



NYC Department of Buildings
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Report of Materials and Equipment Acceptance Division

Pursuant to Administrative Code Section 27-131, the following equipment or material has been found acceptable for use subject to the terms and conditions contained herein.

MEA 28-99-E Vol. III

Manufacturer: Marioff Oy, P.O. Box 25, FIN-01511 Vantaa, Finland
(Represented in the USA by Marioff, Inc., 611-M N. Hammonds Ferry Rd., Linthicum Heights, MD 21090).

Trade Name(s): HI-FOG

Product: Water Mist Fire Protection Systems.

Pertinent Code Section(s): Reference Standard RS-17, §27-133, and NFPA 750.

Test(s): FMRC Fire Performance Class 5560.

Laboratory: Factory Mutual Research, 1151 Boston Providence Turnpike, P.9.
Box 9102, Norwood, MA. 02062.

Test Report(s):

1. Approval Report: Factory Mutual Report Project ID. 3000430 dated June 5, 2001 (Model HI-FOG water mist system for the protection- of combustion turbines, machinery spaces; and special hazard machinery spaces in enclosures with volumes up to, and including, 17,645 cubic feet) Technical Report (Test Data) VTT test report number RTE10312/98 dated April, 1998.
2. Approval Report: Factory Mutual Report Project ID. 3000431 dated June 6, 2001 (Model HI-FOG water mist system for the protection of light hazard occupancies) Technical Report (Test Data) VTT test report number RTE10322/98 dated August, 1998 and RTE11165/99 dated October, 1999.

Description - 1. GPU-Gas Driven Pump Unit: The HI-FOG water mist distribution systems are of twin fluid, single- pipe type employing water as the liquid suppressant and nitrogen both as the atomizing medium and the gaseous suppressant. The systems are suitable for interface with Factory Mutual (FM) approved detection, control and release facilities provided by others. The systems are either self-contained or to be connected to an external water supply. Each system arrangement is configured using a water supply to provide the total suppressant requirement typically for at least 30 minutes for the protected volume. The systems are arranged for double, yet continuous, discharge applications. The system operation does not require any electrical power.

Electrical power is applied for controlling, monitoring and signaling of the system performance in the client's contract specific requirements.

The basic system consists of the following main components: a Gas-driven Pump Unit (GPU) which comprises a mechanical, piston-type pump fully interconnected and powered by a pressurized gas cylinder unit, spray heads for discharging of water mist, stainless steel piping, control valves and an electrical control, monitoring and signaling system.

The distribution network is isolated from the pump unit by a control valve or - if divided in sections - by several control valves. In the standby position, all control valves are closed. A standby pressure of about 360 PSI (25 bar) is maintained in the system up to the control valves by a pneumatic pump. The discharge is actuated when a control valve is opened manually or, optionally, electrically from a control panel. The electric valves can be connected to a fire detection system for automatic activation. At activation, the standby pressure creates a flow of water through the relevant control valve. The water flow induces a pressure drop that opens the hydraulically operating nitrogen cylinder primary valve that starts the pump and opens the pneumatic valves of the first bank of cylinders. The pump raises the pressure in the relevant section and a pressure monitoring switch generates an indication signal to the control panel.

The system components are described in detail and are identified by part number in Marioff design, installation and maintenance manual document reference MO/PES/02/DIOM/FM/98, rev 1.3, dated June 2001 cited in paragraph 5.2 of the Factory Mutual Approval Report.

Description - 2. GPU-Gas Driven Pump Unit: The HI-FOG water mist distribution systems are of twin fluid, single-pipe type employing water as the suppressant and nitrogen or air as the atomizing medium. The systems are either self-contained or to be connected to an external water supply. Each system arrangement is configured using a water and gas supply to provide the total suppressant requirement typically for at least 30 minutes for the required nine sprinklers. The systems are arranged for double, yet continuous, discharge applications. The system operation does not require any electrical power. Electrical power is supplied for controlling, monitoring, and signaling of the system performance as described in the Client's contract specific requirements.

The basic system consists of the following main components: a Gas driven Pump Unit (GPU) which comprises a mechanical, piston-type pump fully interconnected and powered by a pressurized gas cylinder unit, a water cylinder unit at the GPU, sprinklers for discharging water mist, stainless steel piping, section valves, and an electrical control, monitoring, and signaling system.

The distribution network may be divided in sections, each having an independent section valve. In the standby position, all section valves are open. A standby pressure of about 360 PSI (25bar) is maintained in the system by a pneumatic pump. The discharge is actuated when one or several heat sensitive sprinkler bulbs break, opening the access of water through the activated sprinkler(s). At activation, the standby pressure creates a flow of water in the system. The water flow induces a pressure drop in the flow monitor of the relevant section valve and generates an indication signal to the control panel. The pressure drop also opens the hydraulically operating gas cylinder primary valve, that in turn opens the pneumatic valves of the first group of cylinders, and the pump starts.

The system components are described in detail and are identified by part number in Marioff design, installation, and maintenance manual document reference MO/PES/04/DIOM/FM/99 rev, 1.2 cited in paragraph 5.2 of the Factory Mutual Approval Report.

Intended uses:

1-Machinery Spaces. For the protection of combustion turbines, machinery spaces and special hazard machinery spaces with volumes not exceeding 17,645 cubic feet.

2- Light Hazard Occupancies. For the protection of light hazard occupancies in either enclosed or open spaces utilizing a wide range of typical light hazard fire scenarios.

Pursuant to "Promulgation of the Rules relating to Material and Equipment Application Procedures" dated November 5, 1992, the Bureau of Fire Prevention has no objections Letter dated May 3, 2005, F.P. Index No. 0410042A.

Terms and Conditions: The above units be accepted on condition that:

Marioff Hi-Fog Water Mist system for the protection of combustion turbines, machinery spaces and special machinery spaces in enclosures with volumes not exceeding 17.645 cubic feet.

1. Installations of this water mist system shall be voluntary protection system and shall not be installed in lieu of sprinklers, or any other extinguishing system otherwise required by law.
2. The system shall conform to the requirements of NFPA 750 (2003) "Standard on Water Mist Fire Protection Systems".

3. The system shall be in compliance with the requirements/conditions/limitations of the Factory Mutual Research Corporation Approval Report (Project ID 3000430) Class 5560 dated June 5, 2001, including the manufacturer's design, installation, operation and maintenance manual (dated June 2001) Part No. MO/PES/02/DIOM/FM96 Rev. 1.3 and the applicable FM Global Property Loss Prevention Data Sheet.
4. High pressure containers or cylinders shall be constructed, tested and marked in accordance with recognized, international standard, such as the U.S. Department of Transportation, 49 CFR, 171-190, 178~36 - 178.37, specifications (in effect upon the date of manufacture and test) for DOT-3A, 3AA-1800, or higher, seamless steel cylinders.
5. High pressure cylinders used in water mist systems shall not be recharged without a hydrostatic test if more than 5 years have elapsed from the date of the last test.
6. Only water and nitrogen/air shall be used in the system as the medium of extinguishment.
7. The system shall a minimum of thirty minutes of protection for machinery spaces and special hazard machinery space applications. For the protection of combustion turbines, the system shall have a minimum protection time equivalent to the coast down time of the turbine or 30 minutes whichever is greater.
8. The flow of flammable liquids and electrical supplies to the enclosure shall be terminated upon detection of a fire.
9. The use of ventilation shutoffs is required.
10. Spray heads just above a gas turbine must be avoided to prevent a direct impingement of water to the turbine casing.
11. The Gas-Driven Pump Unit shall be located such that the ambient temperature conditions around the unit shall be in the range from 40°F to 130°F.
12. One the 9 Nozzle Spray Head (Model 4S 1 MC 8MC 1000) and other system components listed in the Factory Mutual Approval Report (Project ID 3000430) Class 5560 dated June 5, 2001 shall be used in the system.
13. The system shall be used in manned or monitored facilities only.
14. The use of FM approved heat detectors is required.
15. Installation, testing and maintenance shall be conducted by a licensed master fire suppression piping contractor - Class A.
16. High-pressure piping shall be clearly identified by means of labeling.

17. Installation shall comply with all applicable New York City codes, rules, regulations and testing requirements.
18. The system shall be installed with manual discharge capabilities.
19. Cylinders shall be located outside of equipment enclosure protected.
20. Automatic or manual activation of the system shall sound a local alarm, transmit an alarm to an approved central station, automatically close any doors and dampers, and shut down fuel and lubrication supplies as required NFPA 750.
21. Power to the alarm system shall be in accordance with applicable requirements of the Reference Standard 17-3 of the New York City Building Code, the New York City Electrical Code and NFPA 750.
22. Provision shall- be made for audible and visible alarms within and outside the location to be protected by the installation to signal the activation of an automatic detection device and subsequent operation of extinguishing systems. Such signals shall continue until the atmosphere has been returned to normal.
23. Plans filed with the Department of Buildings for the installation, showing detection equipment, equipment and piping alarm systems, and all other safety features, shall be reviewed and approved by the Bureau of Fire Prevention for each location prior to making such installation.
24. The applicant shall ensure that the installation has been subjected to a satisfactory inspection and test in the presence of an inspector from the Bureau of Fire Prevention prior to placing the system in operation. Such inspection and test shall demonstrate the following:
 - (a) All detection, discharge, alarms and other devices operatesatisfactorily.
 - (b) All piping is clear and unobstructed, and that the piping and attached appurtenances subject to system pressure shall be hydrostatically tested to 150 percent of the normal working pressure, and shall be maintained at that pressure without loss for two (2) hours. Loss shall be determined by drop in gauge pressure or visible leakage.
 - (c) In addition, a discharge test may be required where, in the opinion of the Bureau of Fire Prevention, such test is need to determine whether the system design requirements have been met.
25. Water mist system inspection, testing, maintenance activities, and personnel training shall be implemented in accordance with Chapter 13 of NFPA 750 (2003). The results of inspection, testing, and maintenance conducted during the previous three years shall be maintained on the premises, and shall be produced upon demand of a Fire Department representative.

26. Each approved system shall bear a -metal label permanently affixed indicating the MEA approval number issued by the Material and Equipment Acceptance (MEA) Division of the Department of Buildings.

Marioff Hi-Fog Water Mist system for the protection of Light Hazard Occupancies

1. Installations of this water mist system shall be voluntary protection system and shall not be installed in lieu of sprinklers, or any other extinguishing system otherwise required by law.
2. The system is approved for the protection of light hazard occupancies as defined in FM Global Property Loss Prevention Data Sheets.
3. The system is only to control a fire by limiting the size of fire so as to decrease the heat release rate and pre-wet adjacent combustibles while controlling ceiling gas temperatures to avoid structural damage.
4. It shall not be used where visibility is a concern.
5. The system shall conform to the requirements of NFPA 750 (2003) "Standard on Water Mist Fire Protection Systems".
6. The system shall be in compliance with the requirements/conditions/limitations of the Factory Mutual Research Corporation Approval Report (Project ID 3000430) Class 5560 dated June 5, 2001, including the manufacturer's design, installation, operation and maintenance manual (dated June 2001) Part No. MO/PES/02/DIOM/FM96 Rev. 1.3 and the applicable FM Global Property Loss Prevention Data Sheet.
7. High pressure containers or cylinders shall be constructed, tested and marked in accordance with recognized, international standard, such as the U.S. Department of Transportation, 49 CFR, 171-190, 178.36 - 178.37, specifications (in effect upon the date of manufacture and test) for DOT -3A, 3AA-1800, or higher, seamless steel cylinders.
8. High pressure cylinders used in water mist systems shall not be recharged without a hydrostatic test if more than 5 years have elapsed from the date of the last test.
9. Only water and nitrogen/air shall be used in the system as the medium of extinguishment.
10. The system shall be designed to provide a minimum of thirty minutes of protection (based on a nine nozzle design).
11. The Gas-Driven Pump Unit shall be located such that the ambient temperature conditions around the unit shall be in the range from 40°F to 130°F.

12. Only the nozzles Model1B 1MB 6MB 100A, the Model1B 1MC 6MC 10RA and the Model 1B 1ME 6MF 10RA and other system components listed in the Factory Mutual Approval Report (Project ID 3000431) Class 5560 dated June 5, 2001 shall be used in the system.
13. All water utilized in this system shall be potable water. All water shall be processed through a filter with a minimum mesh size of 100µm.
14. The system shall be used in manned or monitored facilities only.
15. Installation, testing and maintenance shall be conducted by a licensed master fire suppression piping contractor - Class A.
16. High-pressure piping shall be clearly identified by means of labeling.
17. Installation shall comply with all applicable New York City codes, rules, regulations and testing requirements.
18. Cylinders shall be located outside of equipment enclosure protected.
19. Automatic activation of the system shall sound a local alarm, transmit an alarm to an approved central station.
20. Power to the alarm system shall be in accordance with applicable requirements of the Reference Standard 17-3 of the New York City Building Code, the New York City Electrical Code and NFPA 750.
21. Provision shall be made for audible and visible alarms within and outside the location to be protected by the installation to signal the activation of an automatic detection device and subsequent operation of extinguishing systems. Such signals shall continue until the atmosphere has been returned to normal.
22. Plans filed with the Department of Buildings for the installation, showing detection equipment, equipment and piping alarm systems, and all other safety features, shall be reviewed and approved by the Bureau of Fire Prevention for each location prior to making such installation.
23. The applicant shall ensure that the installation has been subjected to a satisfactory inspection and test in the presence of an inspector from the Bureau of Fire Prevention. prior to placing the system in operation. Such inspection and test shall demonstrate the following:
 - (d) All detection, discharge, alarms and other devices operate satisfactorily.
 - (e) All piping is clear and unobstructed, and that the piping and attached appurtenances subject to system pressure shall be hydrostatically tested to 150 percent of the normal working pressure, and shall be maintained at that pressure without loss for two (2) hours. Loss shall be determined by drop in gauge pressure or visible leakage.

- (f) In addition, a discharge test may be required where, in the opinion of the Bureau of Fire Prevention, such test is need to determine whether the system design requirements have been met.
24. Water mist system inspection, testing, maintenance activities, and personnel training shall be implemented in accordance with Chapter 13 of NFPA 750 (2003). The results of inspection, testing, and maintenance conducted during the previous three years shall be maintained on the premises, and shall be produced upon demand of a Fire Department representative.
25. Each approved system shall bear a metal label permanently affixed indicating the MEA approval number issued by the Material and Equipment Acceptance (MEA) Division of the Department of Buildings.

All shipments and deliveries of such equipment shall be provided with a metal tag suitably placed, certifying that the equipment shipped or delivered is equivalent to that tested and accepted for use, as provided for in Section 27-131 of the Building Code.

Final Acceptance September 29, 2005.
Examined by Donald J. [Signature]