

TECHNICAL BULLETIN

UL 900 & UL 586 Filter Classifications



Filters Classified as UL 900

Underwriters Laboratories, Inc. (UL) is an agency that lists products they have tested against criteria deemed appropriate for public safety. The classification for HVAC air filters confirms that the filters will meet local and state requirements for most applications.

UL 900 covers both washable and throwaway filters, used for the removal of dust and other airborne particles from mechanically circulated air in equipment and systems. This is in accordance with the Standards of the National Fire Protection Association (NFPA) for *Installation of Air Conditioning and Ventilating Systems, of Other Than Residence Type, NFPA No. 90A*, and for *Installation of Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B*.

After a period of service, the combustibility and smoke generation of an air filter will depend upon the nature and quantity of the material collected by the filter. The test requirements of this Standard, for classification purposes, applies only to air filters in a clean condition.

A UL 900 Classified Filter is an air filter which, when clean, will burn moderately when attacked by flame, or emit moderate amounts of smoke, or both. The air filter unit shall not produce flame or extensive sparks, which are sustained beyond the discharge end of the test duct described in the Standard, when subjected to the flame exposure test. In addition, the burn shall not cause the development of an area of more than 9 square inches as measured below the smoke-density time curve.

Additionally, the adhesive material used for coating the filtering media, or other parts of an air filter unit, shall have a flash point of not less than

Filter Smoke & Combustibility Testing to Meet Local Codes



In North America, all Camfil Farr products listed as UL 900, will have this identifying mark on the frame or label.

325 degrees F, *Cleveland Open-Cup Method ASTM D92-5a (ANSI Z11.6-1966)*.

It is important to note that the toxicity of the products of combustion, resulting from a filter's exposure to flame, is outside the scope of UL 900, as is the filter's particle capture efficiency before or after flame exposure.

To obtain a UL listing for a product, an application is made to Underwriters Laboratories and several samples are then submitted for testing. All of these samples must successfully pass the criteria established for the Standard.

A listing is then granted only if the manufacturer further agrees to a follow-up service procedure. In this procedure, a UL representative visits each point of manufacture quarterly, and selects a random sample for annual testing. This sample is returned to UL for retest to assure continued compliance with the appropriate test criteria.

For Camfil Farr, UL periodically selects samples from our Riverdale, NJ, Corcoran, CA, Crystal Lake, IL, Conover, NC, Washington, NC and Laval, Canada facilities.

Air Filter Unit
as to Flamability
only
(xxxx) Control Number

Only products which meet the criteria for listing may use the UL label. Products not required by UL to comply with UL 900, even though they may be similar in appearance, will not bear the UL label. The UL Standard ensures that the end user is receiving a product that meets a specific level of quality, or meets the requirements as published by the filter's specifier.

It is important to note that currently, there is only one UL 900 classification for air filters. The decision to sunset the dual-class Standard, Class 1 and Class 2, was made in September of 2009. Manufacturers have until May of 2012 to move into full product labeling conformance with the new marking classification.

A listing of product certifications, for all manufacturers is available on the UL website at <http://www.ul.com>, under the menu choice of Online Certifications.

UL 900 & UL 586

Filters Classified as UL 586

UL 586 for HEPA Filters, *Standard for High-Efficiency, Particulate, Air Filter Units*, defines procedures for confirming the performance of HEPA filters. It also defines minimum construction components, airflow and resistance parameters, testing equipment and a minimum criterion flame test. The scope as listed in the document is as follows:

1.1 - These requirements cover high-efficiency, particulate, air-filter units intended for the removal of very fine particulate matter (not less than 99.97 percent of 0.3 micron diameter particles) from the air of industrial and laboratory exhaust and ventilating systems.

1.2 - These requirements cover single air filter units.

1.3 - These requirements do not cover multiple assembly air filter units.

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 appropriate additional component and end-product requirements to maintain the 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 does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision and implementation of this standard. The Standard applies to filter sizes and airflow capacities as noted in Table 3.1 (right).

The frame of the filter may be of metal or other inorganic material, or of wood, if the wood is at least 3/4" (19 mm) thick and has a flame spread index of 25 or less per UL Standard 723, Test for *Surface Burning Characteristics of Building Materials*. Framing joint requirements are also detailed within the Standard, assuring a specific level of quality and leak free performance.

The filter media may be of glass fiber construction or other inorganic material. Although a gasket is not required for testing, when it is submitted as part of the filter construction, the Standard defines that it shall be securely attached to the frame and shall provide a continuous seal. Materials of construction for gasketing are not defined.

According to the Standard, the manufacturer must submit six 24" by 24" (610 x 610 mm) samples for the efficiency and resistance tests, six samples for the penetration tests, and three samples for confirmation testing. This configuration is considered as representative of smaller units of the same construction.

Each filter is tested for penetration, using air of controlled temperature and humidity levels, with a heated challenge of Henkel Corporation Emery 3004, or a suitable alternative. This process introduces a constant number of uniform aerosol particles, 0.3 micron in diameter. Using a light beam photocell measuring device, measurements are derived from a comparison

of the downstream density ratings and the known upstream aerosol density.

During the test, the airflow through the filter is maintained at the manufacturer's published airflow rating. For units rated at 25, 50, 125, 1500 and 2000 cfm, airflow resistance may not exceed 1.3" w.g.

For units rated at 500 and 1000 cfm, airflow resistance may not exceed 1.0" w.g.

In addition to the penetration and resistance test, the filters are subjected to:

- a heated air test to 700° F, ±50° F
- a moist air test to a humidity level of 90%, ±5% at a room temperature of 77° F
- a low temperature test at 27° F, ±4° F and
- a spot flame test.

The Department of Defense adopted UL 586 in September of 1991. The Standard applies to filters used in nuclear applications and is integral to the qualification of HEPA filters under the *ASME AG-1 Code on Nuclear Air and Gas Treatment*.

The confirming section of the Standard involves sending three units of similar design and construction to an authorized Department of Energy test facility.

The UL Standard further defines that every filter assembled by the manufacturer shall be tested for resistance and efficiency before shipping.

Furthermore, each filter is to be labeled with the manufacturer's name or identifying symbol, the air flow rating in cubic feet (or meters) per minute, the resistance to airflow (in inches water column), the direction of airflow and the efficiency or penetration of the test aerosol.

Size		Airflow Rate @ Normal Pressure & Temperature	
Inches	Millimeters	Cubic Feet Per Minute	Cubic Meters Per Minute
8 x 8 x 3-1/16	203 x 203 x 78	25	0.7
8 x 8 x 5-7/8	203 x 203 x 149	50	1.4
12 x 12 x 5-7/8	305 x 305 x 149	125	3.5
24 x 24 x 5-7/8	610 x 610 x 149	500	14.2
24 x 24 x 11-1/2	610 x 610 x 292	1000	28.3
24 x 24 x 11-1/2	610 x 610 x 292	1500	42.5
24 x 24 x 11-1/2	610 x 610 x 292	2000	56.6

UL is a registered trademark of Underwriters Laboratories.

A complete copy of each Standard is available for purchase from the Underwriters Laboratories Web site at www.ul.com. This document is for the use of designers, planners and facilities personnel. It may be reprinted in whole, or in part with origination credit to Camfil Farr.

Comments or suggestions for revisions may be directed to literature@camfilfarr.com or info@camfilfarr.com. Camfil Farr reserves the right to continually update materials. Contact your Camfil Farr Representative or Distributor for the latest information.