



Member of the FM Global Group

Approval Standard for Liquefied Petroleum Gas Vaporizers, Gas-Air Mixers and Vaporizer- Mixers

Class Number 7151-7156-7157

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Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet FM Approvals' stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of Approval Standards is to present the criteria for FM Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for certification by FM Approvals shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing shall ensure a consistently uniform and reliable product. Approval Standards strive to be performance-oriented. They are intended to facilitate technological development.

For examining equipment, materials and services, Approval Standards:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and
- b) must be readily identifiable.

Continuance of Approval and listing depends on compliance with the Approval Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility.

FM Approvals LLC reserves the right in its sole judgment to change or revise its standards, criteria, methods, or procedures.

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1 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states FM Approval requirements for Approval of Liquefied Petroleum Gas (LP-Gas) Vaporizers (Class No. 7151), Gas-Air Mixers (Class No. 7157), and Vaporizer-Mixers (Class No. 7156).
- 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 is concerned with the details of construction, operation and testing of LP-Gas vaporizers, gas-air mixers, and vaporizer-mixers. LP-Gas vaporizers are intended to aid vaporization of LP-Gas by supplying heat to liquefied LP-Gas. Gas-air mixers are used to mix the LP-Gas vapor with sufficient air to supply a mixture of the necessary heating content for the application, often as a substitute for natural gas. Vaporizer-mixers combine both functions in a single, integrally connected assembly. In vaporizers, heat may be provided by direct application of flame to the portion of the vaporizer containing the LP-Gas, by electrically heating the LP-Gas-containing portion, or by heating a transfer medium which is then used to heat the LP-Gas-containing portion. Mixers may entrain atmospheric air or be connected to a compressed air source. This standard may consider, as necessary, the suitability of portions of the equipment for Class I, Division 1 or 2 hazardous (classified) locations and does consider the suitability of electrical equipment for its intended environmental conditions. The requirements of this standard shall be used to measure and describe the performance of LP-Gas vaporizers, mixers, and vaporizer-mixers in response to exposure to controlled test conditions. The results of these controlled exposures shall not be used to describe or appraise actual exposure conditions, since such conditions will vary widely.

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; in particular they are intended to correspond to those for vaporizers and gas-air mixers in NFPA 58, the Liquefied Petroleum Gas Code.
- 1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of LP-Gas vaporizers, gas-air mixers, and vaporizer-mixers for the purpose of obtaining Approval. Such products 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, products 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 An examination of the manufacturing facilities and audit of quality control procedures is made 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. These examinations may be repeated as part of FM Approvals' product follow-up program.

1.5 Basis for Continued Approval

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 Approval Report;
- satisfactory re-examination of production samples for continued conformity to requirements; and;
- satisfactory Surveillance Audits conducted as part of FM Approvals' product follow-up program.

Also, as a condition of retaining Approval, manufacturers may not change a product or service without prior authorization by FM Approvals.

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 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 July 1, 2019 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 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials (ASTM) SI 10-2010, "American National Standard for Metric Practice." Two other units (liter and bar), outside of but recognized by SI, are commonly used in international fire protection.

1.8 Applicable Documents

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

NFPA 58, Liquefied Petroleum Gas Code, 2017

NFPA 70, National Electrical Code

NFPA 497, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

FM Approval Standard 3810, Electrical Equipment for Measurement, Control and Laboratory Use, 2005

FM Approval Standard 3545, Temperature Limit and Supervisory Switches, 1998