UL 2368

STANDARD FOR SAFETY

Fire Exposure Testing of Rigid Nonmetallic and Composite Nonmetallic Intermediate Bulk Containers for Combustible Liquids

UL Standard for Safety for Fire Exposure Testing of Rigid Nonmetallic and Composite Nonmetallic Intermediate Bulk Containers for Combustible Liquids, UL 2368

Second Edition, Dated January 31, 2012

Summary of Topics

This revision of ANSI/UL 2368 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

The requirements are substantially in accordance with Proposal(s) on this subject dated July 13, 2018.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

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UL 2368

Standard for Fire Exposure Testing of Rigid Nonmetallic and Composite Nonmetallic Intermediate Bulk Containers for Combustible Liquids

First Edition – August, 2001

Second Edition

January 31, 2012

This ANSI/UL Standard for Safety consists of the Second Edition including revisions through October 10, 2018.

The most recent designation of ANSI/UL 2368 as a Reaffirmed American National Standard (ANS) occurred on October 10, 2018. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 This standard includes fire test methods and associated requirements to investigate the ability of rigid nonmetallic or composite rigid nonmetallic intermediate bulk containers (IBCs) to contain combustible liquids when exposed to fire while protected with an automatic wet-pipe sprinkler system installed in accordance with the Flammable and Combustible Liquids Code, NFPA 30.

1.1 revised March 24, 2014

1.2 Deleted March 24, 2014.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard is to comply with the requirements for that component.

2.1.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.3 Undated references

2.3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

3 Glossary

3.1 For the purposes of this standard, the following definitions apply.

3.2 *Deleted March 24, 2014.*

3.3 *Deleted March 24, 2014.*

3.4 INTERMEDIATE BULK CONTAINER (IBC) – Department Of Transportation (DOT) approved shipping container manufactured and marked in accordance with Title 49, Code of Federal Regulations, Part 178; and United Nations Designation 31H1, 31H2, or 31HZ1.

3.5 LEAKAGE – The loss of any liquid from an IBC at a location below its full liquid level.

3.6 STRUCTURAL INTEGRITY – The ability of the IBC to remain in an upright position without toppling over or leaning more than 6 inches (15 cm) or 5 degrees, from a vertical plane, whichever is greater.

CONSTRUCTION

4 General

4.1 IBCs covered by this standard shall have a capacity not exceeding 793 gallons (3000 l) and marked in accordance with 3.4.

4.1 revised March 24, 2014

4.2 IBCs shall be provided with a valve cap seal.

4.2 added March 24, 2014

4.3 IBCs having the valve cap seal broken are not covered by this standard.

4.3 added March 24, 2014

PERFORMANCE

5 General

5.1 Samples representative of each IBC are to be subjected to the following tests. The largest capacity unit is to be evaluated. Similar smaller-sized units need not be evaluated unless their wall thickness is less than that of a larger unit that has been tested with acceptable results.

6 Material Tests

6.1 Test samples of polymeric materials used to construct an IBC are to be subjected to a cone calorimeter test described in ASTM E1354, Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter, for identification purposes.

Exception: Polymeric materials that comply with the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, need not be subjected to this test.

7 Fire Performance Tests

7.1 An IBC shall show no evidence of leakage or loss of structural integrity as described in Section 3, Glossary, when subjected to the large-scale or the reduced-scale fire performance tests described in Sections 8 and 9, respectively.

7.1 revised March 24, 2014

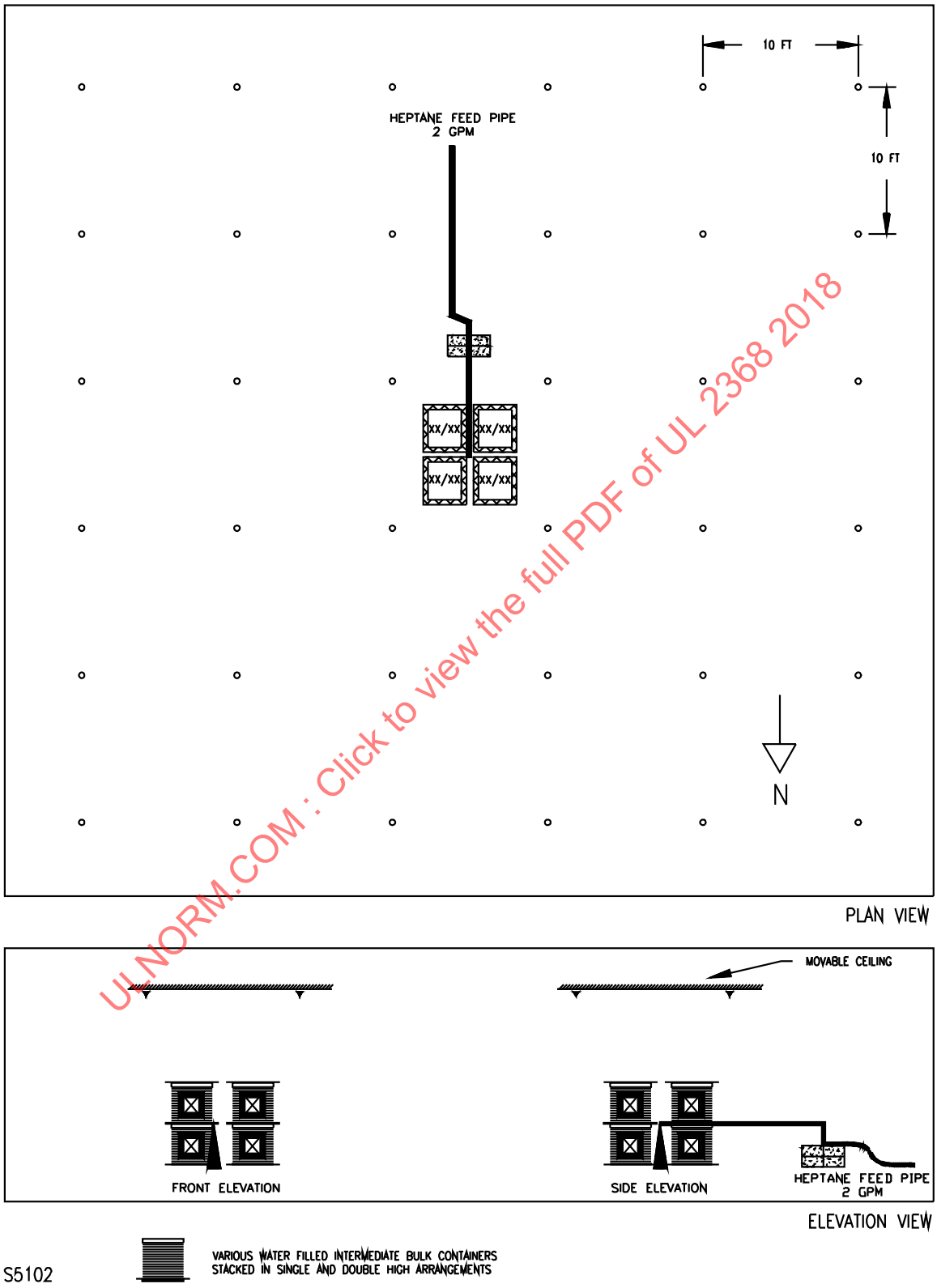
8 Large-Scale Fire Performance Tests

8.1 The large-scale fire performance tests are to be conducted in an enclosed room fitted with a 30-ft (9.2-m) high smooth, flat ceiling. A closed head, wet pipe, automatic sprinkler system utilizing thirty-six 286°F (141°C) standard response nominal K=11.2 upright style sprinklers, installed at a nominal 10-by-10 ft (3-by-3 m) spacing with the sprinkler deflectors 3 – 6 inches (76.2 – 152.4 mm) below the ceiling. The piping system is to be connected to a water supply capable of maintaining the required water discharge density of 0.60 gpm/ft^2(24.5 lpm/m^2).

8.1 revised March 24, 2014

8.2 Eight IBCs are to be filled to their rated capacity, but not more than 98 percent of their overfill capacity, with mineral seal oil and then closed and sealed as for transportation. Each container is then to be stored at 75 ± 5 °F (24 ± 3 °C) for not less than 30 days. The IBCs are then to be arranged in a 2-by-2-by-2 high storage array with 6-in (15.2-cm) longitudinal and transverse flue spaces centered under the ceiling as shown in Figure 8.1.

Figure 8.1
Large-scale fire test



8.3 The following instrumentation is to be provided:

a) Thermocouples located below the ceiling adjacent to each sprinkler to record ceiling temperatures and time of sprinkler operation.

b) Pressure sensors and flowmeters to measure and monitor the water supply to the sprinkler system.

c) Timing devices to monitor and record significant events during the fire tests.

8.4 A three dimensional heptane fire is to be supplied with fuel at a flowrate of 2 gpm (7.6 lpm) through a 1-inch (2.5-cm) upturned pipe elbow located approximately 6 inches (15 cm) above the bottom of the upper unit, flush with the side of the IBC at the center flue intersection of the storage array. The ignition source is to consist of 8 plastic 1-gallon (3.8-l) bags of heptane positioned in the longitudinal and transverse flue spaces as shown in Figure 8.2. The heptane supply is to be opened so as to deliver 2 gallons (7.6 l) of heptane over the area prior to ignition. The 10 gallons (37.8 l) of heptane is then to be ignited with a torch. At the operation of the first ceiling sprinkler, the fuel system is to be turned on to provide 2 gpm (7.6 lpm) of heptane through the fuel delivery system for the remainder of the 30-minute test.

Figure 8.2
Ignition placement details