

UL 80

Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids



Underwriters Laboratories Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062-2096

UL Standard for Safety for Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids, UL 80

Twelfth Edition, Dated September 21, 2007

SUMMARY OF TOPICS

This new edition of ANSI/UL 80 includes the following:

Revision of the Title of the Standard from "Steel Tanks for Oil-Burner Fuel" to "Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids"

Revision of the Scope

Addition of Definitions to the Glossary

Addition of the Requirements for Tank Components

Revision of the Requirements for Size and Form

Revision of the Requirements for Materials

Revision of the Requirements for Shell Seams and Head Joints

Revision of the Requirements for Pipe Connections

Addition of the Requirements for Tank Accessories

Revision of the Requirements for the Physical Abuse Tests

Revision of the Requirements for the Hydrostatic Pressure Test

Revision of the Requirements for Tank Top and Bottom Openings

Revision of the Requirements for Markings and Instructions

Addition of the Requirements for Double Bottom Tanks

Revision of the Requirements for Manufacturing and Production Tests

The following table lists the future effective dates with the corresponding item.

Future Effective Date	References
March 21, 2010	Paragraphs 12.1 - 12.3, 24.2, 24.3; Sections 6 - 11, 13, 17 - 23, 25 - 28

The new requirements are substantially in accordance with UL's Proposal(s) on this subject dated June 9, 2006, December 22, 2006, December 29, 2006, and June 22, 2007.

As indicated on the title page (page1), this UL Standard for Safety has been adopted by the Department of Defense.

As indicated on the title page (page 1), this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this Standard outlining the procedures to be followed to retain the approved text of this ANSI/UL Standard.

The UL Foreword is no longer located within the UL Standard. For information concerning the use and application of the requirements contained in this Standard, the current version of the UL Foreword is located on ULStandardsInfoNet at: <http://ulstandardsinfo.net.ul.com/ulforeword.html>

The master for this Standard at UL's Northbrook Office is the official document insofar as it relates to a UL service and the compliance of a product with respect to the requirements for that product and service, or if there are questions regarding the accuracy of this Standard.

UL's Standards for Safety are copyrighted by UL. Neither a printed copy of a Standard, nor the distribution diskette for a Standard-on-Diskette and the file for the Standard on the distribution diskette should be altered in any way. All of UL's Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

Revisions of UL Standards for Safety are issued from time to time. A UL Standard for Safety is current only if it incorporates the most recently adopted revisions.

UL provides this Standard "as is" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

UL will attempt to answer support requests concerning electronic versions of its Standards. However, this support service is offered on a reasonable efforts basis only, and UL may not be able to resolve every support request. UL supports the electronic versions of its Standards only if they are used under the conditions and operating systems for which it is intended. UL's support policies may change from time-to-time without notification.

UL reserves the right to change the format, presentation, file types and formats, delivery methods and formats, and the like of both its printed and electronic Standards without prior notice.

Purchasers of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgement (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.

If a single-user version electronic Standard was purchased, one copy of this Standard may be stored on the hard disk of a single personal computer, or on a single LAN file-server or the permanent storage device of a multiple-user computer in such a manner that this Standard may only be accessed by one user at a time and for which there is no possibility of multiple concurrent access.

If a multiple-user version electronic Standard was purchased, one copy of the Standard may be stored on a single LAN file-server, or on the permanent storage device of a multiple-user computer, or on an Intranet server. The number of concurrent users shall not exceed the number of users authorized.

Electronic Standards are intended for on-line use, such as for viewing the requirements of a Standard, conducting a word search, and the like. Only one copy of the Standard may be printed from each single-user version of an electronic Standard. Only one copy of the Standard may be printed for each authorized user of a multiple-user version of an electronic Standard. Because of differences in the computer/software/printer setup used by UL and those of electronic Standards purchasers, the printed copy obtained by a purchaser may not look exactly like the on-line screen view or the printed Standard.

An employee of an organization purchasing a UL Standard can make a copy of the page or pages being viewed for their own fair and/or practical internal use.

The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the note following the affected item. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

Copyright © 2007 Underwriters Laboratories Inc.

This Standard consists of pages dated as shown in the following checklist:

Page	Date
1-30.....	September 21, 2007
SR1-SR6	September 21, 2007

No Text on This Page



SEPTEMBER 21, 2007



ANSI/UL 80-2007

1

UL 80

Standard for Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids

The first and second editions were titled Design and Construction of Inside Tank Equipment for Oil Burners. The third edition was titled Inside Storage Tanks for Oil Burners. The fourth and fifth editions were titled Inside Tanks for Oil-Burner Fuel. The sixth through ninth editions were titled Steel Inside Tanks for Oil-Burner Fuel. The tenth and eleventh editions were titled Steel Tanks for Oil-Burner Fuel.

First Edition – November, 1927
Second Edition November, 1934
Third Edition – October, 1953
Fourth Edition – February, 1958
Fifth Edition – September, 1963
Sixth Edition – November, 1968
Seventh Edition – June, 1973
Eighth Edition – September, 1974
Ninth Edition – July, 1980
Tenth Edition – November, 1996
Eleventh Edition – August, 2004

Twelfth Edition

September 21, 2007

The most recent designation of ANSI/UL 80 as an American National Standard (ANSI) occurred on September 14, 2007.

This ANSI/UL Standard for Safety, which consists of the Twelfth Edition, is under continuous maintenance, whereby each revision is ANSI approved upon publication.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc. and is not part of the ANSI standard

The Department of Defense (DoD) has adopted UL 80 on January 2, 1992. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements. Comments or proposals



Documents

Document Sharing Hub

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>.

COPYRIGHT © 2007 UNDERWRITERS LABORATORIES INC.



CONTENTS

INTRODUCTION

1 Scope	4
2 Components	5
3 Glossary	5
4 Units of Measurement	7
5 References	8
6 Tank Components	8
7 Tank Accessories	8

CONSTRUCTION

8 Size and Form	9
9 Materials	11
10 Shell Seams	13
11 Head Joints	15
12 All Tank-To-Pipe Connections	19
13 Top Fill, Vent, and Gauge Connections	21
14 Bottom Supply or Drain Connection	22
15 Protection of Openings	22
16 Painting	22

HYDROSTATIC PRESSURE TEST

17 Physical Abuse Tests	23
18 Handle/Lug Strength	24
19 Tank Stability	24
20 Support Load	24
21 Top Load	25
22 Tank Buoyancy	25
23 Hydrostatic Pressure Test	25

MANUFACTURING AND PRODUCTION TESTS

24 General	26
------------------	----

MARKING AND INSTRUCTIONS

25 General Marking Information	27
26 Engineering Markings	27
26.1 All tanks	27
26.2 Primary containment tanks	28
26.3 Secondary containment tanks and double bottom tanks	28
26.4 Diked tanks	29
26.5 Tank accessories	29
27 Marking Methods	29
28 Instructions	30

INTRODUCTION

1 Scope

1.1 These requirements cover steel primary, steel secondary, and steel diked type atmospheric storage tanks from 60 to 660 gallons (227 to 2500 L) intended primarily for the storage and supply of heating fuels 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 shall be permitted to be fabricated in various shapes (cylindrical, rectangular or obround), orientations (horizontal, vertical) and may have integral options (tank supports or accessories), as covered in this Standard.

1.3 These shop fabricated 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 Each tank shall be permitted to be fabricated as a double bottom tank as covered in this Standard.

1.5 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 Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A, the Uniform Fire Code, ANSI/NFPA 1, and the International Fire Code published by the International Code Council.

1.6 These requirements do not apply to tanks covered by the Standard for Steel Underground Tanks for Flammable and Combustible Liquids, UL 58, the Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids, UL 142, the Standard for Fire Resistant Tanks for Flammable and Combustible Liquids, UL 2080, the Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids, UL 2085, or the Outline of Investigation for Non-Metallic Oil Burner Fuel Tanks, SU 2258.

1.7 These requirements do not apply to tanks covered by the Specification for Field-Welded Tanks for Storage of Production Liquids, API 12D; and the Specification for Shop-Welded Tanks for Storage of Production Liquids, API 12F or the Standard for Welded Steel Tanks for Oil Storage, API 650.

1.8 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, and do not cover fuel blends with more than 20 percent of bio diesel fuel. These requirements do not cover storage of flammable liquids.

1.9 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 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 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.

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

2.4 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.

3 Glossary

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

3.2 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.

3.3 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.

3.4 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.

3.5 BOTTOM SUPPLY CONNECTION – A storage tank bottom opening that is intended to provide a means to supply fuel to oil burning equipment or oil to a dispensing device by gravity in addition to providing a means to automatically drain water from the tank.

3.6 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 and ultra low sulfur diesel) typically intended for powering compression ignition engines.

3.7 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 or tanks but not capable of being pressurized for leak testing. Dikes 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.

3.8 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 or tanks and spill containment.

3.9 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 or tanks and spill containment.

3.10 DOUBLE BOTTOM TANK – A primary tank with an additional bottom capable of being pressurized and has means for venting and monitoring for leaks in the interstitial space, but does not provide complete secondary containment.

3.11 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.

3.12 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.

3.13 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.

3.14 OBOROUND – Oboround tanks are cylindrical tanks with flat portions of the shell and head on two opposing sides, as shown in Figure 12.2.

3.15 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.

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

3.17 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 oboround shapes and vertical or horizontal orientations.

3.18 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.

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

3.20 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 oboround shapes, and vertical or horizontal orientations.

3.21 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.

3.22 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.

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

3.24 TANK SHAPES – General description of the geometry of an aboveground tank. Cylindrical tanks are tubes formed with rolled 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.

3.25 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 by welds, bolts, or threaded pipe, and may be saddle, leg, flat, skid, or other types.

3.26 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.

3.27 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).

3.28 WASTE OIL – General description of oils such as those 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.

4 Units of Measurement

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