FM Approvals®

Member of the FM Global Group

Approval Standard for Safety Containers and Filling, Supply and Disposal Containers

Class Number 6051 and 6052

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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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I. INTRODUCTION

1.1 This standard covers safety containers and filling, supply or disposal containers for flammable liquids. These containers have openings tightly equipped with tightly fitting caps, or valves that remain closed unless held open for filling or discharging liquid.

1.2 FM Approval is based on satisfactory evaluation of the product an the manufacturer in three major areas:

- Examinations and tests on production samples are performed to evaluate (1) the suitability of the product, (2) the proper operation and performance of the product as specified by the manufacturer and required by FM Approvals and (3) as far as practical, the durability and reliability of the product.
- An examination of manufacturing facilities and quality control procedures is conducted to evaluate the manufacturer's ability to produce the product which is examined and tested. These examinations are periodically repeated as part of FM Approvals' product follow-up program.
- Satisfactory field experience is the final test of Approval. Unsatisfactory field experience may result in withdrawal of FM Approval.

1.3 The requirements of this standard are intended as guidelines reflecting current FM Approval tests and practices. Containers, which do not precisely conform to these requirements may be Approved if they meet the intent of this standard. Similarly, items that do conform to these requirements may not be Approved if they do not meet the intent of these requirements or if other conditions govern.

II. GENERAL REQUIREMENTS

2.1 Container Capacity

A container shall not exceed 5 gal (18.9 dm^3) capacity. Allowance shall be made for expansion of the liquid within the container due to heating and normal usage.

2.2 Materials

The container shall be constructed of materials free of defects that would impair safety and serviceability over a temperature range of -40°F (-40°C) to 130°F (54°C). All materials shall be compatible with the liquids to be contained. (See Section III, Paragraph 3.7 for test procedures.)

2.3 Flame Arrester

All openings in containers used for handling nonviscous liquids shall be protected by a securely installed flame arrester. It shall cause no undue restriction to the flow of liquid either into or out of the container. The flame arrester shall meet the requirements of Paragraph 3.5.

2.4 Openings

A minimum number of openings shall be provided for each specific use and each opening shall be protected by a spring-loaded, automatic closing device. A single opening may be provided for filling and pouring.

2.5 Vacuum Venting

A vacuum breaking vent shall be provided where venting is not provided at the pour opening during withdrawal of liquid. The arrangement to serve this purpose shall effectively prevent flashback into the container.

2.6 Pressure Venting

A relief vent shall limit the internal container pressure even when subjected to an exposure fire. It may be incorporated as part of the spring-loaded, automatic closure on the pouring or filling spout. The vent's opening point shall not be more than 5 psi (34 kPa) nor less than 3 psi (21 kPa).

2.7 Nozzle

The container may be integrally equipped with a flexible nozzle. The nozzle shall not leak at any joint when filled with gasoline and flexed through its normal range without forcing. No sharp edges shall be exposed with the nozzle attached or separated from the container. If a nonmetallic nozzle is provided, it shall be electrically conductive and made to prevent kinking.

2.8 Handle

A substantial handle shall be provided for comfortably carrying the container and holding it while dispensing the contained liquid.

2.9 Seams

Seam(s) and joints of a metal container shall be lock-seamed and soft/hard soldered, brazed or welded; other joint construction shall be the subject of a special investigation.

2.10 Bottom

The bottom of the safety container shall be recessed and reinforced at the perimeter of the base.

III EXAMINATION AND TESTS

Representative samples of the containers shall be submitted for testing, along with manufacturing drawings and material specifications for examination.

3.1 Stability

The container will be filled to its rated capacity, tipped to an angle of 30° from horizontal and released. It shall return to the normal, upright position and no spillage shall occur.

3.2 Leakage

3.2.1 Any valve shall not leak more than four drops per minute when the container is filled with gasoline and inverted for at least 10 min. The valve shall be able to comply with this test after 5,000 normal opening/closing operations.

3.2.2 All containers shall be subjected to a body/joint air pressure test at 10 psi (69 kPa) while under water and with all tank openings sealed. No leakage of air shall occur at any body seam/joint.

3.3 Strength of Pouring Spout and Handle

3.3.1 A concentrated test load, specified below in Table I, will be applied externally against the pour spout wall ¼ in. (6.3 mm) below the opening on the side opposite the valve opening linkage and perpendicular to the vertical axis of the container body. The spout shall comply with the leakage limits permitted under tightness of valve, Paragraph 3.2.1 after this test.

TABLE I

Container gal.	*Capacity (dm^3)*	*Test Load on Pourspout*		*Test Load on Handle*	
		lb	*(kg)*	*lb*	*(kg)*
Up to 0.5	(1.9)	25	(11.3)	75	(34)
0.5 to 1	(1.9 to 3.8)	50	(22.7)	125	(57)
1 to 2	(3.8 to 7.6)	75	(34)	150	(68)
2 to 3	(7.6 to 11.4)	100	(45)	175	(79)
3 to 5	(11.4 to 18.9)	125	(57)	250	(113)

3.3.2 The carrying handle shall withstand a test load, as specified in Table I, exerting a pull from the center of the normal carrying grip and parallel to the vertical axis of the container. All valves shall be tight and no leakage is permissible in the seams and joints of the container during and at the conclusion of this test.

3.4 Fire Exposure

The container, filled with flammable liquid to its rated capacity and in its normally closed condition, shall be placed upright in a square, steel pan containing water on which is floated 1 in. (25 mm) of normal heptane. The flammable liquid surface shall be 1 in. (25 mm) to 1½ in. (37 mm) above the container bottom. The flammable liquid in the pan shall be ignited and the exposure fire allowed to burn until it is consumed (approximately 8 minutes). The internal, can pressure shall vent throughout the duration of the exposure fire and the contents of the can shall be retained without rupture or spillage.

3.5 Flame Arrester

A combustible, hydrocarbon gas-air mixture (natural gas) shall be passed through the flame arrester, ignited and controlled to burn on the flame screen. After one minute, the flow will cut off abruptly. This procedure will be repeated 5 times consecutively. No evidence shall be found of flame passing through the flame arrester during or at the conclusion of this test.

3.6 Abuse

The container, filled with liquid, shall withstand a drop to a concrete floor (landing on any part of the container except the spout or spout mechanism) from a height of 3 ft (0.9 m) without sufficient damage to cause leakage. This test may be run at any temperature in the range of -40°F (-40°C) to 130°F (54°C).

3.7 Nonmetallic Materials

3.7.1 Samples of the container material shall be subjected to a 30 day chemical test to determine its compatibility with the intended liquid storage. Sample coupons shall not show evidence of softening or swelling. Increase in sample thickness or weight shall not exceed 3%.

3.7.2 A sample container shall be filled to rated capacity with gasoline, sealed and stored for 30 days at approximately 75°F (24°C). The total weight loss shall not exceed 0.10%.

3.7.3 Resistance to mechanical piercing shall be tested at 130°F (54°C) by filling the container with warm water and leaving it for a minimum of 18 hours while supported on four ¼ in. (6.3 mm) diameter bolts.

IV MARKINGS

Each container shall be plainly and permanently marked with the name or recognized trademark of the manufacturer, the model number and rated capacity, and the FM Approvals' mark of approval.