



Member of the FM Global Group

Assessment Standard

for

Proportioning Testing

Class Number 5138

April 2011

Table of Contents

1. INTRODUCTION	1
1.1 PURPOSE	1
1.2 SCOPE	1
1.3 BASIS FOR REQUIREMENTS	1
1.4 BASIS FOR CONTINUANCE OF VALIDITY OF CERTIFICATE OF ASSESSMENT	1
1.5 EFFECTIVE DATE	1
1.6 SYSTEM OF UNITS	2
1.7 APPLICABLE DOCUMENTS	2
1.8 DEFINITIONS	2
2. GENERAL INFORMATION	5
2.1 REQUIREMENTS	5
3. GENERAL REQUIREMENTS	5
3.1 DOCUMENTATION	5
3.2 PHYSICAL OR STRUCTURAL CONSTRUCTION FEATURES	5
3.2.1 TEST LIQUIDS	5
3.3 CALIBRATION	6
4. PERFORMANCE REQUIREMENTS	6
4.1 ENGINEERING REQUIREMENTS	6
4.2 PROCEDURES	6
4.3 TRAINING OF PERSONNEL	7
4.4 EQUIPMENT AND INSTRUMENTATION	8
4.5 REPORTING TESTING RESULTS	8
4.6 CUSTOMER SITE VISIT	9
4.7 TEST LIQUIDS	9
5. OPERATIONS REQUIREMENTS	10
5.1 FACILITIES AND PROCEDURES AUDIT (F&PA)	10
5.2 INSTALLATION INSPECTIONS	10
5.3 NEW OR ALTERNATE TESTING PROCEDURES	10
5.4 DOCUMENT CONTROL	10
APPENDIX A: UNITS OF MEASUREMENT	1
APPENDIX B: ASSESSMENT INFORMATION	2

1. INTRODUCTION

1.1 Purpose

Water equivalency proportioning and test liquid proportioning are methods of assessing the accuracy of an installed foam proportioning system without having to use the actual foam concentrate. This is intended to mitigate logistical difficulties resulting from the need to dispose of the foam solution produced in traditional proportioning tests. The use of water equivalency proportioning or test liquid proportioning should facilitate initial acceptance and annual testing of foam systems to verify their readiness. Such testing must be conducted with substantial discipline by properly trained personnel to be accurate and representative of the true performance of the proportioner. All such testing requires a baseline acceptance test in which the foam concentrate (or a proxy test liquid) is actually proportioned into water to establish performance of the proportioning system in its installed state. This baseline acceptance is then repeated using water or a test liquid in lieu of the concentrate. Since it can be reasonably assumed that any change in the true proportioning rate would be signaled by a change in the water equivalency proportioning rate or the test liquid proportioning rate, subsequent annual testing can be performed without flowing the concentrate, unless there is a substantial change in the water proportioning rate or test liquid proportioning rate.

1.2 Scope

1.2.1 This standard sets performance requirements for commercial entities providing evaluations of installed foam system proportioning accuracy.

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 has also been considered.

1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of foam fire extinguishing water equivalency proportioning services. Services having characteristics not anticipated by this standard may be accepted if performance equal, or superior, to that required by this standard is demonstrated, or if the intent of the standard is met.

Alternatively, services that meet all of the requirements identified in this standard may not fall under the scope of this standard if other conditions which adversely affect performance exist or if the intent of this standard is not met.

1.4 Basis for continuance of validity of Certificate of Assessment

Validity of the Certificate of Assessment is based upon:

- The continued use of acceptable quality assurance procedures;
- Satisfactory field experience;
- Compliance with the terms stipulated in the Master Agreement
- Satisfactory Facilities and Procedure Audits (F&PAs) conducted as part of a follow-up program

1.5 Effective Date

The effective date of this standard is **30 April 2011** for full compliance with all requirements.

1.6 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. Appendix A lists the selected units and conversions to SI units for measures appearing in this standard. Conversion of U.S. customary units is in accordance with the Institute of Electrical and Electronics Engineers (IEEE)/ American Society for Testing and Materials (ASTM) SI 10 - 2002, American National Standard for Use of the International System of Units (SI): The Modern Metric System. One unit (liter), outside of but recognized by SI, is commonly used in international fire protection and is used in this standard.

1.7 Applicable Documents

This standard is used in conjunction with the following standards

- ASTM E 729 – 96 (2007), Standard Guide for Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians
- FM Approvals, Approval Standard 5130, Approval Standard for Foam Extinguishing Systems, January 2011
- FM Global Property Loss Prevention Data Sheet 2-81, Fire Protection System Inspection, Testing and Maintenance and Other Fire Loss Prevention Inspections, September 2008
- FM Global Property Loss Prevention Data Sheet 4-3N, Medium- and High-Expansion Foam Systems, September 2010
- FM Global Property Loss Prevention Data Sheet 7-93N, Aircraft Hangars, September 2004
- FM Global Property Loss Prevention Data Sheet 4-7N, Low Expansion Foam Systems, September 2010
- FM Global Property Loss Prevention Data Sheet 4-12, Foam-Water Sprinkler Systems, September 2010
- IEEE/ASTM SI 10 - 2002, American National Standard for Use of the International System of Units (SI): The Modern Metric System
- National Fire Protection Association (NFPA) 11, Standard for Low-, Medium-, and High Expansion Foam, 2010 Edition
- NFPA 16, Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems, 2011 Edition
- NFPA 409, Standard on Aircraft Hangars, 2011 Edition
- United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances (EPA OPPTS) 850.175, Fish Acute Toxicity Test, Freshwater and Marine
- US EPA OPPTS 870.1100, Acute Oral Toxicity
- US EPA OPPTS 870.1200, Acute Dermal Toxicity
- US EPA OPPTS 870.2500, Acute Dermal Irritation

1.8 Definitions

For purposes of this standard, the following terms shall apply:

Around the Pump Proportioner

See Pump Proportioner.

Automatic Foam Concentrate Control Valve

A valve controlling the flow of foam concentrate to the proportioner. The valve is automatically actuated by either hydraulic, pneumatic, or electrical power and incorporates means to supervise its position.

Balanced Pressure Pump-Type Proportioning

Foam proportioning using a foam concentrate pump and an automatic pressure balancing valve that is operated by water supply pressure and is located in the concentrate bypass line to the pump to balance concentrate and water pressures to a modified venturi-type proportioner.

Concentration

The volume percent of a foam concentrate in water.

Concentration Ratio

See Concentration.

Direct Injection Variable Pump Output Proportioning

Proportioning using flowmeters for both concentrate and water supply and a control system to vary foam concentrate pump flow in proportion to water supply flow.

Eductor

A device that uses the Bernoulli pressure reduction caused by the flow of water through a venturi to allow atmospheric pressure to drive foam concentrate into the water stream to produce a mixture of the specified concentration.

Foam

A stable aggregation of bubbles produced from an aqueous solution of foam concentrate that has a sufficiently low density and sufficient fluidity to allow it to float on top of and form a blanket on the surface of a liquid being protected.

Foam Concentrate

A concentrated aqueous liquid formulated to produce firefighting foam when mixed in the proper concentration with water and in which air can be entrained to reach the specified Expansion Ratio.

Foam Solution

A solution of foam concentrate in water that is named by the concentrate's name and the specified concentration.

In-Line Balanced Pressure Proportioning

Balanced foam proportioning using a concentrate pressure which is greater than the water supply working pressure under all operating conditions. Automatic pressure balancing valves operated by the water supply pressure to the proportioner are used to regulate the concentrate pressure individually to each proportioner. Concentrate pressure may be created by either a bladder tank or a concentrate pump.

Inline Eductor

An eductor that is installed upstream of the discharge device and which uses a foam concentrate supply at atmospheric pressure.

Maximum Working Pressure

The pressure in a foam extinguishing system at the maximum available pressure of the water and foam concentrate supplies.

Minimum Working Pressure

The pressure in a foam extinguishing system below which it will not produce foam of acceptable quality.

Mixture Strength or Ratio

See Concentration.

Operable Pressure Range

The pressure range corresponding to the pressures in the water supply at the specified minimum and maximum flow rates at which the system is intended to be operable.