Approval Standard for Bench, Swab, Plunger and Dispenser Cans

Class Number 6053

June 2019

Foreword

The FM Approvals certification mark 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 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 Approval requirements for bench, swab, plunger and dispenser cans that are used for cleaning parts with ignitable liquids or dispensing small quantities of ignitable liquids.

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 Survallence Audit program.

1.2 Scope

1.2.1 This standard applies to bench, swab, plunger, and dispenser cans with the following specifications:

- Maximum 5.0 gallon (18.9 ℓ) rated capacity;
- constructed of non-combustible materials with a minimum melting point of 1000°F (536 C);
- contain flame arrestors which are automatically maintained above the fluid level, unless equipped with valves to automatically close openings to vapor space when not in use; the flame arrestor may be incorporated with other functions but must not restrict its flame arresting ability;
- constructed of materials which are impervious to the liquids contained.

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.

1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of bench, swab, plunger, and dispenser cans for the purpose of obtaining Approval. Bench, swab, plunger, and dispenser cans 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, bench, swab, plunger, and dispenser cans 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' Surveillence Audit 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 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 December 31, 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. 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. For undated references, the latest edition of the referenced document (including any amendments) applies:

FM Approvals Test Procedures:

Stability Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid

Drop Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid

Operation (Valve / Flame Arrestor Function) Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid

Fire Exposure Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid

Test Method for Flame Arrester Components

Test Method for Leakage of Safety Containers and Filling, Supply and Disposal Containers, Test Procedure.

1.9 Terms and Definitions

For purposes of this standard, the following terms apply:

Bench Cans – A device used for cleaning small parts in ignitable liquids.

Dispenser Can – A device equipped with a faucet and used for dispensing ignitable liquids.

Flame Arrestor – A device that allows the passage of gas but stops the passage of flames.

Non-combustible – The property of a material to not ignite or burn.

Plunger Can – A device with a pump assembly that fills an upper pan with liquid when depressed.

Rated Capacity – Maximum volume identified by the manufacturer of ignitable liquid designed to be held by a can.

Swab Can – A device similar to a bench can but used for sponging operations.

2 GENERAL INFORMATION

2.1 Product Information

Bench, swab, plunger, and dispenser cans are designed for use with ignitable liquids. These products are defined in 1.9. Other designs meeting the criteria of this standard may also be considered for Approval.

2.2 Approval Application Requirements

To apply for an Approval examination the manufacturer, or its authorized representative, should submit a request to information@fmapprovals.com.

The manufacturer shall provide the following preliminary information with any request for Approval consideration:

- A complete list of all models, types, sizes, and options for the products or services being submitted for Approval consideration;
- general assembly drawings, complete set of manufacturing drawings, materials list, anticipated marking format, brochures, sales literature, spec. sheets, operation and maintenance procedures, etc.;
- the number and location of manufacturing facilities.
- All documents shall identify the manufacturer's name, document number or other form of reference, title, date of last revision, and revision level. All documents shall be provided with English translation.

2.3 Requirements for Samples for Examination

2.3.1 Following authorization of an Approval examination, the manufacturer shall submit samples for examination and testing. Sample requirements will be determined by FM Approvals following review of the preliminary information.

2.3.2 Requirements for samples may vary depending on design features, results of prior or similar testing, and results of any foregoing tests.

2.3.3 The manufacturer shall submit samples representative of production. Any decision to use data generated using prototypes is at the discretion of FM Approvals.

2.3.4 It is the manufacturer’s responsibility to provide any necessary test fixtures or special tools, such as those which may be required to evaluate the products for Approval.

2.3.5 At the discretion of FM Approvals, a representative of FM Approvals may witness production of, and place an identification mark on, each product to be examined. If a product has one or more plastic components, a representative of FM Approvals may, also at the discretion of FM Approvals, witness the production of the plastic components.

3 GENERAL REQUIREMENTS

3.1 Review of Documentation

3.1.1 During the initial investigation and prior to physical testing, the manufacturer's specifications and details shall be reviewed to assess the ease and practicality of use. The Approval investigation may define the limits of the Approval.

3.2 Markings

3.2.1 Marking on the product or, if not possible due to size, on its packaging or label accompanying the product, shall include the following information:

- name and address of the manufacturer or marking traceable to the manufacturer;
- date of manufacture or code traceable to date of manufacture or lot identification;
- model number, size, rating, capacity, etc., as appropriate.

When hazard warnings are needed, the markings should be universally recognizable.

3.2.2 The model or type identification shall correspond with the manufacturer's catalog designation and shall uniquely identify the product as FM Approved. The manufacturer shall not place this model or type identification on any other product unless covered by a separate agreement.

3.2.3 The Approval Mark shall be displayed visibly and permanently on the product and/or packaging as appropriate and in accordance with the FM Approvals Certification Mark Usage Guidelines. The manufacturer shall not use this mark on any other product unless such product is covered by a separate report.

3.2.4 All markings shall be legible and durable.

3.3 Manufacturer’s Installation and Operation Instructions

The manufacturer shall provide the user with

- instructions for the installation, maintenance, and operation of the product;
- facilities for repair of the product and supply replacement parts; and
- services to ensure proper installation, inspection, or maintenance for products of such nature that it would not be reasonable to expect the average user to be able to provide such installation, inspection, or maintenance.

3.4 Calibration

3.4.1 Each piece of equipment used to verify the test parameters shall be calibrated within an interval determined on the basis of stability, purpose, and usage. A copy of the calibration certificate for each piece of test equipment is required for FM Approvals records. The certificate shall indicate that the calibration was performed against working standards whose calibration is certified as traceable to the National Institute of Standards and Technology (NIST) or traceable to other acceptable reference standards and certified by an ISO/IEC 17025 accredited calibration laboratory. The test equipment shall be clearly identified by label or sticker showing the last date of the calibration and the next due date. A copy of the service provider’s accreditation certificate as an ISO/IEC 17025 accredited calibration laboratory is required for FM Approvals’ records.

3.4.2 The calibration of new equipment is also required. Documentation indicating either the date of purchase or date of shipment, equipment description, model and serial number is required for

identification. The new test equipment shall be clearly identified by label or sticker showing the date of initial calibration and the next due date.

3.4.3 When the inspection equipment and/or environment is not suitable for labels or stickers, other methods such as etching of control numbers on the measuring device are allowed, provided documentation is maintained on the calibration status of thus equipment

4 PERFORMANCE REQUIREMENTS

4.1 Stability

4.1.1 Requirement

A bench, swab, plunger, or dispenser can shall be constructed such that no contents spill when tipped 30° from horizontal when filled to its rated capacity. The container shall return to its normally upright position when released after having been tilted 30° in any direction while on a horizontal surface. The intent of this performance requirement is to measure the capability of the can to contain ignitable liquids under simulated transport and normal working conditions.

4.1.2 Tests/Verification

FM Approvals *Stability Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid*, Test Procedure Class Number 6053.

4.2 Drop

4.2.1 Requirement

A bench, swab, plunger, or dispenser can shall be constructed such that no operating parts break and show no signs of leaking as a result of being dropped in any position from 3 ft (0.9 m) then returned to its normal operating position. The intent of this performance requirement is to measure the capability of the can to operate as designed, and contain ignitable liquids when subjected to common hazards such as falling off a work bench or dropping during transport.

4.2.2 Tests/Verification

FM Approvals *Drop Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid*, Test Procedure Class Number 6053.

4.3 Operation

4.3.1 Requirement

A bench, swab, plunger, or dispenser can shall be constructed such that any spring actuated flame arrestor or valve returns to its original closed position after subjected to 20,000 cycles of usage. The intent of this performance requirement is to measure the capability of the can to resist ignition of its ignitable liquids or explosion after a simulated long term usage of its parts.

4.3.2 Tests/Verification

FM Approvals *Operation (Valve / Flame Arrestor Function) Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid*, Test Procedure Class Number 6053.

4.4 Fire Exposure

4.4.1 Requirement

A bench, swab, plunger, or dispenser can shall be constructed such that after exposed to a heptane fire hazard, the can shall (a) have no significant physical damage, (b) have valves and / or flame arrestor which work(s) as designed, and (c) during the test, the liquid contents shall not be spilled or ejected from the container. The

intent of this performance requirement is to measure the capability of the can to resist a fire hazard while the lid is in its normally closed position.

4.4.2 Tests/Verification

FM Approvals *Fire Exposure Testing of Bench, Swab, Plunger, Dispenser Cans, Ignitable Liquid*, Test Procedure Class Number 6053.

4.5 Flame Arrestor

4.5.1 Requirement

Flame arresters shall prevent a flame from progressing through an ignitable gas/air mixture.

4.5.2 Tests/Verification

Flame arresters, shall be tested in accordance with FM Approvals *Test Method for Flame Arrester Components*, Test Procedure.

4.6 Leakage Test—applicable to only dispenser cans

4.6.1 Requirements

A. A dispenser can is subjected to 5,000 normal opening / closing operations. The dispenser can is then filled with heptane and inverted for 10 minutes and its closed valve is tested for leakage. The closed valve shall not leak more than four (4) drops per minute, with a total maximum volume of 0.068 oz (2.0 mL).

B. All dispenser cans shall not leak when subjected to a body / joint air pressure test at 10 psi (69 kPa) while under water and with all tank openings sealed.

4.6.2 Test/Verification

A. Leakage testing shall be in accordance with *Test Method for Leakage of Safety Containers and Filling, Supply and Disposal Containers*, Test Procedure.

B. Leakage testing shall be in accordance with *Test Method for Leakage of Safety Containers and Filling, Supply and Disposal Containers*, Test Procedure.

4.7 Additional Tests

4.7.1 Additional tests may be required, at the discretion of FM Approvals, depending on design features and results of any foregoing tests.

4.7.2 Any test following a failure shall be acceptable only at the discretion of FM Approvals and with a technical justification of the conditions or reasons for failure.

5 OPERATIONS REQUIREMENTS

5.1 Demonstrated Quality Control Program

5.1.1 A quality assurance program is required to assure that subsequent bench, swab, plunger, and dispenser cans produced by the manufacturer shall present the same quality and reliability as the specific bench swab, plunger, and dispenser can(s) examined. Design quality, conformance to design, and performance are the areas of primary concern.

- Design quality is determined during the examination and tests, and is documented in the Approval Report.
- Continued conformance to this Standard is verified by the Surveillance Audit.
- Quality of performance is determined by field performance and by periodic re-examination and testing.

5.1.2 The manufacturer shall demonstrate a quality assurance program which specifies controls for at least the following areas:

- existence of corporate quality assurance guidelines;
- incoming quality assurance, including testing;
- in-process quality assurance, including testing;
- final inspection and tests;
- equipment calibration;
- drawing and change control;
- packaging and shipping; and
- handling and disposition of non-conforming materials.

5.1.3 Documentation/Manual

There should be an authoritative collection of procedures/policies. It should provide an accurate description of the quality management system while serving as a permanent reference for implementation and maintenance of that system. The system should require that sufficient records are maintained to demonstrate achievement of the required quality and verify operation of the quality system.

5.1.4 Records

To assure adequate traceability of materials and products, the manufacturer shall maintain a record of all quality assurance tests performed, for a minimum period of two years from the date of manufacture.

5.1.5 Drawing and Change Control

- The manufacturer shall establish a system of product configuration control that shall allow no unauthorized changes to the product. Changes to critical documents,

identified in the Approval Report, must be reported to, and authorized by, FM Approvals prior to implementation for production.

- The manufacturer shall assign an appropriate person or group to be responsible for, and require that, proposed changes to FM Approved or Listed products be reported to FM Approvals before implementation. The manufacturer shall notify FM Approvals of changes in the product or of persons responsible for keeping FM Approvals advised by means of FM Approvals' Revision Request, FM Approved Product/Specification-Tested Revision Report or Address/Main Contact Change Report.

- Records of all revisions to all FM Approved products shall be maintained.

5.2 Surveillance Audit

5.2.1 An audit of the manufacturing facility is part of the Approval investigation to verify implementation of the quality assurance program. Its purpose is to determine that the manufacturer's equipment, procedures, and quality program are maintained to insure a uniform product consistent with that which was tested and FM Approved.

5.2.2 These audits shall be conducted periodically but at least annually by FM Approvals or its representatives.

5.2.3 FM Approved products or services shall be produced or provided at or from the location(s) audited by FM Approvals and as specified in the Approval Report. Manufacture of products bearing the Approval Mark is not permitted at any other location without prior written authorization by FM Approvals.

5.3 Manufacturer's Responsibilities

The manufacturer shall notify FM Approvals of changes in product construction, components, raw materials, physical characteristics, coatings, component formulation or quality assurance procedures prior to implementation.