# APPENDIX II

November 23, 2009

## UNDERWRITERS LABORATORIES INC. CERTIFICATION REQUIREMENT DECISION

This Certification Requirement Decision is prepared and published by Underwriters Laboratories Inc. (UL). It is normative for the applicable UL Product Certification Program(s); however, it is currently not part of the UL Standard(s) referenced below.

**Product Category (CCN): AGGZ, OETX**
**Standard Number: UL 867**
**Edition Date: October 9, 2000**
**Edition Number: 4**
**Section / Paragraph Reference: Section 37**
**Subject: Filter Test Iterations**

**DECISION:**

3.3A **Base Material** – Basic filter media type (paper, HEPA, carbon) provided without any coatings and/or infusions.

3.9A **Media Combination** – Any possible set of pre-filters, main filters, and/or other filtration device intended to be used with a specific appliance design.

3.11A **Standard Filter Media** – Pre-filters, main filters, and/or other filtration devices installed within the air cleaning device when shipped.

37.4.6A If the appliance is designed for use with multiple filter media technologies, the test described in 37.1-37.4.6 and 37.4.8 shall be:

a) Conducted with the standard filter media in place, and

b) Repeated in the highest ozone operating mode (high or low fan speed, special features "on") as determined in (a), with all remaining media combinations.

*Exception: The test described in 37.1-37.4.6, and 37.4.8 is not required to be conducted with all filter media combinations if:*

*a) The appliance is tested as described in 37.4.8 with the least reactive base material media combination, and*

*b) The test is repeated in the highest ozone operating mode (high or low fan speed, special features "on") as determined in (a), with all filters removed and, if applicable, interlocks defeated.*

Note: Basic filter media types listed from least reactive to most reactive with ozone: Paper, HEPA, Carbon.

37.4.7 If the filter cell or other high voltage component can be energized with any of its fans not functioning or with pre- and/or main filters removed, the test described in 37.1 - 37.4.6 is to be repeated in the highest ozone operating mode (high or low fan speed – where applicable, special features "on") as determined under 37.4.8, with the various ~~fans~~ components not operating or with filter(s) removed.

Note: If the appliance can be energized with both the fan(s) not functioning and the filter(s) removed, the repeated tests shall be conducted as one test, with both the fan(s) not operating and with the filter(s) removed.

*Exception: Repeated testing with the pre-and/or main filters removed is not required when the appliance has been tested per the requirements of the Exception to 37.4.6A.*

37.4.8 If the appliance is provided with multiple fan speeds and/or ozone or high voltage output level settings ~~of operation~~, the test described in 37.1 - 37.4.6A is to be ~~repeated~~conducted ~~on~~at both the highest and lowest (non-zero) fan ~~each~~ speed while operating under the conditions that produce the highest ozone output level as determined under Section 37A.5. If the air cleaner is equipped with special features, such as ionizers or UV lamps that can be activated independently, they shall be ″on″. ~~For those appliances with continuous or near-continuous dial settings, tests shall be conducted at the minimum, middle, and maximum settings.~~

*Exception: While they are required to be turned on at the start of the test, boost functions are not required to be maintained in the "on" position for the full duration of the test if all of the following are true:*

*a) The boost functions operate via a timer function or momentary contact switch, and*

*b) Boost functions are operated as specified in the manufacturer's operating instructions.*

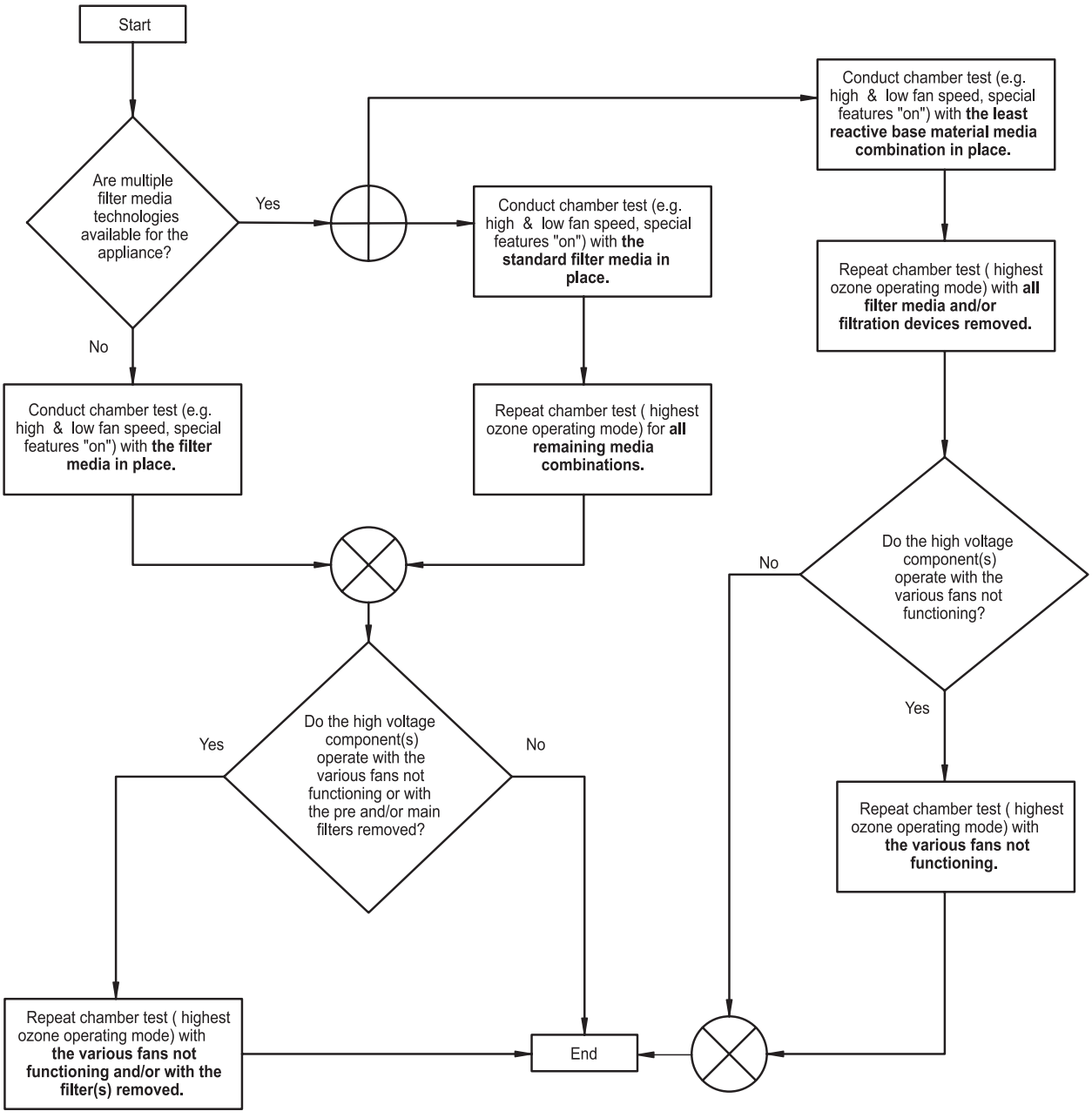
37A.5 The ozone emitted from the air cleaner shall be measured at each location defined in 37A.3 and 37A.4. The air cleaner shall be operated on both the highest and lowest (non-zero) fan speed if so equipped and each ozone or high voltage output level setting. For those appliances with four or more dial settings for fan speed and/or ozone or high voltage output, the appliance shall be operated at the minimum (non-zero) and maximum settings for fan speed and at the minimum, middle and maximum settings for the ozone or high voltage output. If the air cleaner is equipped with special features, such as ionizers or UV lamps, that can be activated independently, they shall be ″on″ for purposes of the test. The sampling probe shall be positioned at a measurement location and allowed to operate for a minimum of 2 minutes, longer if necessary for equipment specific measurement stabilization, before recording the peak ozone level. Background ozone values within the measurement grid shall be allowed to return to background levels between measurements. The measurement location and operating condition that produced the highest ozone reading in the air stream shall be identified for use during the Ozone Test, Section 37.

Note: Mechanical ventilation (i.e., a portable fan) can be used to assist in returning to background values between measurements.

37A.5A If the appliance is designed for use with multiple filter media technologies, the test described in 37A.5 shall be conducted with the least reactive base material media combination.

37A.5B If the filter cell or other high voltage component can be energized with any of its fans not functioning the test described in 37A.5 is to be repeated in the highest ozone operating mode (special features "on") with the various fans not operating.

## Figure 37.4.1
## Filter Test Iterations Flow Chart

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**RATIONALE FOR DECISION:**

Air cleaner manufacturers sometimes offer various types of filters as alternate or optional pre- and main-filters with their products. These filter types may have differing impacts on ozone emissions from the appliance. Paragraphs 3.3A, 3.9A, 3.11A and 37.4.6A of this decision clarify how the filter, or combination of multiple filters, will be selected for chamber testing.

Filter types and coatings or infusions have the potential for impact on ozone emissions removal, via reactivity with ozone. Filter media may be grouped into three basic types (from least to most reactive with ozone): paper, HEPA, and carbon. The base materials can then be coated or infused to improve their anti-microbial properties or to improve their reactivity with specific VOCs or odors.

When considering the known filter types, as well as coatings and infusions on the market, the number of potential test combinations can become significant. Where multiple types of filters are available for use in a product, this decision supports the requirement that all media combinations be tested while allowing an alternative that achieves the intent of the requirement. That is, testing of the least reactive media combinations, in conjunction with testing of the appliance with all filters removed, is representative of the range of potential test combinations of the main method of test.

Pre-filters have the potential to significantly reduce ozone emissions from appliances, by reducing air pollutants that react quickly with ozone, and by reducing the amount of ozone that is recirculated through the product. Paragraphs 3.9 A and 37.4.7 of this decision, clarify that pre-filters shall also be considered when determining the test conditions.

Operation in the fan-off mode, when available, may increase ozone emission measurements and/or change the peak ozone measurement location. Paragraph 37A.5B of this decision, clarifies that if the ozone emitting component can be operated with the fan in the Off setting. The fan-off setting must be evaluated by the test 37A.5 to determine the location for the chamber ozone measurement.

Appliance boost functions may have timers and other controls that would disable the boost function prior to completion of the 8- or 24-hour test period. This document clarifies in the exception to paragraph 37.4.8 that, under specific conditions, such boost functions are to be enabled only once, at the beginning of the test. This allows testing of such boost functions in their normal mode of operation.