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NATIONAL STANDARD

ANSI/CAN/UL/ULC 1316:2018

Standard for Fibre Reinforced Underground Tanks for Flammable and Combustible Liquids

Approved American National Standard
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ANSI/UL 1316-2019

Standards Council of Canada
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UL Standard for Safety for Fibre Reinforced Underground Tanks for Flammable and Combustible Liquids, ANSI/CAN/UL/ULC 1316:2018

Third Edition, Dated November 21, 2018

Summary of Topics

This March 2019 revision of UL/ULC 1316 has been issued as part of the project to support the National Research Council of Canada program to address Climate Change Adaptation in Canadian Codes and Standards.

The new and revised requirements are substantially in accordance with Proposal on this subject dated August 24, 2018.

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Standard for Fibre Reinforced Underground Tanks for Flammable and Combustible Liquids

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November 21, 2018

This ANSI/CAN/UL/ULC Safety Standard consists of the Third Edition including revisions through March 12, 2019.

The most recent designation of ANSI/UL 1316 as an American National Standard (ANSI) occurred on March 12, 2019. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface or SCC Foreword.

This standard has been designated as a National Standard of Canada (NSC) on March 12, 2019.

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Preface

This is the Third Edition of the ANSI/CAN/UL/ULC 1316, Standard for Fibre Reinforced Underground Tanks for Flammable and Combustible Liquids, including revisions through March 12, 2019.

UL is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. ULC Standards is accredited by the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

Appendices A through E, are identified as Normative, forms a mandatory part of this Standard.

Appendix F, identified as Informative, is for information purposes only.

This ANSI/CAN/UL/ULC 1316 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This Third Edition Joint American National Standard and National Standard of Canada is based on, and now supersedes, the Second Edition of UL 1316 and the Third Edition of CAN/ULC-S615-14.

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 http://csds.ul.com.

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a "yes" or "no" answer based on the literal text of the requirement concerned.

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This Edition of the Standard has been formally approved by the Joint UL/ULC Technical Committee (TC) on Flammable and Combustible Liquid Underground Tanks, TC 1316.

This list represents the TC 1316 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

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This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

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INTRODUCTION

1 Scope

1.1 This Standard sets forth minimum design and construction requirements for fibre reinforced plastic, non-pressure tanks that are used for the underground storage of flammable and combustible liquids, such as:

a) Petroleum products, including petroleum hydrocarbon fuels with low-biofuels blends, per specifications, and similar flammable or combustible liquid petroleum derivatives, such as fuel components (cetane, hexane, heptane), and oils (lubricating, hydraulic, machine);

b) Oxygenated fuel blends, including all "petroleum product" liquids plus petroleum hydrocarbon fuels with low-biofuels blends;

c) Oxygenates, including all “petroleum product” and "oxygenated fuel blends" liquids plus pure/ denatured or highest oxygenated blend stocks for use in mixing of dispensed lower fuel-blends and components, such as biodiesel and ethanol; and

d) Other flammable and combustible liquids (for which the test fuels in Appendix A are not considered to be sufficient or applicable) that can be demonstrated or determined to be compatible with the reinforced plastic underground tank materials as determined by the certifier.

In addition to this Standard’s traditional safety requirements for underground fiber reinforced plastic tanks that primarily evaluate structural integrity, material compatibility and mitigate environmental hazards from loss of liquid containment under expected normal conditions; optional construction and/or performance requirements, and associated ratings, intended to address more severe conditions associated with the effects of Climate Change are included in Appendix F.

NOTE: The test fuels in Appendix A are considered to be sufficient and representative for US or Canadian approved motor fuels, off-road fuels, gasoline from renewable and petroleum feedstocks, diesel, renewable diesel, synthetic diesel, biodiesel, kerosene, aviation fuels, jet fuels, fuel oil and heating oil as referenced in (a), (b), and (c).

1.2 This Standard covers tanks of either single, double or multiple wall construction.

1.3 Tanks covered by this Standard are fabricated, inspected, and tested for leakage prior to shipment from the factory as completely assembled vessels.

1.4 This Standard covers tanks where the primary tank may have a single compartment or have multiple compartments.

1.5 These tanks are intended for installation and use in accordance with applicable documents in the following list:

a) In Canada:

1) National Fire Code of Canada;

2) CAN/CSA-B139, Installation code for oil-burning equipment;

3) CCME PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products;

4) Regulations of the authority having jurisdiction; and

b) In the United States:

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1) Standard for the Installation of Oil-Burning Equipment, NFPA 31;

2) Flammable and Combustible Liquids Code, NFPA 30; and

3) Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A, as applicable.

1.6 Accessories, such as, ladders, tank sumps, risers, and guide lugs, that do not affect tank performance and are attached to the tank internally or externally during manufacture are permitted but not covered by this standard.

1.7 Except for optional Climate Change Adaptation requirements in Appendix F, these requirements do not cover special evaluations for resistance to, or use after earthquakes, floods, high wind events, or other natural disasters.

NOTE: See the Note at the beginning of Appendix F for further information on the terms “Adaptation” and “Mitigation”, as they pertain to Climate Change.

2 Units of Measurement and References

2.1 When a value for measurement is followed by a value in other units in parentheses, the second unit is only approximate. The first stated value is the requirement.

2.2 Any undated references 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, refer to Appendix B.

3 Glossary

3.1 AUTHORITY HAVING JURISDICTION (AHJ) – The governmental body responsible for the enforcement of any part of this Standard or the official or agency designated by that body to exercise such a function.

3.2 COMBUSTIBLE LIQUID – Any liquid having a flash point at or above 37.8 °C (100 °F) and below 93.3 °C (200 °F) and as defined in the National Fire Code of Canada and NFPA 30, Flammable and Combustible Liquids Code.

3.3 CRUSHED STONE – Washed, crushed aggregate or crushed gravel with an angular particle size of not more than 13 mm (0.5 in) diameter that is clean and free flowing and with no more than 5 % passing a No. 8 sieve (2.38 mm screen size opening). The material has a minimum dry gravel density of 1520 kg/m^3 (95 lb/ft^3) and meets the Fine Aggregate requirements for deleterious substances and soundness of ASTM C33/C33M, Standard Specification for Concrete Aggregates.

3.4 DESIGN SERIES – A tank design series is a set of tanks of the same diameter, number of walls, and head shape that vary in length.

3.5 DOUBLE WALL TANK – A primary tank with an integral secondary containment where the space between the walls is capable of being monitored.

3.6 FIBRE REINFORCED PLASTIC (FRP) – A composite material consisting of a combination of rigid thermoset resin and glass fibre reinforcements. The glass fibre reinforcements may take the form of short randomly oriented fibre and/or woven or nonwoven fabrics and/or glass fibre rovings.

3.7 FLAMMABLE LIQUID – Any liquid having a flash point below 37.8 °C (100 °F) and a vapour pressure not exceeding 275 kPa (absolute) (40 psig) at 37.8 °C (100 °F) and as defined in the National Fire Code of Canada, and NFPA 30.

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3.8 INTERSTICE / INTERSTITIAL SPACE or ANNULAR SPACE – The space between the walls that is capable of being monitored for leakage through:

a) the primary tank wall;

b) the secondary containment wall;

c) the multiple containment walls; or

d) monitorable bulkheads.

3.9 MANWAY – An opening on a tank designed to provide personnel access to the interior of the tank.

3.10 MONITORABLE BULKHEAD / BULKHEAD – A partitioning structure within a primary tank separating the primary tank into independent liquid containment compartments and consisting of two layers of material with a space between them that is capable of being monitored for leaks.

3.11 MULTIPLE WALL TANK – A double wall tank, which incorporates additional tank walls of containment where each interstice is capable of being monitored independently.

3.12 NONPRESSURE TANK – A tank that is vented to atmosphere in a manner that will maintain internal pressures at the top of the tank of 0 ±7 kPa (0 ±1 psig).

3.13 PEA GRAVEL – A naturally rounded aggregate, actual size no greater than 19 mm (0.75 in), freeflowing and with no more than 5 % passing a No. 8 sieve (2.38 mm screen size opening). The material has a minimum dry gravel density of 1520 kg/m^3 (95 lb/ft^3) and meet the Fine Aggregate requirements for deleterious substances and soundness of ASTM C33, Standard Specification for Concrete Aggregates. Local names vary and include "pea gravel", "pea stone", "roofing gravel", etc.

3.14 PRIMARY TANK – The product storage tank or compartment.

3.15 SECONDARY CONTAINMENT / CONTAINMENT – A structure that is external to the primary tank designed to create an interstice and capture and contain leakage in case of failure of the primary tank.

3.16 STRIKER PLATES – also known as impact pads, deflector or deflection plates, or gauge plates. A device designed to prevent possible damage to the inside tank wall surface from repeated impact of dipsticks or other devices used to gauge tank contents.

CONSTRUCTION

4 General

4.1 All tank types constructed in accordance with this Standard shall use fibre reinforced plastic materials to form all liquid containment surfaces except openings, manways, and lift lugs and shall be spherical or shall have a cylindrical shell with any shape heads, but are permitted to be primary, secondary or tertiary containment types of any capacity.

4.2 Tanks shall be capable of being lifted for transport and installation, and shall be capable of being anchored against upheaval by ground water. The lifting means shall be evaluated per Section 15, Tank Lifting Test, and the anchoring means shall be evaluated per Section 18, Buried Tank Load Test.

4.3 Tanks shall be designed for burial with 2.13 m (7.0 ft) of backfill above the tank top shell, unless specifically tested for greater burial depth.

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