

Approval Standard

Air Drying Units

Class Number 1034
November 2013



Member of the FM Global Group

Approval Standard for Air Drying Units

Class Number 1034

November 2013

Copyright © 2013 by FM Approvals LLC. All rights reserved.

Table of Contents

1.	INTRODUCTION	1
1.1	PURPOSE	1
1.2	SCOPE	1
1.3	BASIS FOR REQUIREMENTS	1
1.4	BASIS FOR APPROVAL	1
1.5	BASIS FOR CONTINUED APPROVAL	2
1.6	EFFECTIVE DATE.....	2
1.7	SYSTEM OF UNITS	2
1.8	APPLICABLE DOCUMENTS.....	2
1.9	DEFINITIONS	3
2.	GENERAL INFORMATION	4
2.1	PRODUCT INFORMATION	4
2.2	APPROVAL APPLICATION REQUIREMENTS	4
2.3	REQUIREMENTS FOR SAMPLES FOR EXAMINATION	4
3.	GENERAL REQUIREMENTS	5
3.1	REVIEW OF DOCUMENTATION.....	5
3.2	PHYSICAL OR STRUCTURAL FEATURES	5
3.3	MATERIALS	6
3.4	MARKINGS	6
3.5	MANUFACTURER'S INSTALLATION AND OPERATION INSTRUCTIONS	6
3.6	CALIBRATION.....	6
3.7	TOLERANCES.....	7
4.	PERFORMANCE REQUIREMENTS	7
4.1	EXAMINATION.....	7
4.2	OPERATIONAL TEST	7
4.3	MAINTENANCE ASSESSMENT	8
4.4	PRESSURE CAPACITY	8
4.5	SYSTEM DURABILITY	8
4.6	CONTROL PANEL CYCLING	8
4.7	DIELECTRIC STRENGTH.....	9
4.8	ADDITIONAL TESTS.....	9
5.	OPERATIONS REQUIREMENTS.....	9
5.1	DEMONSTRATED QUALITY CONTROL PROGRAM	9
5.2	SURVEILLANCE AUDIT PROGRAM	11
5.3	MANUFACTURER'S RESPONSIBILITIES	11
5.4	MANUFACTURING AND PRODUCTION TESTS	11
	APPENDIX A: UNITS OF MEASUREMENT	13
	APPENDIX B: FM APPROVALS CERTIFICATION MARKS.....	14
	APPENDIX C: TOLERANCES	16
	APPENDIX D: SAMPLE LISTINGS	17

1. INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states FM Approvals criteria for air drying units for use in dry pipe and refrigerated area sprinkler system piping. They provide compressed air, with reduced humidity, to the sprinkler piping to reduce the possibility of ice formation.
- 1.1.2 Approval criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a follow-up program.

1.2 Scope

- 1.2.1 This standard encompasses the design and performance requirements for air drying units. In cases where metric sized products are to be examined for Approval, test criteria comparable to the equivalent or nearest nominal inch size shall be used.
- 1.2.2 Approval Standards are intended to verify that the product described will meet stated conditions of performance, safety and quality useful to the ends of property conservation.

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 air drying units for the purpose of obtaining Approval. Air drying units having characteristics not anticipated by this standard may be FM Approved if performance equal, or superior, to that required by this Standard is demonstrated, or if the intent of the standard is met. Alternatively, air drying units which meet all of the requirements identified in this Standard may not be FM Approved if other conditions which adversely affect performance exist or if the intent of this standard is not met.

1.4 Basis for Approval

Approval 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 by FM Approvals; and, as far as practical,
 - The durability and reliability of the product.
- 1.4.2 A first audit shall be conducted to evaluate the manufacturer's ability to consistently produce the product that was examined and tested as part of the Approval project. The audit shall review the facility and in-place quality control procedures used in the manufacturing of the product. Typically, areas of review are incoming inspection, work in progress, production testing, final quality control, marking, calibration of equipment, shipping procedures, and document and drawing control. These audits are repeated periodically for as long as the product remains FM Approved, as part of FM Approvals' Surveillance Audit program. (Refer to Section 5.2, Surveillance Audit Program.)

1.5 Basis for Continued Approval

1.5.1 Continued Approval is based upon:

- Production or availability of the product as currently FM Approved;
- The continued use of acceptable quality assurance procedures;
- Satisfactory field experience;
- Compliance with the terms stipulated in the Master Agreement;
- Satisfactory re-examination of production samples for continued conformity to requirements; and
- Satisfactory Surveillance Audits conducted as part of FM Approval's product surveillance audit program.

1.5.2 Also, as a condition of retaining Approval, manufacturers may not change an FM Approved product or service without prior authorization by FM Approvals. (Refer to section 5.1.4 for further details regarding changes.)

1.6 Effective Date

The effective date of an Approval standard mandates that all products tested for Approval after the effective date shall satisfy the requirements of that standard. Products FM Approved under a previous edition shall comply with the new version by the effective date or else forfeit Approval.

The effective date of this Standard is **One Year from Issue Date** for compliance with all requirements.

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. 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 Materials (ASTM) SI 10-2010, *American National Standard for Metric Practice*.

Two units (liter and bar), outside of but recognized by SI, are commonly used in international fire protection and are used in this Standard.

1.8 Applicable Documents

The following standards, test methods, and practices are referenced in this standard:

American National Standards Institute (ANSI) B16.5 - 1996, *Pipe Flanges & Flanged Fittings*
ANSI/American Water Works Association (AWWA) C-606- 2011, *Grooved and Shouldered Joints*
American Society of Mechanical Engineers (ASME) B1.20.1 - 1983 (R2006), *Pipe Threads, General Purpose, (Inch)*
ANSI/ASME Boiler & Pressure Vessel Code - 2010, Section VIII Division 1 – *Rules for Construction of Pressure Vessels*
FM Global Property Loss Prevention Data Sheet 2-0 - April 2011, *Installation Guidelines for Automatic Sprinklers*
IEEE/ASTM SI 10-2010, American National Standard for Metric Practice
ISO 17025 - 2005, *General Requirements for the Competence of Testing and Calibration Laboratories*
NFPA 13, 2010 edition, *Standard for the Installation of Sprinkler Systems*
FM Global Property Loss Prevention Data Sheet 8-29, May 2007, *Refrigerated Storage*

1.9 Definitions

Accepted

This term refers to installations acceptable to the authority enforcing the applicable installation rules. When the authority is FM Global, such locations are termed “FM Global Accepted.” Acceptance is based upon an overall evaluation of the installation. Factors other than the use of FM Approved equipment impact upon the decision whether to accept the product. Acceptance is not a characteristic of a product. It is installation specific. A product accepted for one installation may not be acceptable elsewhere. (Contrast with FM Approved.)

Adsorption

Physical process by which gas or vapor is attracted to and captured on a solid surface.

Air Pressure Maintenance Device

A device that automatically maintains, within pre-set limits, the air pressure for a dry pipe sprinkler system.

Dessicant (Adsorbent)

A dessicant is a hygroscopic substance that induces or sustains a state of dryness. This term is used to describe the chemical(s) (typically activated alumina) that are used to attract water vapor and capture it in the dryer tower.

Dew Point

This term refers to the temperature at which water vapor in the air will start to condense.

End Connections

The term “End Connections” refers to the method of connecting components of a fire protection system. Typical end connections in fire protection service are flanged, grooved, threaded and welded end.

FM Approvals Certification Marks

The FM Approvals Certification Marks are detailed in Appendix B. Their use is mandatory on all units of FM Approved products. These registered marks cannot be used except as authorized by FM Approvals via the granting of Approval to a specific product.

FM Approved

This term refers to products FM Approved by FM Approvals. Such products are listed in the Approval Guide, an on-line resource of FM Approvals, see Appendix C. All products so listed have been successfully examined by FM Approvals, and their manufacturers have signed and returned a Master Agreement to FM Approvals. This form obligates the manufacturer to allow re-examination of the product and surveillance audits at FM Approvals discretion. It further requires the manufacturer not to deviate from the as-FM Approved configuration of the product without review by and agreement of FM Approvals. Approval is product specific.

Pressure Dew Point

Dew point measured at the actual pressure.

Rated Working Pressure

This is the maximum sustained pressure at or below which the device shall operate trouble free for its entire design life. This value sets the basis for the testing described in Section 4.

Relative humidity

Ratio of the partial pressure of water vapor in an air-water mixture to the saturated vapor pressure of water at that temperature.

Regeneration

The process where a portion of the dried air is used to remove water from one dryer tower, preparing it to enter a new period of operation.

System Pressure

The maximum output pressure the system is rated for. This pressure is chosen by the manufacturer and listed in the FM Approval Guide.