NATIONAL
STANDARD
OF CANADA

CAN/ULC-S615-14

STANDARD FOR FIBRE REINFORCED PLASTIC UNDERGROUND TANKS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

ULC Standards
Normes ULC

Standards Council of Canada
Conseil canadien des normes

Underwriters Laboratories of Canada (ULC) was established in 1920 by letters patent issued by the Canadian Government. It maintains and operates laboratories and certification services for the examination, testing and certification of appliances, equipment, materials, constructions and systems to determine their relation to life, fire and property hazards as well providing inspection services.

Underwriters Laboratories of Canada is accredited by the Standards Council of Canada as a Certification Organization, a Testing Organization, and an Inspection Body under the National Standards System of Canada.

ULC Standards develops and publishes standards and other related publications for building construction, security and burglar protection, environmental safety, electrical equipment, fire protection equipment, gas and oil equipment, thermal insulation products, materials and systems, energy use in the built environment and electrical utility safety.

ULC Standards is a not-for-profit organization and is accredited by the Standards Council of Canada as a Standards Development Organization.

National Standards of Canada developed by ULC Standards conform to the criteria and procedures established by the Standards Council of Canada. Such standards are prepared using the consensus principle by individuals who provide a balanced representation of interests relevant to the subject area on a national basis.

ULC is represented across Canada as well as many countries worldwide. For further information on ULC services, please contact:

Customer Service: 1-866-937-3852

CORPORATE HEADQUARTERS
Underwriters Laboratories of Canada
7 Underwriters Road
Toronto, Ontario M1R 3A9
Telephone: (416) 757-3611
Fax: (416) 757-9540

REGIONAL OFFICES

PACIFIC OFFICE
13775 Commerce Parkway, Suite 130
Richmond, British Columbia V6V 2V4
Telephone: (604) 214-9555
Fax: (604) 214-9550

EASTERN OFFICE
6505, Rte Transcanadienne, Suite 330
St-Laurent, Québec H4T 1S3
Telephone: (514) 363-5941
Fax: (514) 363-7014

The Standards Council of Canada (SCC) is the coordinating body of the Canadian standardization network, which is composed of people and organizations involved in the development, promotion and implementation of standards. Through the collaborative efforts of Canadian standardization network members, standardization is helping to advance the social and economic well-being of Canada and to safeguard the health and safety of Canadians. The network's efforts are overseen by SCC.

The principal objectives of SCC are to foster and promote voluntary standardization as a means of advancing the national economy, supporting sustainable development, benefiting the health, safety and welfare of workers and the public, assisting and protecting the consumer, facilitating domestic and international trade, and furthering international cooperation in relation to standardization.

An important facet of the Canadian standards development system is the use of the following principles: consensus; equal access and effective participation by concerned interests; respect for diverse interests and identification of those who should be afforded access to provide the needed balance of interests; mechanism for dispute resolution; openness and transparency; open access by interested parties to the procedures guiding the standards development process; clarity with respect to the processes; and Canadian interest consideration as the initial basis for the development of standards.

A National Standard of Canada (NSC) is a standard prepared or reviewed by an SCC-accredited SDO and approved by the SCC according to NSC approval requirements. Approval does not refer to the technical content of the standard, as this remains the responsibility of the SDO. An NSC reflects a consensus of a number of capable individuals whose collective interests provide, to the greatest practicable extent, a balance of representation of general interests, producers, regulators, users (including consumers) and others with relevant interests, as may be appropriate to the subject at hand. NSCs are intended to make a significant and timely contribution to the Canadian interest.

Those who have a need to apply standards are encouraged to use NSCs. These standards are subject to periodic review. Users of NSCs are cautioned to obtain the latest edition from the SDO that publishes the standard.

The responsibility for approving standards as NSCs rests with:

Standards Council of Canada
270 Albert Street
Suite 200
Ottawa, Ontario
K1P 6N7
Telephone: (613) 238-3222

For further information on ULC standards, please contact:

ULC STANDARDS
171 Nepean Street, Suite 400
Ottawa, Ontario K2P 0B4
Telephone: (613) 755-2729
Fax: (613) 231-5977

E-mail: customerservice@ulc.ca
Web site: www.ulc.ca

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.

Copies of this National Standard of Canada may be ordered from ULC Standards.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE

NATIONAL STANDARD OF CANADA

CAN/ULC-S615-14

STANDARD FOR FIBRE REINFORCED PLASTIC UNDERGROUND TANKS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

ICS 23.020.10

Prepared and Published by

ULC Standards
Normes ULC

Approved by

Standards Council of Canada
Conseil canadien des normes

First Edition . . . . . February 1983
Second Edition . . . . . February 1998
THIRD EDITION . . . . . OCTOBER 2014

Copyright © 2014

ULC Standards
All rights reserved. No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior permission of Underwriters Laboratories of Canada.

TABLE OF CONTENTS

ULC STANDARDS COMMITTEE ON STATIONARY NONMETALLIC STORAGE CONTAINERS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS I

ULC STANDARDS TASK GROUP ON FIBRE REINFORCED PLASTIC UNDERGROUND TANKS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS II

PREFACE III

1 SCOPE 1

2. REFERENCE PUBLICATIONS 1

3 GLOSSARY 4

4 CONSTRUCTION 6

4.1 GENERAL 6
4.2 ACCESS TO LEAK MONITORING 6
4.3 VENT OPENINGS 6
4.4 LIFTING 6
4.5 MANWAYS 7
4.6 INTERNAL PROTECTION 7
4.7 TANK CONNECTIONS 7
4.8 SUPPLEMENTARY EQUIPMENT AND MANUALS 8
4.9 CORROSION PROTECTION 8

5 PERFORMANCE 8

5.1 GENERAL 8
5.2 LEAKAGE TEST 9
5.3 TANK INTEGRITY TESTING 9
5.4 MANWAYS 9
5.5 LIFTING LUGS 10
5.6 HYDROSTATIC PRESSURE 10
5.7 CONCENTRATED LOADING 10
5.8 FLOOD LOADING 11
5.9 TANK CONNECTIONS 11
5.10 IMMERSION 12

6 PRODUCTION TESTS 12

6.1 LEAKAGE TEST 12

7 MARKING 13

8 INSTALLATION INSTRUCTIONS 14

TABLES 16

FIGURES 18

APPENDIX A (INFORMATIVE) LIST OF STANDARDS ON FUELS AND OTHER FLAMMABLE AND COMBUSTIBLE LIQUIDS 19

APPENDIX B (INFORMATIVE) INSTALLATION INSTRUCTIONS 21

APPENDIX C (INFORMATIVE) GUIDELINES FOR MINIMUM VENT LINE INTERNAL DIAMETERS 23

APPENDIX D (INFORMATIVE) TEST FUEL FORMULATIONS 24

D1 REPRESENTATIVE AGGRESSIVE COMBUSTIBLE TEST FUEL MIXTURES AND UL-B100 ... 24

D2 REPRESENTATIVE AGGRESSIVE FLAMMABLE TEST FUELS AND MIXTURES 25

ULC STANDARDS COMMITTEE ON STATIONARY NONMETALLIC STORAGE CONTAINERS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

NAME	AFFILIATION	REGION	CATEGORY
A. Crimi (Chair)	AC Consulting Solutions Inc.	Ontario	General Interest
A. Barker	Technical Standards & Safety Authority	Ontario	Regulator
M. Beaulieu	Roth Industries Ltd.	Canada	Producer
E. Bourassa	Granby Industries LP	Canada	Producer
C. Deschamps	Régie du bâtiment du Québec	Québec	Regulator
A. Dornan	Environment Canada	Canada	Regulator
J. Dutton	Department of Environment and Conservation	Newfoundland and Labrador	Regulator
D. Edgecombe	Petroleum Tank Management Associationn of Alberta	Alberta	Regulator
E. Fernandes	ON Petroleum Contractors Association	Ontario	User
L. Grainawi	Steel Tank Institute	U.S.A.	General Interest
S. Hyde-Clarke	National Research Council of Canada	Canada	General Interest
S. Jones	J and B Engineering, Inc.	Canada	General Interest
P. Legault	Department of National Defence	Canada	User
D. Lenart	Imperial Oil	Canada	User
M. Mailvaganam	Consultant	Ontario	General Interest
A. Mills	Layfield Geosynthetics	Alberta	Producer
G. Nikolic	MHCC Consultants Inc.	Ontario	General Interest
W. Schneider	Containment Solutions Inc.	U.S.A.	Producer
R. Scragg	ZCL Composites	Canada	Producer
R. Smith	Canadian Oil Heat Association	Canada	User
R. Stephenson	Chevron	Canada	User
W. Trussler	Ship's Point Consulting	B.C.	General Interest
S. Villeneuve	Vilco Ltd.	Nova Scotia	Producer
R. Murphy (Associate Member)	Containment Solutions Inc.	Canada	Non-Voting
R. Riegel (Associate Member)	UL LLC	U.S.A.	Non-Voting
R. Sumabat (Associate Member)	Technical Standards & Safety Authority	Ontario	Non-Voting
T. Espejo (Project Manager)	ULC Standards	Canada	Non-Voting

This list represents the membership at the time the Committee balloted on the final text of this edition. Since that time, changes in the membership may have occurred.

ULC STANDARDS TASK GROUP ON FIBRE REINFORCED PLASTIC UNDERGROUND TANKS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

MEMBER	REPRESENTING
A. Crimi (Chair)	AC Consulting Solutions Inc., Ontario
A. Barker	Technical Standards and Safety Authority, Ontario
E. Bourassa	Granby Industries LP, Canada
J. Dutton	Department of Environment and Conservation, Newfoundland and Labrador
E. Fernandes	ON Petroleum Contractors Assn, Ontario
D. Edgecombe	Petroleum Tank Management Association of Alberta, Alberta
L. Grainawi	Steel Tank Institute, U.S.A.
S. Jones	J and B Engineering Inc., Canada
P. Legault	Department of National Defence, Canada
D. Lenart	Imperial Oil, Canada
G. Nikolic	MHCC Consultants Inc., Ontario
R. Riegel	UL LLC, U.S.A.
W. Schneider	Containment Solutions Inc., U.S.A.
R. Scragg	ZCL Composites, Canada
T. Espejo (Project Manager)	ULC Standards, Canada

STANDARD FOR FIBRE REINFORCED PLASTIC UNDERGROUND TANKS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

PREFACE

This is the Third Edition of the Standard for Fibre Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids, CAN/ULC-S615-14.

This Edition of the Standard was developed by the ULC Standards Task Group on Fibre Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids, and has been formally approved by the ULC Standards Committee on Stationary Nonmetallic Storage Containers for Flammable and Combustible Liquids.

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.

In Canada, there are two official languages, English and French. All safety warnings must be in English and French. Attention is drawn to the fact that Canadian authorities may require markings and/or installation instructions to be in either or both official languages except as stated elsewhere in the Standard.

Appendices A, B, C and D, identified as informative, are for guidance and informational purposes only.

This Third Edition National Standard of Canada is based on, and now supersedes, the Second Edition ULC-S615-1998.

Attention is drawn to the possibility that some of the elements of this Canadian standard may be the subject of patent rights. ULC Standards shall not be held responsible for identifying any or all such patent rights.

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.

The initiation of the review of this Standard will commence within 5 years of the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended for conformity assessment.

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 bio-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* that can be demonstrated to be compatible with the reinforced plastic underground tank materials.

NOTE: Refer to Appendix A (Informative) for a list of Standards on fuels and other *flammable* and *combustible liquids*.

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

NOTE: Tanks covered by these requirements are generally cylindrical or spherical in shape.

1.3 Tanks covered by this Standard are fabricated, inspected, and tested for leakage and structural strength 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 This Standard covers tanks where the total combined capacities of all compartments of the *primary tank* may be up to, and including 250 000 L.

1.6 The installation, maintenance and operation of these tanks may be covered by any of, but not limited to, the following documents:

A National Fire Code of Canada;

B CAN/CSA-B139, Installation Code for Oil Burning Equipment;

C CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products; and

D Regulations of the *authority having jurisdiction*.

2. REFERENCE PUBLICATIONS

2.1 The documents shown below are referenced in the text of this Standard. Unless otherwise stated elsewhere in this Standard such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the Committee approved this ULC Standard. All undated references shall be interpreted as referring to the latest edition of that document.

Documents Published by the American Petroleum Institute (API)
1220 L Street, N.W., Washington, DC 20005 U.S.A.
Telephone: (202) 682-8159
www.api.org

• API 650-2013, Standard for Welded Steel Tanks for Oil Storage

---

Documents Published by the American Society for Testing and Materials (ASTM)
100 Barr Harbour Drive, PO Box C700, West Conshohocken, PA 19428-2959 U.S.A.
Telephone: (610) 832-9585
www.astm.org

• ASTM C33/C33M-13, Standard Specification for Concrete Aggregates

• ANSI/ASTM D396-13, Standard Specification for Fuel Oils

• ASTM D471-12 (Rev A), Standard Test Method for Rubber Property - Effect of Liquids

• ASTM C581-03 (R2008), Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service

• ASTM D664-11, Standard for Acid Number of Petroleum Products by Potentiometric Titration

• ASTM D790-10,Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Material

• ASTM D910-13 Rev A, Standard Specification for Aviation Gasolines

• ASTM D975-14, Standard Specification for Diesel Fuel Oils

• ANSI/ASTM D3699-13 (Rev B), Standard Specification for Kerosene

• ASTM D4304-13, Standard Specification for Mineral and Synthetic Lubricating Oil Used in Steam or Gas Turbines

• ASTM D4814-14, Standard Specification for Automotive Spark-Ignition Engine Fuel

• ANSI/ASTM D5798-13 (Rev A), Standard Specification for Ethanol Fuel Blends for Flexible-Fuel Automotive Spark Ignition Engines

• ASTM D6158-10, Standard Specification for Mineral Hydraulic Oil

• ASTM D6615-14, Standard Specification for Jet B Wide-Cut Aviation Turbine Fuel

• ASTM D7719-13, Standard Specification for High-Octane Unleaded Fuel

---

Standards Published by the American National Standards Institute and American Society for Mechanical Engineers (ANSI/ASME)
11 W. 42nd Street, New York, NY 10036 U.S.A.
Telephone: (212) 642-4900
www.ansi.org