system?	Yes / No

If yes to 15b, provide full details. Where part of a fire engineered solution please provide details of the fire strategy:

15c. If there is a remit for this system to be '**equivalent**' to i.e. a BS sprinkler system – demonstrate how 'equivalency' for BOTH Performance (ability to put out fire) and Reliability (ability to actuate and perform optimally upon a fire starting over time) has been assured.

16. System Approvals

Note: Component Standards and approvals are dealt with at 6 & 7.

16a. Which Installation Standard or document is the system designed to and compliant with?

16b. Provide details of any deviations from the standard(s) identified in 15a:

16c. Who is the provider of the third party certification of the system installation (e.g. Lloyds, LPCB, Warrington, VdS, FM etc.):

Commentary and Recommendations on fire test evidence:

- *Fire testing shall be undertaken by an independent test body.*
- *The test body shall be accredited by a national accreditation body for undertaking such work.*
- *Fire test evidence shall be presented in formal test reports issued by the independent test body.*
- *Test reports shall be presented in full.*
- *Testing shall be full-scale and matched to the nature of the risk to be protected and nozzle actuation method⁵ (i.e. fat fryer testing is suitable for fat fryer protection, transformer testing is suitable for transformer protection).*
- *There shall be full traceability between fire testing and subsequent application (component specification, types, configurations and designs, system design, nature of risk).*
- *The limitations of testing shall not be exceeded in application (i.e. size and nature of risk, amount of fuel load, ventilation, inherent thermal energy in the risk, etc.).*

17. Fire test evidence

17a. Provide the accredited third party test report(s) that demonstrate the system performance in a directly representative scenario for which protection is to be provided⁵ (reference report(s) here, append full reports to this questionnaire. If different reports evidence different aspects of a systems performance, explain here):

⁵ Test evidence based on the performance of 'Deluge' system operation cannot be used in support of systems that used thermally actuated watermist heads.

18. Pressure system regulations	Delete applicable
18a. Will the installed system require a written scheme of examination to comply with the pressure system regulations 2000?	Yes / No
18b. If 'yes' to Question 18a, have the system users'/owners'/responsible persons' been made aware of their responsibilities?	Yes / No
<p>18c. If 'yes' to Question 18b, and the provision of a written scheme of examination is part of the system supply contract, provide details of the competent person(s) certifying the written scheme of examination and undertaking any identified examinations before the system is first used:</p>	
<p>Notes: The Pressure Systems Safety Regulations 2000 came into force on 21 February 2000. Users and owners of pressure systems are required to demonstrate that they know the safe operating limits, principally pressure and temperature, of their pressure systems, and that the systems are safe under those conditions. They need to ensure that a suitable written scheme of examination is in place before the system is operated. They also need to ensure that the pressure system is actually examined in accordance with the written scheme of examination. A written scheme of examination is a document containing information about selected items of plant or equipment which form a pressure system, operate under pressure and contain a 'relevant fluid'. The term relevant fluid is defined in the Regulations and covers compressed or liquefied gas, including air, at a pressure greater than 0.5 bar (approximately 7 psi).</p> <p>For further information see:</p> <p>HSE, 2009. <i>Safety of pressure systems - Pressure Systems Safety Regulations 2000 - Approved Code of Practice</i>. 4th edition. London, UK: HSE.</p> <p>HSE, 2002. <i>Guide INDG178 - Written schemes of examination - Pressure Systems Safety Regulations 2000</i>. 2nd edition. Suffolk: HSE Books.</p> <p>HMSO, 2000. <i>The Pressure Systems Safety Regulations SI 2000/128</i>. London, UK: Great Britain.</p>	

19. System operation and maintenance

19a. Provide details of the user manual/instructions, drawings and data to be provided to the end user:

19b. Provide full details of the system maintenance requirements (this should also include details of the impact maintenance has upon the protected risk and at least direct the user to appropriate SOPs):

19c. Provide details of company(s) competent to undertake maintenance:

19d. System re-instatement; Following an operation, what steps must be undertaken to re-instate the system? What spare parts and consumables should be stored locally (heads, detectors, agent, propellant, etc.)? How long does re-instatement take and by whom should it be undertaken?

20. Resilient design features

20a. Please indicate below any design features in-built to prevent single-point failures within key system components from rendering the system ineffective (such as duplication and automatic reconfiguration):

Loss of power (electric, stored gas etc.)	Yes / No / NA
Pump failure	Yes / No / NA
Failure of detection device	Yes / No / NA
Loss of water supply	Yes / No / NA
Failure of main isolation / actuation valve	Yes / No / NA
Failure of interlocks as specified in 11c	Yes / No / NA
Nozzle blockage via contamination of water supplies (i.e. particulates)	Yes / No / NA
Other _____	Yes / No / NA
Other _____	Yes / No / NA
Other _____	Yes / No / NA
Other _____	Yes / No / NA

If 'yes' to any of 20a please describe in full:

21. Any other relevant data

21a. Details of all drawings, calculations and documents supplied with this questionnaire which have not already been referenced in previous questions above, or that contain additional parts that require consideration:

22. Declaration

I am authorised to represent the company identified below (22d) making this submission. I have supplied full and accurate information as required by this form.

22a.
Name
(please print)

22b.
Signature

22c.
Date

22d.
Representing
(Please print
company name)

Annex A: Minimum supporting documentation which must be supplied with the completed questionnaire

At least the documentation identified in A1 to A4 shall be provided with this questionnaire. Any drawings shall be at a scale of not less than 100:1:

- A.1 A general specification for the system;
- A.2 A block plan of the premises showing:
 - a) Compartmentation;
 - b) The installation and the details of the protected object, space or area;
 - c) The extent of the protection;
 - d) A cross-section of the protected object, space or area
 - e) Location and rating of fire boundaries.
 - f) Water supply location(s)
- A.3 Design and operation manual for the watermist system.
- A.4 The following documentation shall be provided to support the questionnaire as part of the design process.

A summary schedule, which shall include the following:

- a) the name of the project;
- b) drawing and document references including issue number, issue dates and titles;
- c) the installation type(s);
- d) control valve(s) details, including nominal diameter, and reference number(s)
- e) the number of nozzles controlled by each control valve; and

Layout drawings of the water mist installation(s), the drawings shall include:

- a) the north point indication;
- b) the level of protection provided for each protected enclosure;
- c) constructional details of floors, ceilings, roofs, partitions, exterior walls in close proximity to the protected object, space or area;
- d) indication of obstructions which may adversely influence performance of water mist nozzles;
- e) water mist nozzles;
- f) the fire detecting means and their operating set point;
- g) location and type of control valve sets;
- h) fire alarms, flow alarms, sounders and alarm panel;
- i) pressure switches;
- k) locations and sizes of any subsidiary stop valves;
- l) the drainage slope of the pipework;
- m) the locations of all drain and test valves;
- n) pipework and pipe fitting specifications and materials;

- o) a key to the symbols used on drawings; and
- p) a schedule of water mist nozzles, their fire detection means and the areas they protect.

A.5 Pipe work design

Details shall be provided which show how the pipe sizes will be determined;

If the pipe sizes are determined by calculation, provide:

- a) the calculation method or computer programme name;
- b) the date of the data provided;
- c) the internal diameter of all pipes ;
- g) water mist nozzles;
- h) location and type of control valves;
- i) flow alarms, sounders and alarm panel;
- j) pressure switches;
- k) locations and sizes of any subsidiary stop valves or selection valves;
- l) the drainage slope of the pipework;
- m) the locations of all drain and test valves;
- n) a key to the symbols used on drawings.

A.6 Water supply drawings

The drawings shall show the water supplies and the pipework up to the control valves. The position of any stop valves, non-return valves, pressure reducing or controlling devices, water meters and any connections for other services shall be shown.