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SUBJECT 2258

OUTLINE OF INVESTIGATION

FOR

NONMETALLIC TANKS FOR OIL-BURNER FUELS AND OTHER
COMBUSTIBLE LIQUIDS

ISSUE NUMBER: 4

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Summary of Topics

This Issue No. 4 of the Outline of Investigation for Nonmetallic Tanks for Oil-Burner Fuels and Other Combustible Liquids, Subject 2258, is issued to extend the future effective date of August 8, 2010 to August 9, 2011. This change applies to entire Outline.

This issue becomes effective August 9, 2011. See the First Issue for the current requirements until the effective date is met.

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CONTENTS

INTRODUCTION

1 Scope	5
2 Units of Measurement	6
3 Undated References	6
4 Components	6
5 Glossary	6
6 Tank Components and Tank Accessories	9

CONSTRUCTION

7 Size and Form	9
8 Materials	10
9 Primary Tanks	11
10 Secondary Tanks	11
11 Diked Tanks	11
12 Functional Tank Components	12

TANK PERFORMANCE TESTS

13 General	12
------------------	----

NORMAL USE TESTS

14 Tank Drop Test	13
15 Tank Handle and Lift Lug Strength Test	13
16 Pipe and Fitting Torque Test	13
17 Pipe and Fitting Bending Test	14
18 Tank Impact Test	14
19 Tank Stability and Support Load Test	15
20 Rain Test	15

ABNORMAL USE TESTS

21 Tank Top Load Test	17
22 Tank Stability Test	17
23 Interstitial Communication Test	17
24 Bouyancy Test	18
25 Freeze/Thaw Cycle Test	18
26 Proof of Design and Hydrostatic Load Tests	18
27 Pool Fire Test	19
28 Comparative Small Scale Fire Test	22

MATERIALS COMPATIBILITY TESTS

29 General	22
30 Permeation Test	23
31 Material Property Tests	24
32 Thermal Compatibility Test	25
33 Fuel Compatibility Tests	25

34	Fluids Compatibility Tests	25
35	UV Compatibility Test	25
36	Extreme Temperature Tests	26
37	Nonmetallic Stress Cracking Test	26
38	Metallic Stress Cracking Test	26

MANUFACTURING AND PRODUCTION TESTS

39	Leakage Test	27
----	--------------------	----

MARKINGS

40	General Marking Information	27
41	Engineering Markings	28
41.1	All tanks	28
41.2	Primary containment tanks	29
41.3	Secondary containment tanks	29
41.4	Diked tanks	29
41.5	Tank accessories	30
42	Marking Methods	30

INSTRUCTIONS

43	General	30
----	---------------	----

APPENDIX A REPRESENTATIVE COMBUSTIBLE LIQUIDS TEST FUEL MIXTURES

A.1	Representative Aggressive Combustible Test Fuel Mixtures	A1
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INTRODUCTION

1 Scope

Section 1 effective August 9, 2011

1.1 These requirements cover nonmetallic or composite primary, secondary and diked type atmospheric storage tanks from 60 – 660 gallons (227 – 2500 L) intended primarily for the storage and supply of heating fuel for oil burning equipment, or alternately for the storage of diesel fuels for compression ignition engines and motor oils (new and used) for automotive service stations, in aboveground applications.

1.2 Each tank type is permitted to be fabricated in a combination of various shapes (cylindrical, rectangular or obround), orientations (horizontal, vertical) and may have integral options (tank supports or accessories) as covered in this Outline of Investigation.

1.3 These shop built tanks are completely fabricated, inspected, and tested for leakage before shipment from the factory as completely assembled vessels except for options intended for field assembly in accordance with the manufacturers instructions.

1.4 These tanks are intended for installation and use in accordance with the Standard for the Installation of Oil-Burning Equipment, ANSI/NFPA 31; the Flammable and Combustible Liquids Code, ANSI/NFPA 30; the Code for Fuel Dispensing Facilities and Repair Garages, NFPA 30A; and the International Fire Code published by the International Code Council.

1.5 These requirements do not apply to steel tanks covered by the Standard for Steel Underground Tanks for Flammable and Combustible Liquids, UL 58; the Standard for Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids, UL 80; or the Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids, UL 142.

1.6 These requirements do not apply to nonmetallic tanks covered by the Standard for Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures, UL 1316; or the Standard for External Corrosion Protection Systems for Steel Underground Storage Tanks, UL 1746.

1.7 These requirements do not cover storage of waste oils or other combustible liquids with different fire, physical or material compatibility properties with respect to the intended liquids in 1.1, but do cover 100 percent bio diesel and bio diesel blends up to 20 percent. These requirements do not cover storage of flammable liquids.

1.8 These requirements do not cover special evaluations for resistance to hurricanes, tornadoes, earthquakes, floods, fires or other natural disasters; or resistance to vehicle impact.

2 Units of Measurement

Section 2 effective August 9, 2011

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

3 Undated References

Section 3 effective August 9, 2011

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

4 Components

Section 4 effective August 9, 2011

4.1 Except as indicated in 4.2, a component of a product covered by this Outline of Investigation shall comply with the requirements for that component.

4.2 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 a product covered by this Outline of Investigation, or
- b) Is superseded by a requirement in this Outline of Investigation.

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

4.4 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.

5 Glossary

Section 5 effective August 9, 2011

5.1 For the purposes of this Outline, the following definitions apply.

5.2 ABOVEGROUND TANK (also known as ABOVEGROUND STORAGE TANK or AST) – A storage tank that is intended for installation above grade, at grade or below grade without backfill.

5.3 ATMOSPHERIC TANK – A storage tank that has been designed to operate at pressures from atmospheric through a gauge pressure of 1.0 psig (6.9 kPa) measured at the top of the tank.

5.4 BIO DIESEL – General description of various Class II to IIIB range of long chain fatty acid ester fuels complying with ASTM D6751 processed from vegetable oils or animal fats in pure form (B100). Bio diesel may also be blended with heating fuels or diesel fuels (B1-B99) denoting the percent volume of bio diesel in the mix.

5.5 DIESEL FUELS – General description of various Class II petroleum distillate grades complying with ASTM D975 including No. 1 and No. 2 Diesel Fuel (also known as on-road diesel, including low sulfur diesel, ultra low sulfur diesel and bio diesel blends) typically intended for powering compression ignition engines.

5.6 DIKE – A single wall construction forming a bottom and high sides with open or closed top intended to provide integral support and secondary containment of an aboveground tank(s) but not capable of being pressurized for leak testing. Dike types include combinations of rectangular or cylindrical shapes or horizontal or vertical orientations. Open top dike constructions do not have covers to prevent precipitation or debris from entering the dike area. Closed top dike constructions have covers to resist precipitation or debris from entering the dike area.

5.7 DIKED PRIMARY TANK – An aboveground primary tank within an open or closed dike intended to provide at least 110 percent containment capacity of the primary tank(s) and spill containment.

5.8 DIKED SECONDARY TANK – An aboveground secondary tank within an open or closed dike intended to provide at least 110 percent containment capacity of the primary tank(s) and spill containment.

5.9 FIRE JACKET – An external material enclosing the primary tank, secondary tank or dike tank which is intended to provide protection from fire, physical damage, or both.

5.10 HEATING FUELS – General description of various Class II petroleum distillate grades complying with ASTM D395 or ASTM D3699, including No. 1 and No. 2 Fuel Oils or K1 Kerosene (also known as oil burner fuel, including low sulfur distillates and bio diesel blends), typically intended for use in oil burning equipment.

5.11 INTERSTITIAL SPACE – The volume between two tank walls that is capable of communicating fluid from a leak in the primary tank to a collection point for purposes of monitoring and venting.

5.12 LOW SULFUR DIESELS – Diesel fuels with additional processing to reduce the sulfur content $\leq$ 500 ppm (low sulfur diesel) or $\leq$ 15 ppm (ultra low sulfur diesel).

5.13 MOTOR OILS – General description of various Class III petroleum distillate or synthetic grades including lube oils, hydraulic oils or transmission oils typically used as lubricating, cooling, or working fluids in motor vehicle applications.

5.14 NONMETALLIC TANK (also known as TANK SYSTEM) – A storage tank that is constructed of a nonmetallic primary tank and optional fire jacket, metallic secondary or dike, or nonmetallic secondary or dike.

5.15 PERFORMANCE TESTS – A complete evaluation conducted on a limited quantity of representative “worst case” tanks intended to verify compliance with all applicable performance requirements in a Standard. Performance tests are typically destructive.

5.16 PRIMARY CONTAINMENT – The ability of an enclosed design or construction to contain a liquid while in normal use without leakage.

5.17 PRIMARY CONTAINMENT TANK (also known as PRIMARY TANK or SINGLE WALL TANK) – A single wall tank construction that provides primary containment. Primary containment tank types include cylindrical, rectangular or obround shapes and vertical or horizontal orientations.

5.18 PRODUCTION TESTS – A limited evaluation conducted by the tank manufacturer on each tank after complete assembly but prior to shipping intended to verify compliance with critical production requirements in a Standard, such as leakage. Production tests are not destructive.

5.19 RELIEF DEVICE – A mechanical or electrical device which automatically reduces the risk of over pressure of any part of the tank system.

5.20 SECONDARY CONTAINMENT – The ability of a design or construction to contain a liquid to a minimum of 300 degrees (for cylindricals and obrounds), 95 percent height (for rectangulars and verticals), or 110 percent primary capacity (for dikes) only in abnormal use (from primary containment leakage or rupture) for short periods without leakage.

5.21 SECONDARY CONTAINMENT TANK (also known as SECONDARY TANK or DOUBLE WALL TANK) – A double wall tank construction with interstitial space that provides secondary containment that is capable of being pressurized for leak testing. Secondary containment tank types include cylindrical, rectangular or obround shapes, and vertical or horizontal orientations.

5.22 STORAGE TANK (also known as TANK) – A vessel having a liquid capacity of at least 60 gal (230 L), is intended for fixed installation, and is not used for processing.

5.23 SUPPLY CONNECTION – A storage tank top or bottom opening that is intended to provide a means to supply fuel to oil burning equipment or oil to a dispensing device by gravity or suction. Bottom connections also provide a means to automatically drain water from the tank.

5.24 TANK ACCESSORY – Optional devices or components of an aboveground tank intended to provide a specific function, such as venting, heating, load bearing, or special containment. Tank accessories are either integrally connected or field assembled to the tank and may be emergency vents, hot wells, lift lugs, spill containers or other types.

5.25 TANK ORIENTATIONS – General description of the position of an aboveground tank with respect to stability. Horizontal tanks typically are longer and wider than high. Vertical tanks typically are higher than wide.

5.26 TANK SHAPES – General description of the geometry of an aboveground tank. Cylindrical tanks are tubes formed with formed shells and equivalent circular heads. Rectangular tanks are boxes formed with flat right angled sides. Obround tanks are cylindrical tanks with flat portions of the shell and head on 2 opposing sides.

5.27 TANK SUPPORT – Optional structural members of an aboveground tank intended to bear the weight of, raise above grade and/or stabilize the tank and its contents. Tank supports are integrally connected to the tank and may be saddle, leg, flat, skid or other types.

5.28 USED OILS – General description of oils such as those drained from motor vehicles or cooking appliances after use that do not contain water, gas or other contaminants that change the oil Class or may adversely affect the storage tank.

5.29 VENT OPENING – A storage tank top opening that is intended to provide both normal venting (equalizing pressure from fill, withdraw or atmospheric changes typically up to 1.0 psig) and emergency venting (relief of excessive pressure from external fire exposure typically not to exceed 2.5 psig).

5.30 WASTE OIL – General description of oils that have been drained from motor vehicles or cooking appliances after use that contain some amounts of water, gasoline, diesel, or other contaminants that change the oil Class or may adversely affect the storage tank.

6 Tank Components and Tank Accessories

Section 6 effective August 9, 2011

6.1 The following tank components may be provided as either an attached part of a complete tank, or packed with a tank for assembly per the manufacturers instructions at the installation site. When provided, these components shall comply with all applicable requirements of the Standards identified below:

- a) Fuel Filters or Oil Deairators per the Standard for Strainers for Flammable Fluids and Anhydrous Ammonia, UL 331 rated at least 25 psig for use with combustible liquids described in the scope intended for connection to the burner supply.
- b) Fusible Link Valves or Shutoff Valves per the Standard for Valves for Flammable Fluids, UL 842 rated at least 25 psig for use with the combustible liquids described in the scope intended for connection for the burner supply.
- c) Liquid Level Gauges, Vent Signal Devices or Leak Detection Devices per the Standard for Liquid-Level Indicating Gauges for Oil Burner Fuels, UL 180 rated at least 25 psig for use with the combustible liquids described in the scope intended for use in a top openings.

6.2 The following tank accessories may be provided as either an attached part of a complete tank, or packed with a tank for assembly per the manufacturers instructions at the installation site. When provided these accessories shall comply with all applicable requirements identified below:

- a) Spill Containers shall be plastic or steel leak tight constructions integral to the tank with attached covers, and have a minimum 1.0 gal (3.8 L) capacity for use around top openings such as fill and vents.
- b) Piping for Fittings for legs supports shall be minimum Schedule 40 ASME B36.10M black pipe in sizes and threads to fit the integral leg brackets and comply with the Pipe and Fitting Bending Test, Section 17.

CONSTRUCTION

7 Size and Form

Section 7 effective August 9, 2011

7.1 Tanks of this class shall be cylindrical, obround, rectangular or of another form which complies with all applicable performance tests but shall not exceed a primary tank capacity of 660 gallons (2500 L). The marked nominal capacity shall be within 95 – 100 percent of the actual capacity.

7.2 Primary tanks shall be formed or molded from only non-metallic materials which comply with the applicable requirements in this Outline of Investigation. Tanks of any form shall not have any shell penetrations below the liquid level line except for supply connections.

7.3 Secondary tanks shall have containment of at least 300 degrees or 95 percent height of the primary tank and an interstitial space capable of being vented and monitored. The secondary tank walls are permitted to be in direct contact or separated by supporting members.

7.4 The secondary shall not have any drains or shell penetrations except for welded through connections for burner supply piping or top fittings from the primary tank, or the secondary interstitial vent.

7.5 The secondary top opening shall be permitted to combine venting and monitoring.

7.6 Diked Tanks shall have containment of at least 110 percent of the primary tank, spill coverage of at least 1 inch beyond the primary tank projected area, and a wall height of at least 1/2 the primary tank height (with supports). The dike shall have tank hold downs.

7.7 The dike shall not have any drains or wall penetrations except for welded and supported through connections for burner supply piping from the primary tank.

7.8 The dike may be of either an open or closed top design with/without baffles or supports but shall not prevent venting or liquid flow.

8 Materials

Section 8 effective August 9, 2011

8.1 All materials shall be evaluated for compatibility with the intended fluids, installation and use as identified in this Section. Combinations of materials shall be compatible with each other with respect to dielectric corrosion or other chemical reactions between materials.

8.2 Other than as indicated in 8.3, a product shall be factory built as a complete assembled unit and shall include all the essential components necessary for its intended function.

8.3 If the product is not assembled by the manufacturer as a complete unit, it shall be arranged in subassemblies where it shall be capable of being incorporated into a final assembly without alteration, such as cutting, drilling, threading, welding, or similar operations by the installer or user. Two or more subassemblies that have a definite relationship to each other for the intended installation or operation of the product, shall:

a) Be arranged and constructed to be incorporated into the complete assembly without need for fitting or alignment, or

b) Be assembled, production tested, and shipped from the factory as one element except for fittings, components and accessories per Tank Components and Tank Accessories, Section 6.

8.4 All completely assembled tanks shall comply with Tank Performance Tests in Sections 13 – 27 for Normal Use and Abnormal Use as appropriate.

8.5 All polymeric materials and composites where polymers are the major component shall additionally comply with Materials Compatibility Tests in Sections 28 – 38 as appropriate.

8.6 All metallic materials and composites where metals are the major component shall additionally comply with Materials Compatibility Tests in Sections 28 – 38 as appropriate.

8.7 All fittings and pipe provided with the tank intended to be connected to external pipe (fill, vent) or devices (gauge) shall be compatible with NPT threaded pipe.

8.8 Electrical components, whether provided by or recommended for use by the manufacturer, shall not be located inside the primary tank, secondary tank or dike tank unless evaluated for the application.

9 Primary Tanks

Section 9 effective August 9, 2011

9.1 Primary tanks shall be constructed from non-metallic or combinations of metallic and nonmetallic materials which comply with the applicable requirements in this Outline of Investigation.

9.2 Primary tanks shall have a minimum of three top openings (fittings or pipe) of equal size not less than 2 inches (50.8 mm) in diameter for connection of fill and vent piping, and a liquid-level gauge.

9.3 Primary tanks shall have provisions for a minimum 1/2 inch (12.7 mm) burner connection for fuel withdraw located either in the top, bottom or head of the primary.

10 Secondary Tanks

Section 10 effective August 9, 2011

10.1 Secondary tanks are permitted to be constructed from metallic, non-metallic or combinations of metallic and nonmetallic materials or which comply with the applicable requirements in this Outline of Investigation.

10.2 Secondary tanks shall have a minimum of one top opening (fitting or pipe) not less than 2 inches (50.8 mm) in diameter for connection of the interstitial vent pipe.

10.3 Secondary tanks shall have containment features per 7.3 – 7.5 with provisions for a minimum 1/2 inch (12.7 mm) opening for monitoring the interstitial space located only in the top of the secondary.

11 Diked Tanks

Section 11 effective August 9, 2011

11.1 Dike tanks are permitted to be constructed from metallic, non-metallic or combinations of metallic and nonmetallic materials or which comply with the applicable requirements in this Outline of Investigation.

11.2 Dike tanks shall be either closed-top types with penetrations only for primary tank fittings and pipe, or open-top types with additional openings permitted.

11.3 Diked tanks shall have containment features per 7.6 – 7.8 with provisions for a minimum 1/2 inch (12.7 mm) opening for monitoring the interstitial space located only in the top of the dike.