



UL 330

STANDARD FOR SAFETY

Hose and Hose Assemblies for Dispensing Flammable Liquids

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UL Standard for Safety for Hose and Hose Assemblies for Dispensing Flammable Liquids, UL 330

Eighth Edition, Dated July 13, 2018

SUMMARY OF TOPICS

The following revision to the Eighth Edition of the Standard for Safety for Hose and Hose Assemblies for Dispensing Flammable Liquids, UL 330, is being published:

1. Revision to construction section regarding threads and couplings

The revised requirements are substantially in accordance with Proposal(s) on this subject dated June 8, 2018.

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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Standard for Hose and Hose Assemblies for Dispensing Flammable Liquids

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Eighth Edition

June 30, 2017

This ANSI/UL Standard for Safety consists of the Eighth Edition including revisions through July 13, 2018.

The most recent designation of ANSI/UL 330 as an American National Standard (ANSI) occurred on July 12, 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 hose and hose assemblies, including vapor recovery hose and assemblies, for use on dispensing devices for flammable liquids. A flammable liquid hose assembly consists of flexible hose and fittings suitable for attachment to flammable liquid dispensing equipment. For the purpose of this Standard flammable liquids are gasoline and diesel fuel. The term "gasoline" includes gasoline with small amounts of additives such as detergents, solvents for detergents, and anti-icing chemicals and gasoline with up to 10 percent ethanol.

1.2 Hose assemblies are intended for use in accordance with the Automotive and Marine Service Station Code of National Fire Protection Association, NFPA 30A.

1.3 These requirements cover hose and hose assemblies (hose with couplings attached) in sizes up to and including 1-1/2 inches (38.1 mm).

1.4 Hose for conveying liquid fuel is intended for use at a maximum working pressure of 50 psig (345 kPa). Hose for conveying vapors of fuel is intended for use at a maximum working pressure of 0.5 psig (3.4 kPa), including slight negative pressures from vapor assist systems.

1.5 These requirements cover hose and hose assemblies for use at temperatures down to minus 40°C (minus 40°F) or minus 54°C (minus 65°F).

1.6 These requirements also cover fuel hose assemblies designated as "low permeation", intended for use on dispensing devices for flammable liquids. For the purposes of this standard, permeation is considered to encompass fuel loss through the flexible hose, fuel loss at the fittings and fuel loss at the connection between the hose assembly and the equipment to which it is intended to be attached in the dispensing system.

1.7 These requirements do not cover hose or hose assemblies, intended for use in automotive vehicles or in confined areas, except for locations inside the housings of dispensing devices complying with the Standard For Power-Operated Dispensing Devices For Petroleum Products, UL 87.

2 General

2.1 Units of measurements

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

2.2 Undated references

2.2.1 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.

3 Glossary

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

3.2 **ADJUSTED MASS LOSS** – The mass loss of the blank (unfilled hose assembly) subtracted from the mass loss of a filled hose assembly. The purpose of this is to adjust for factors other than fuel permeation that may affect mass loss.

3.3 **BALANCE VAPOR RECOVERY HOSE ASSEMBLY** – A coaxial hose consisting of an inner line for conveying fuel and an outer line. Fuel vapors are permitted to return to the fuel dispenser in the annular space between the two lines.

3.4 **HOSE ASSEMBLY VOLUME (V)** – The total volume in cubic centimeters of a capped hose assembly, calculated as follows:

$$V = D^2 (L + 2d) \pi/4$$

in which:

D = the inner diameter of the hose in centimeters, as determined in 15.5.3

L = the length of the hose in centimeters, as determined in 15.5.1

d = the depth of the cap in centimeters, as determined in 15.5.2

3.5 **LEAST SQUARES FIT LINE** – A best fit line drawn through a set of data such that the sum of the squared residuals has its least value, a residual being the difference between an observed value (data point) and the line.

3.6 **PERMEATION SURFACE AREA** – The length of the hose as determined in 15.5.1 multiplied by the inner circumference of the hose, expressed in square meters. For vacuum-assist vapor recovery hose, the length of the hose is multiplied by the inner circumference of the outer hose. For balance vapor recovery hose, the length of the hose is multiplied by the average inner circumference of the outer hose.

3.7 **REINFORCEMENT** – Natural or synthetic fibers or fabric, or metallic wire that is wrapped, braided or spiral wound in one or more layers over the tube, intended to provide longitudinal and transverse (hoop) strength to the hose.

3.8 **VACUUM-ASSIST VAPOR RECOVERY HOSE ASSEMBLY** – A coaxial hose consisting of an inner vacuum line for vapor recovery and an outer line. Fuel is dispensed through the annular space between the two lines.

CONSTRUCTION

4 Tube and Cover

4.1 Single-line hose and double-line vapor recovery hose

4.1.1 The tube shall be made from a material resistant to gasoline and diesel fuel.

4.1.2 The cover shall be made from a material resistant to gasoline, diesel fuel, oils, and ozone.

4.1.3 The tube and cover shall be of uniform thickness, and free from pitting, blisters, or other imperfections. This requirement is not intended to exclude the use of a corrugated cover.

4.2 Coaxial vapor recovery hose

4.2.1 The tube and cover, if any, of the inner hose shall be made from materials resistant to gasoline and diesel fuel.

4.2.2 The tube of the outer hose or a homogeneous outer hose shall be made from materials resistant to gasoline and diesel fuel.

4.2.3 The cover of the outer hose or a homogeneous outer hose shall be made from a material resistant to gasoline, diesel fuel, oil, and ozone. An outer homogeneous thermoplastic hose with no separate layer of reinforcement shall also be made from a material resistant to sunlight.

4.2.4 The tube and cover shall be of uniform thickness and free from pitting, blisters, or other imperfections. This requirement is not intended to exclude the use of a corrugated tube, cover, or outer vapor hose.

5 Thickness of Cover

5.1 The thickness of the cover shall not be less than 0.047 inch (1.19 mm) when measured in accordance with 5.2 – 5.6.

Exception: This requirement does not apply to the cover of the inner hose and the outer vapor hose of a coaxial type vapor recovery hose.

5.2 For removing irregularities in samples, the buffing machine or skiving machine outlined in the Standard Practice for Rubber – Preparation of Product Pieces for Test Purposes from Products, ASTM D3183, is to be used.

5.3 The abrasive wheel of the buffing machine is to be No. 30 – 60 grit and the diameter and rotary velocity of the wheel are to be such that it will have a peripheral speed of 4000 ± 700 feet per minute (20.3 ± 3.6 m/s). The machine is to be provided with a slow feed so that very little compound can be removed at one cut to avoid overheating of the specimen.

5.4 A dial micrometer graduated to 0.001 inch (0.03 mm) that exerts a load of 2.82 – 3.00 ounces (80 – 85 grams) by means of a weight is to be used to measure thickness. The load is to be applied through a flat contact foot 0.25 ± 0.01 inch (6.4 ± 0.3 mm) in diameter.

5.5 To determine the thickness of the tube and cover, a strip, 6 – 8 inches (152.4 – 203.2 mm) long and 1 inch (25.4 mm) wide, or as close to 1 inch (25.4 mm) as possible from small diameter hose, is to be cut longitudinally from the hose, and the part separated from the plies. When the thickness of the part is not uniform around the circumference of the hose, the strip is to be cut from the thinnest portion of the sample.

5.6 The strip specimen is to be buffed or skived to remove the impressions left by the fabric or braid or other surface irregularities, using the equipment described in 5.2 and 5.3. A series of five thickness measurements are to be taken within the area from which the impressions have been removed, and the maximum reading obtained is to be taken as the thickness of the part.

6 Internal Diameter

6.1 The internal diameter of a hose shall be equal to the nominal diameter $\pm 1/32$ inch (0.8 mm) for sizes up to and including $3/4$ inch (19.0 mm) and $\pm 1/16$ inch (1.6 mm) for larger sizes.

6.2 A tapered plug gauge of wood or metal having a taper of $3/8$ inch per foot (31.3 mm/m), marked to indicate variations of $1/64$ inch (0.4 mm) in diameter, or a set of wood or metal plug gauges, straight or ball type, in increments no greater than 0.01 inches (0.25 mm) for hoses in sizes 1 inch (25.4 mm) and less and 0.02 inches (0.51 mm) for hoses in sizes greater than 1 inch (25.4 mm), shall be used for measuring the internal diameter. An expanding ball gauge, and a micrometer or other equivalent means to accurately measure the expanded ball, are required in some cases. See 6.3.

6.3 The end of the hose is to be cut square. When a tapered plug gauge is used, the plug gauge is to be inserted in the hose sample until a close fit is obtained without forcing. The diameter of the gauge at the end of the sample, to the nearest $1/64$ inch (0.4 mm), is to be recorded as the internal diameter of the hose. When a set of straight or ball-type plug gauges is used, the diameter of the gauge, which when inserted in the hose sample gives a close fit without forcing, is to be recorded as the internal diameter of the hose. When the end of a wire-braided hose is constricted or flared, the inside diameter is to be measured 1 inch (25.4 mm) from the end to be representative of the inside diameter by means of an expanding ball gauge.

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