



Member of the FM Global Group

Examination Standard for Fire Pump Monitoring and Automated Testing

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Foreword

This standard is intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of this standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states testing and certification requirements for two products: fire pump monitoring systems and automated testing systems. These systems are used to detect and report fire pump system operations, anomalies, and performance trends. These separate systems can also be combined into a single system that meets all requirements of this standard.
- 1.1.2 Testing and certification criteria includes performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a surveillance program.

1.2 Scope

- 1.2.1 This standard describes the design and performance requirements for:
- fire pump monitoring systems that measure and collect information on fire pump systems for the purposes of detecting and reporting conditions during standby and operation of the fire pump;
 - automated fire pump testing systems which initiate, monitor, and collect information on fire pump churn (no flow) testing for the purposes of detecting and reporting conditions during operation of the fire pump. Automated fire pump testing systems shall meet test requirements and the intent of required inspection and testing in accordance with applicable jurisdictional requirements.
- 1.2.2 These systems shall not have any influence on the starting and running of the fire pump system in case of a fire protection water demand, including during pump testing.

1.3 Basis for Requirements

- 1.3.1 The requirements of this standard are based on experience, research and testing, and/or the standards of other organizations. The advice of manufacturers, users, trade associations, jurisdictions and/or loss control specialists was also considered.
- 1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of fire pump monitoring systems and automatic fire pump churn test systems for the purpose of obtaining certification.

1.4 Basis for Certification

Certification is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

- 1.4.1 Examination and tests on production samples shall be performed to evaluate:
- the suitability of the product;
 - the performance of the product as specified by the manufacturer and required for certification;
 - the durability and reliability of the product.
- 1.4.2 An examination of the manufacturing facilities and audit of quality control procedures may be conducted to evaluate the manufacturer's ability to consistently produce the product, which is examined and tested, and the marking procedures used to identify the product. Subsequent surveillance may be required by the certification agency in accordance with the certification scheme to ensure ongoing compliance.

1.5 Basis for Continued Certification

The basis for continual certification may include the following based upon the certification scheme and requirements of the certification agency:

- production or availability of the product as currently certified;
- the continued use of acceptable quality assurance procedures;
- compliance with the terms stipulated by the certification;
- satisfactory re-examination of production samples for continued conformity to requirements; and
- satisfactory surveillance audits conducted as part of the certification agencies product surveillance program.

1.6 Effective Date

The effective date of this new examination standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.

1.7 System of Units

Units of measurement used in this standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10.

1.8 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies.

ANSI/IEC 60529, *Degrees of Protection Provided by Enclosures (IP Code)*.

ANSI/UL 50E, *Enclosures for Electrical Equipment, Environmental Considerations*

ISO/IEC 17025, *General Requirements for the Competence of Testing and Calibration Laboratories*

FM Approvals Examination Standard 1042, *Vane-Type Waterflow Alarm Indicators*

FM Approvals Examination Standard 1044, *Fire Service Meters*

FM Approvals Examination Standard 1046, *Fire Pump Flowmeter Systems*

FM Approvals Examination Standard 1321/1323, *Controllers for Electric Motor Driven and Diesel Engine Driven Fire Pumps*

FM Approvals Examination Standard 3510, *Flow and Pressure Safety Switches*

FM Approvals Examination Standard 7710, *Low Water Level Limit Controls for Boilers*

FM Approvals Examination Standard 7745, *Controllers for Liquid Leak Detectors*

1.9 Terms and Definitions

For purposes of this standard, the following terms apply:

Accepted - This term refers to installations acceptable to the authority (AHJ) enforcing the applicable installation rules.

Actuator – an actuator is a device that receives an energy input and converts it into motion or force.

AHJ: Authority Having Jurisdiction. An organization office, or individual responsible for enforcing the requirements of a code standard, or for approving equipment, materials, installation, or procedure.

Automated Testing System - automatic system to carry out the weekly or monthly churn test including all sensors and actuators to cover the required inspection and testing in accordance with applicable jurisdictional requirements. The system consists of the following components:

- Control unit
- Sensors
- Actuators

Battery - A packaged collection of battery cells used as a supplemental power source.

Circulation Relief Valve- A valve on a fire pump designed to discharge a small amount of water to prevent overheating of the pump during no flow (“shutoff” or “churn”) conditions.

Control unit – processing unit measuring and monitoring functions and components, collecting data and alarms and processing the needed operations. The control unit consists of the following components:

- Central processing unit
- Input modules
- Output modules

Diesel Engine - A certified internal combustion engine in which the fuel is ignited entirely by the heat resulting from the compression of the air supplied for combustion. The oil-diesel engine, which operates on fuel injected after compression is practically completed, is the type usually used as a fire pump driver.

Diesel Engine Fire Pump Controller – A certified controller intended to control a diesel engine-driven fire pump.

Electric Fire Pump Controller - A certified controller intended to control an electric motor-driven fire pump.

Electromagnetic Compatibility – EMC – Ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

Electromagnetic Immunity – EMI - The ability of a device, equipment, or system to perform without degradation in the presence of an electromagnetic disturbance.

Emission (electromagnetic) - The term refers to the phenomenon by which electromagnetic energy emanates from a source.

Enclosure - A surrounding case constructed to provide a degree of protection against incidental contact with the enclosed equipment, and to provide a degree of protection against specified environmental conditions.

Fire Pump - Pump dedicated to delivering a specified rate of water flow at a specified pressure to the fire extinguishing system of a premises.

Fire Pump Churn Test – A test start and run of the fire pump without water flowing. Typically conducted weekly or monthly for a period of 10 to 30 minutes.

Fire Pump Controller – Generic term for a Diesel Engine Fire Pump Controller or an Electric Fire Pump Controller used to start the fire pump. (see FM Standard 1321/1323)

Fire Pump Monitoring System - monitoring system monitors the operation of the Fire Pump System and records data for performance trending and or further analysis.

Fire Pump Unit - An assembled unit consisting of a fire pump, driver, controller, and accessories.

Fail safe – A system ensuring in the event of a fault due to the characteristics of its components and their integration the system will always go to a safe status.

Pressure Activated - Starting of the pump driver is initiated by detecting a reduction in water pressure in the sprinkler system piping.

Redundancy - System design principle that introduces duplicate components to provide fault tolerance if a component fails.

Remote Location – Term used to define where data is sent after being collected.

Sensor -A sensor is a device that detects and responds to some type of input from the physical environment such as light, heat, motion, moisture, or pressure and converts this input into an electrical output.

Type-Tested Device - A device conforming to an established type, comprised of elements (components, devices, equipment) combined and rated as a unit, replicating the constructional and performance features of the typical device which has been verified previously to be in accordance with a designated standard.