



UL 1046

STANDARD FOR SAFETY

Grease Filters for Exhaust Ducts

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UL Standard for Safety for Grease Filters for Exhaust Ducts, UL 1046

Fourth Edition, Dated February 5, 2010

SUMMARY OF TOPICS

This revision of ANSI/UL 1046 dated June 22, 2022 includes the addition of the Drop Test; [7.2](#) and Section [9A](#).

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.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated August 27, 2021 and May 13, 2022.

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ANSI/UL 1046-2022

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UL 1046

Standard for Grease Filters for Exhaust Ducts

First Edition – December, 1974
Second Edition – July, 1979
Third Edition – March, 2000

Fourth Edition

February 5, 2010

This ANSI/UL Standard for Safety consists of the Fourth edition including revisions through June 22, 2022.

The most recent designation of ANSI/UL 1046 as an American National Standard (ANSI) occurred on June 22, 2022. 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 Products covered by these requirements are single-stage and multi-stage grease filters. These grease filters are intended for installation and use in accordance with the Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, NFPA No. 96 and the International Mechanical Code (IMC).

1.2 Grease extraction devices integral to the exhaust hoods that use them and other filter devices designed to be used in only the specific manufacturer's hoods are not covered by this standard but are tested under the Standard for Exhaust Hoods for Commercial Cooking Equipment, UL 710, or the Standard for Recirculating Systems, UL 710B, or the Outline for Ultraviolet Radiation Systems for Use in the Ventilation Control of Commercial Cooking Operations, Subject 710C.

1.3 The test methods described in this standard pertain to filters used in exhaust hoods for commercial cooking operations. The primary function of these devices and the capability of devices tested in this standard are to prevent flames from penetrating into the exhaust system beyond the hood collar. The terms grease and oil are used interchangeably in this standard.

1.4 Filters are investigated to determine their abilities to:

- a) Limit the projection of flames downstream when subjected to flames on the upstream face, after having been loaded with grease in a manner representative of cooking that produces a grease-rich exhaust,
- b) Drain any collected grease in such a manner that it does not fall back onto the cooking surface.

1.5 The standard does not measure capture efficiency or physical robustness of the grease filter device or other factors that do not directly affect user or fire safety.

Note: Capture efficiency of a kitchen hood filter can be measured using ASTM F2519 "Standard Test Method for Grease Particle Capture Efficiency of Commercial Kitchen Filters and Extractors".

2 Components

2.1 Except as indicated in these requirements, 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 Units of Measurement

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

4 Undated References

4.1 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.

5 Glossary

5.1 For the purpose of this standard the following definitions apply.

5.2 FILTER-FACE AREA – The overall height times the overall width.

5.3 INTEGRAL GREASE EXTRACTION DEVICES – are integral to the exhaust hoods that use them and typically contain a series of horizontal baffles that run the full length of the hood. The baffles are not removable for cleaning and a wash system is provided. Some hoods have doors that can be opened or removed to clean the grease extractors.

5.4 NON-COMBUSTIBLE – A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

5.5 NORMAL HANDLING – The insertion, removal and cleaning of the grease extraction device.

5.6 REMOVABLE GREASE EXTRACTORS – (also called cartridge filters) typically have a single horizontal slot air inlet. The cartridge filters are arranged in a channel or bracket for easy insertion and removal for cleaning. Removable grease extractors may be evaluated under this standard or may be evaluated as part of the hood construction under the Standard for Exhaust Hoods for Commercial Cooking Equipment, UL 710.

CONSTRUCTION

6 General

6.1 Any part of a grease filter that normally comes in contact with the user's hands during normal handling shall be free from sharp edges or sharp projections.

6.2 Parts of grease filters that are exposed to cooking effluent shall be constructed of non-combustible materials.

PERFORMANCE

7 General

7.1 Grease filter constructions that are not symmetrical from front to rear (inlet to outlet), side to top, or bottom to top, shall be tested mounted as intended and again when mounted in reverse. Markings alone are not considered sufficient to prevent reverse installation.

Exception No. 1: If handles are permanently attached to one face, no handholds are attached to the opposite face.

Exception No. 2: Constructions that – by their shape or mounting attachment to the exhaust hood – limit the installation from front to rear (inlet to outlet) to one direction.

7.2 Multi-stage grease filters or grease filter systems consisting of two or more discrete components shall be evaluated as follows:

- a) When installed as intended, the grease filter system shall be subjected to the Grease Loading Test, Section 8, the Flame Exposure Test, Section 9, and the Drop Test, Section 9A; and
- b) Each stage shall be subjected individually to the Grease Loading Test, Section 8, the Flame Exposure Test, Section 9, and the Drop Test, Section 9A, if it can be installed without the adjacent stage(s) attached.

8 Grease Loading Test

8.1 General

8.1.1 During the final 15 minutes of the grease loading test, there shall be no evidence that any of the grease collected on the filter falls back onto the cooking surface.

Exception: One drip per every 20 seconds can fall from mounting handles.

8.1.2 When drainage occurs, drainage from the filters must be made evident by observing grease drained into the grease trough and/or grease cup.

8.1.3 A filter shall not warp, or otherwise be damaged to an extent that it can not be easily inserted into or removed from the hood.

8.2 Loading test equipment

8.2.1 Test hood

8.2.1.1 A hood conforming to the requirements of Standard for Exhaust Hoods for Commercial Cooking Equipment, UL 710 shall be used.

8.2.1.2 The hood shall have a collar connecting to a square or circular exhaust duct with a cross sectional area of 256 square inches (1652 square cm). The duct shall be centered on the length of the hood and shall be located 0 to 2 inches (0 - 51 mm) from the back wall of the exhaust hood plenum.

8.2.1.3 The exhaust system shall be provided with a means to vary the air flow volume through the grease removal devices. Any device located in the exhaust duct system shall be located a minimum of 48 inches (122 cm) from the duct connection to the hood.

8.2.1.4 The exhaust hood shall be a minimum of 40 inches (101.6 cm) long and a maximum of 48 inches (122 cm) long.

8.2.1.5 The exhaust plenum shall be a minimum of 22 inches (56 cm) deep and a maximum of 24 inches (61 cm) deep.

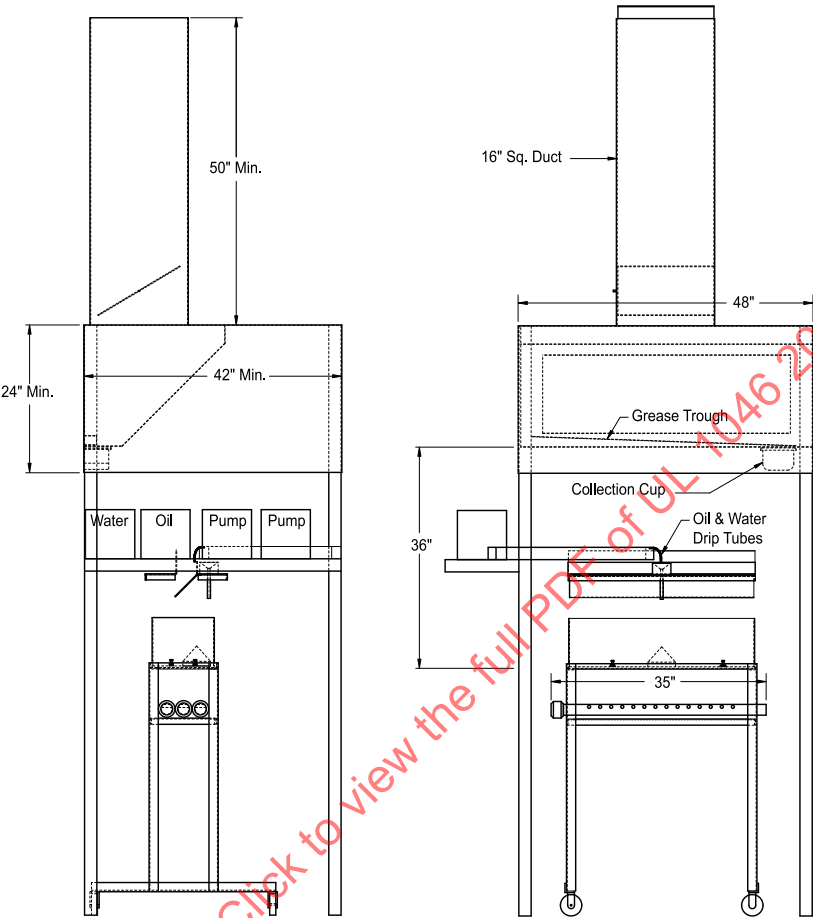
8.2.1.6 The hood shall be provided with a trough(s) and a collector cup capable of holding all drainage from the filters collected during the entire test period.

8.2.2 Mounting of filters

8.2.2.1 Filters shall be as close in size as available to 20 inches (50.8 cm) high and 20 inches (50.8 cm) wide. They shall be mounted $45 \pm 5/0$ degrees from the horizontal. Two filters shall be tested side-by-side. See [Figure 8.1](#).

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Figure 8.1
Test hood and apparatus



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Conversion Factors	
Inch	(mm)
16	(406)
24	(610)
35	(889)
36	(914)
42	(1067)
48	(1219)
50	(1270)

- NOTES:
1. Hood shall comply with UL 710 and NFPA 96.
 2. Oil and water delivery system must be capable of feed rates specified in [8.2.3.3](#).
 3. An adjustable damper or fan speed control must be used. If a damper is installed, it must be at least 48" above the joint between the hood and duct.

8.2.2.2 Grease filters smaller than 20 inches (50.8 cm) in height or width may be used if the construction will not include 20 inch (50.8 cm) filters. Adapter(s) shall be provided to close the 20 by 40 inch (50.8 by 101.6 cm) opening in the hood. The adapters shall be located at the top or outside edges of the grease removal device. See [Figure 8.1](#).

8.2.2.3 Filters to be tested shall fit into the hood tightly together to assure that all flow is through the filters.

8.2.2.4 The filters shall be sealed to each other and to the plenum or filter supports with aluminum duct tape or sealants that will remain in place and be air tight throughout the tests.

8.2.3 General

8.2.3.1 The hood shall be designed and constructed to capture and convey the test effluent through the filters during the loading test. Panels or extensions may be added to the sides, front or rear of the hood to prevent any spillage of the test effluent.

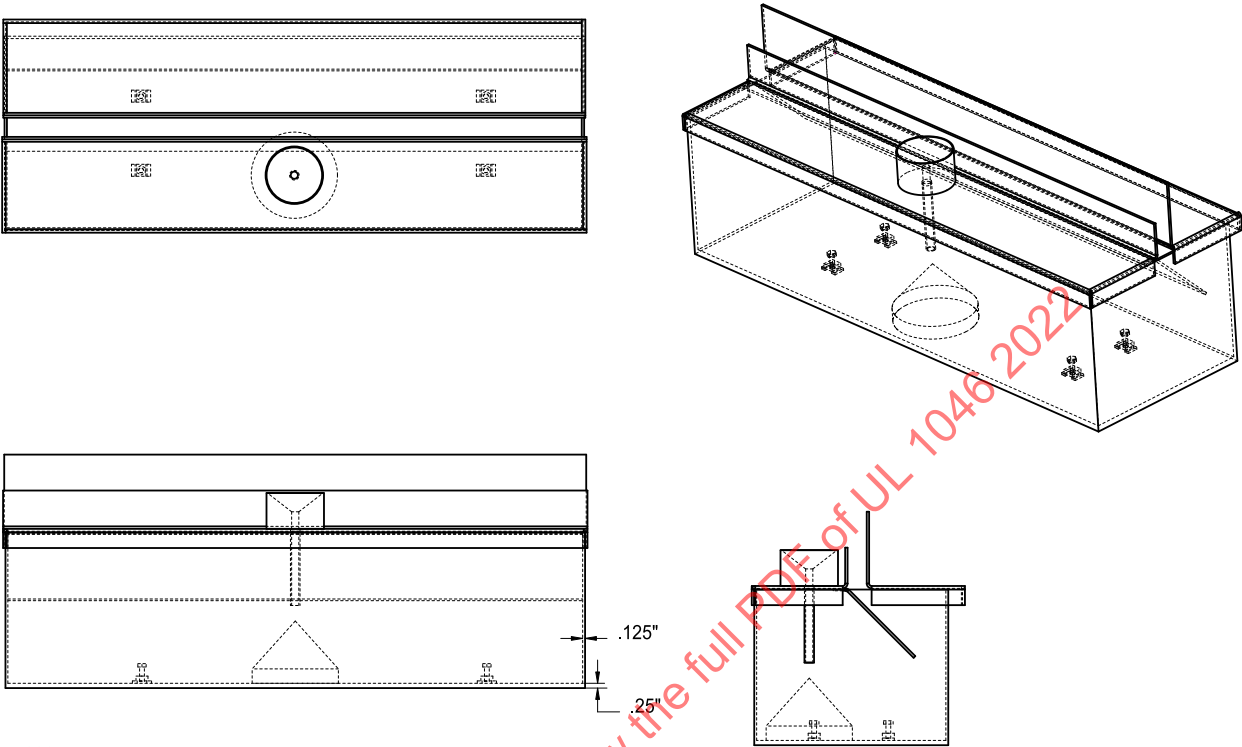
8.2.3.2 The filter Loading Pan shall be constructed as shown in [Figure 8.2](#) and [Figure 8.3](#).

8.2.3.3 The grease loading system shall include a chamber as shown in [Figure 8.2](#) and [Figure 8.3](#) and an oil and water delivery system capable of producing a flow into the loading pan at a rate of 10 ± 0.5 and 24.5 ± 0.5 ml/minute (0.338 and 0.828 fl oz/min) for oil and water respectively throughout the test.

8.2.3.4 A heat source capable of maintaining a temperature of the pan, as determined by iron-constantan (J type) or chromal-alumel (k type) thermocouples located per [Figure 8.2](#), in the range of $725 \pm 25^\circ\text{F}$ ($385 \pm 14^\circ\text{C}$) throughout the test shall be provided.

8.2.3.5 Soybean oil 7.68 lbs/gal (0.92 g/ml) shall be used as the loading material. It is closely representative in physical and chemical properties of the compounds emitted during cooking.

Figure 8.2
Vapor box and covers



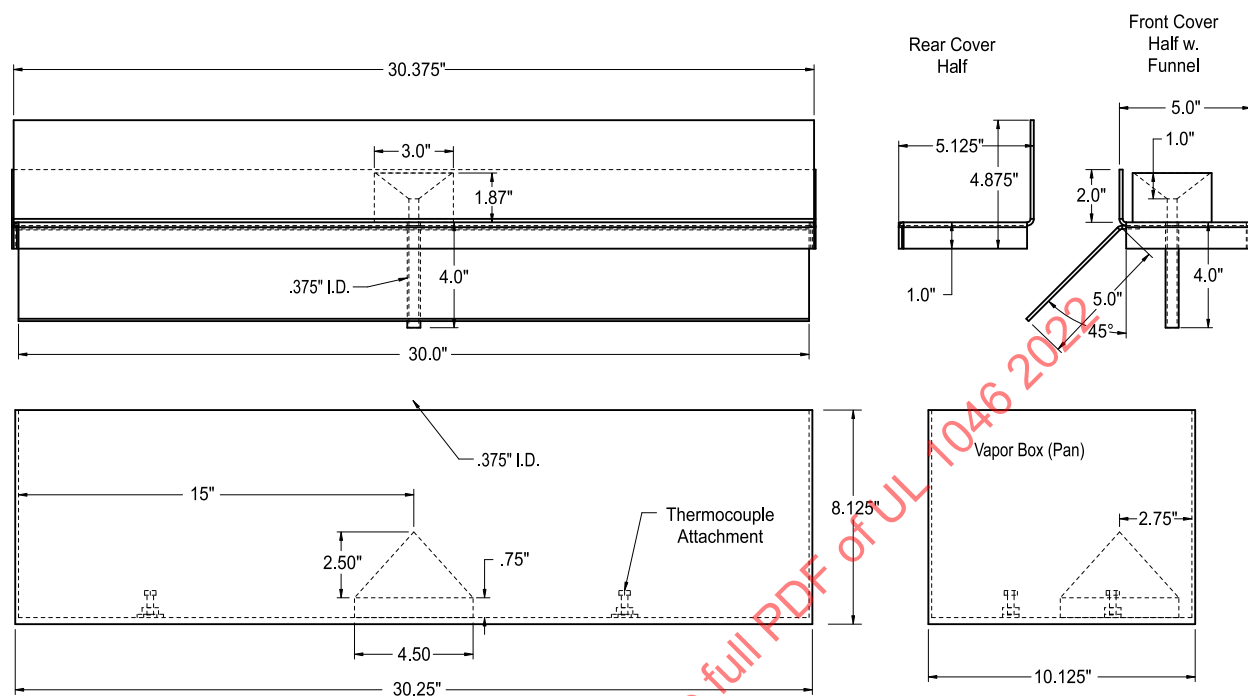
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Conversion Factors	
Inch	(mm)
0.125	(3.2)
0.25	(6.3)

NOTES:

1. Weld thermocouple hardware to bottom on inside of box.
2. Use J-type thermocouples.
3. Sides and ends thickness is 0.125 in (3.2 mm). Bottom thickness is 0.25 in (6.3 mm).

Figure 8.3
Vapor box and covers



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Conversion Factors					
Inch	(mm)	Inch	(mm)	Inch	(mm)
0.375	(9.5)	2.75	(69.8)	5.125	(130)
0.75	(19.0)	3.0	(76.2)	8.125	(206)
1.0	(25.4)	4.0	(102)	10.125	(257)
1.87	(47.6)	4.5	(114)	30.0	(762)
2.0	(50.8)	4.875	(124)	30.25	(768)
2.50	(63.5)	5.0	(127)	30.375	(772)