# UL 443

## STANDARD FOR SAFETY

# Steel Auxiliary Tanks for Oil-Burner Fuel

UL Standard for Safety for Steel Auxiliary Tanks for Oil-Burner Fuel, UL 443

Sixth Edition, Dated October 25, 2006

***Summary of Topics***

***This revision of ANSI/UL 443 is being issued to reaffirm approval as an American National Standard. No changes in requirements are involved.***

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. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

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# UL 443

## Standard for Steel Auxiliary Tanks for Oil-Burner Fuel

The First edition was titled "Auxiliary Tanks for Oil-Burners".

First Edition – May, 1957
Second Edition – September, 1973
Third Edition – December, 1979
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**Sixth Edition**

**October 25, 2006**

This ANSI/UL Standard for Safety consists of the Sixth Edition including revisions through March 8, 2013.

The most recent designation of ANSI/UL 443 as a Reaffirmed American National Standard (ANS) occurred on May 30, 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 These requirements cover the design and construction of welded steel tanks of the atmospheric type intended for the auxiliary storage and supply of fuel oil for oil burners. They are for use in the supply piping between a burner and its main fuel supply tank.

1.2 These tanks are intended for installation and use in accordance with the Standard of the National Fire Protection Association for the Installation of Oil-Burning Equipment, NFPA No. 31.

1.3 An auxiliary tank equipped with a mechanism for control of a pump or otherwise controlling liquid level or for preventing the spillage of fuel oil from a tank not required to be vented to the outside of a building is to be judged under the Standard for Pumps for Oil-Burning Appliances, UL 343.

1.4 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

### 2 General

#### 2.1 Components

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

2.1.2 A component need not comply with a specific requirement that:

a) Involves a feature or characteristic not needed 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 recognized rating established for the intended conditions of use.

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

### 2.2 Units of measurement

2.2.1 When a value for measurement is followed by a value in other units in parentheses, the first stated value is the requirement.

### 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.

## CONSTRUCTION

### 3 General

3.1 A tank of this class shall be cylindrical or of another form which has been demonstrated by test to possess strength and tightness as required by 10.2.

3.2 An auxiliary tank shall not exceed 60 gallons (227 liters) individual capacity.

### 4 Materials

4.1 A tank shall be constructed of commercial grade as noted in 4.2. Only new material shall be used.

4.2 Carbon steel shall be in accordance with (a), (b) or both:

a) Comply with the Specification for Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip (Commercial Quality), ASTM A569M-91a; or Specification for Steel, Sheet and Strip, Heavy Thickness Coils, Carbon, Hot-Rolled, ASTM A635M-93.

b) Have a carbon content of 0.25 percent or less, or a carbon equivalency of 0.53 percent or less, and mechanical strength and welding characteristics at least equivalent to one of the steels specified in (a).

**Table 4.1**
**Thickness of steel**

| Capacity | | Manufacturer's standard gage no. | Galvanized sheet gage no. |
|---|---|---|---|
| U.S. gallons | (Liters) | | |
| Up to 10 | Up to 37.9 | 18 | 20 |
| 10.1 to 60 | 38.2 to 227 | 16 | 16 |

4.3 The thickness of the steel is to be determined by five micrometer readings spaced equally along the edge of the full piece as rolled. Thickness is to be determined on the sheet not less than 3/8 inch (9.5 mm) for a cut edge and not less than 3/4 inch (19.1 mm) from a mill edge.

4.4 The thickness of metal as measured in accordance with 4.3 shall be not less than the required minimum thickness value given in Table 4.2 or 4.3.

**Table 4.2**
**Nominal and minimum thickness for uncoated sheet steel**

| Manufacturers' standard gage no. | Nominal thickness, | | Minimum thickness, | |
|---|---|---|---|---|
| | Inches | mm | Inches | mm |
| 16 | 0.060 | 1.52 | 0.053 | 1.34 |
| 18 | 0.048 | 1.22 | 0.042 | 1.07 |

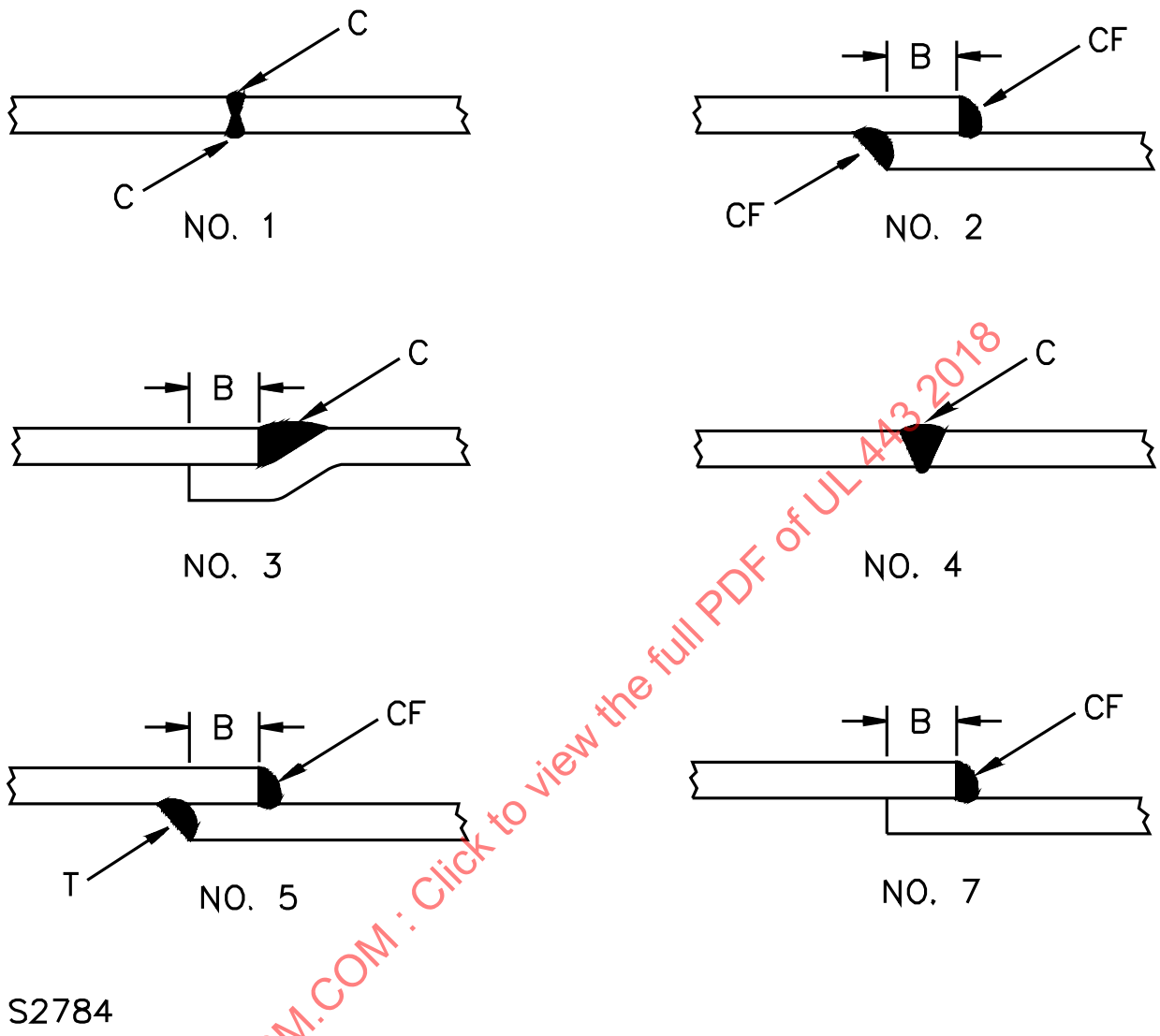
**Table 4.3**
**Nominal and minimum thickness for galvanized sheet steel**

| Galvanized Sheet Gage No. | Nominal Thickness, | | Minimum Thickness, | |
|---|---|---|---|---|
| | Inches | mm | Inches | mm |
| 16 | 0.064 | 1.63 | 0.056 | 1.42 |
| 20 | 0.040 | 1.02 | 0.034 | 0.86 |

## 5 Shell Seams

5.1 Shell seams shall be one of the forms shown by Figure 5.1.

**Figure 5.1**
**Shell seams**






B – Overlap 1/2 inch (12.7 mm) minimum.

C – Continuous weld.

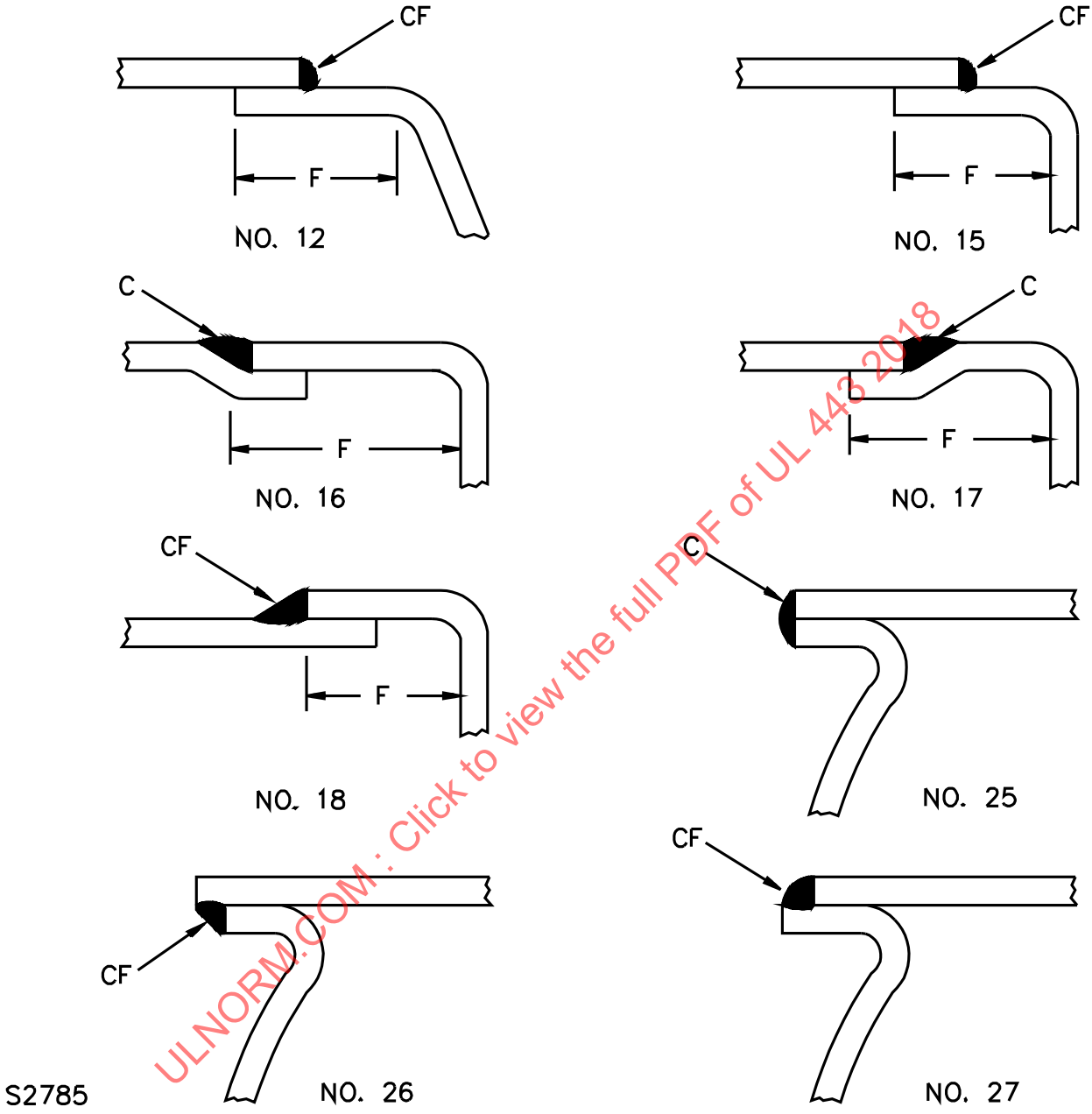
CF – All lap welds shall be continuous full fillet welds

T – Tack weld 1-inch spots not over 12 inches (305 mm) apart.

## 6 Heads and Head Joints

6.1 Conventional designs of heads and forms of joints which have been demonstrated by tests as complying with the requirements for strength and tightness are illustrated by Figure 6.1. Tanks employing these forms of construction are not exempt from the test for determining strength of assembly specified in 10.1 and 10.2. They are included herein only as a reference to assist the manufacturer in the construction to be employed in a design.

**Figure 6.1**
**Heads and head joints**






C – Continuous weld.

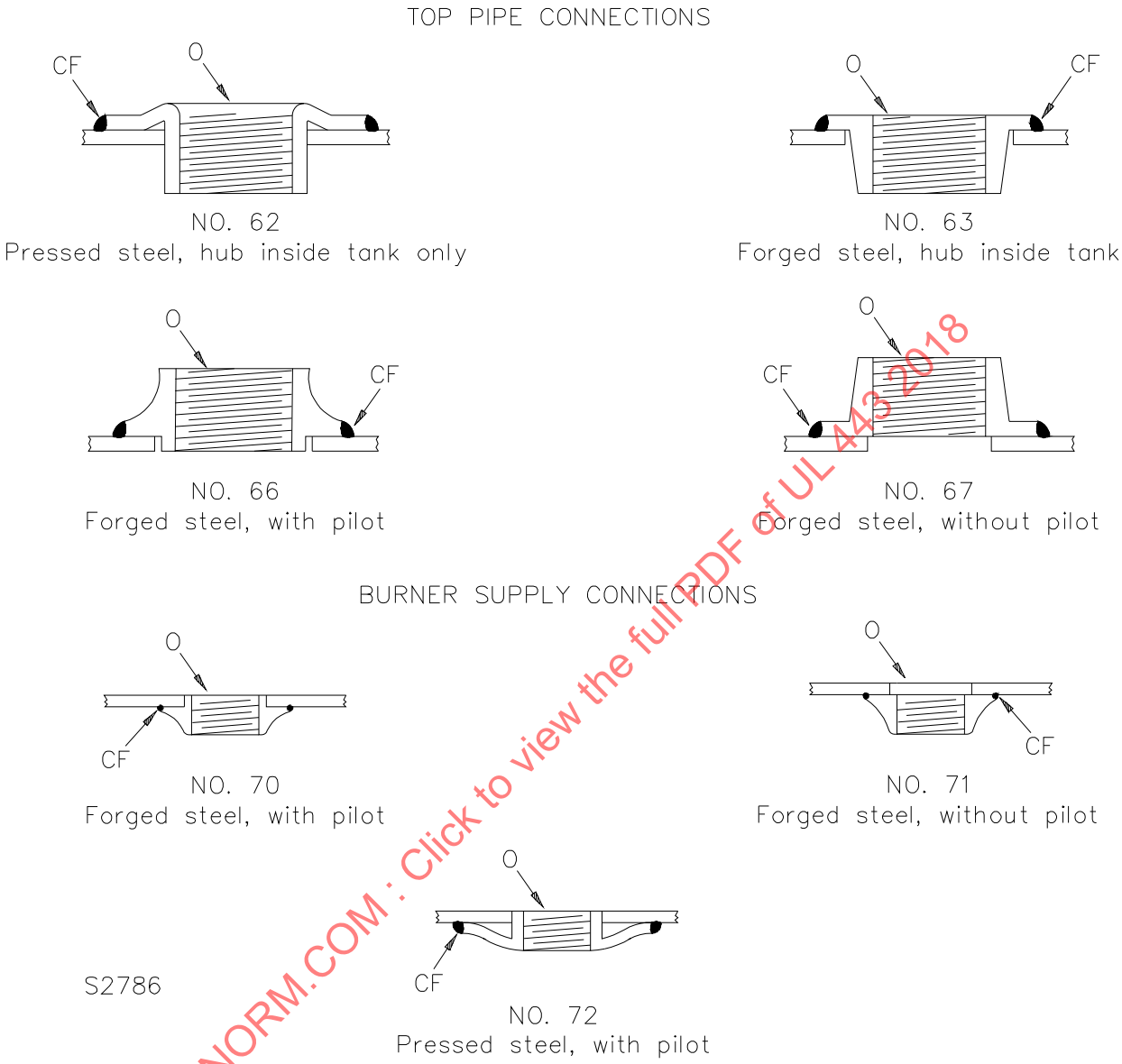
CF – Shall be continuous full fillet welds.

F – Not less than 1/2 inch (12.7 mm).

## 7 Pipe Connections

7.1 Pipe connections shall be supplied by welding threaded flanges to the tank. Conventional types of pipe connections are illustrated in Figure 7.1. They shall be of steel and the minimum length of the thread shall conform to the values shown in Table 7.1.

**Figure 7.1**
**Top pipe connections**






CF – Continuous full fillet weld.

O – Minimum length of thread (see Table 7.1).

## Table 7.1
## Pipe connections

| Nominal pipe size, | Minimum length of thread, | | Thickness of flange section of pressed-steel fittings | | |
|---|---|---|---|---|---|
| | | | | Minimum thickness, | |
| inches | Inches | mm | Gage no. | Inches | mm |
| 1/2 | 11/32 | 8.7 | 10 | 0.123 | 3.12 |
| 3/4 | 11/32 | 8.7 | 10 | 0.123 | 3.12 |
| 1 | 7/16 | 11.1 | 10 | 0.123 | 3.12 |
| 1-1/4 | 7/16 | 11.1 | 12 | 0.093 | 2.36 |
| 1-1/2 | 7/16 | 11.1 | 12 | 0.093 | 2.36 |
| 2 | 7/16 | 11.1 | 12 | 0.093 | 2.36 |
| 2-1/2 | 7/8 | 22.2 | 7 | 0.167 | 4.24 |

7.2 Pressed-steel pipe-connecting fittings shall be installed with the hub section on the inside of the tank only as shown by Details 62 and 72 of Figure 7.1. The minimum thickness of the flange section shall be as specified in Table 7.1.

7.3 Pipe threads shall be in accordance with the Standard for Pipe Threads, General Purpose (Inch), ANSI/ASME B1.20.1-1983(R1992).

7.4 Not less than three connections shall be provided in an auxiliary tank not equipped with an independently operated manual-reset type high-oil level switch or device to prevent the further supply of oil to the tank when such level has been reached. These threaded openings are to provide connections for burner supply, tank supply, and overflow to supply tank.

7.5 An auxiliary tank of 10 gallon (37.9 liters) capacity or less, when equipped with an independently operated manual-reset type high-oil level switch or device to prevent the further supply of oil to the tank when an unsafe level is reached shall be provided with not more than two threaded openings for burner and for tank supply, respectively. This requirement applies to a tank intended to be vented into the adjoining space. No provision for an overflow connection to the supply tank shall be required.

7.6 An auxiliary tank of more than 10 gallon (37.9 liters) capacity shall be vapor and liquid tight and shall have a pipe threaded opening for the connection of a vent line intended for termination outside of the building.

7.7 An opening for a vent line shall be 1-1/4 inch nominal pipe size. An overflow opening shall be one pipe size larger than the tank supply opening. All other openings shall be at least 1/2 inch nominal pipe size. The burner supply opening shall be provided in the bottom of the tank and when this location is in the shell, the center of the opening shall be located not more than 3 inches (76 mm) from the end of the shell. Such an opening shall be without internal projections to permit complete drainage.