

ANSI/AHRI Standard 851 (SI)-2013

**2013 Standard for
Performance Rating of
Commercial and Industrial Air
Filter Equipment**



Approved by ANSI on April 15, 2014



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2111 Wilson Boulevard, Suite 500
Arlington, VA 22201, USA
www.ahrinet.org
PH 703.524.8800
FX 703.562.1942

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Note:

This standard supersedes ARI Standard 850-2004.
For I-P ratings, see ANSI/AHRI Standard 850 (I-P)-2013.

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PERFORMANCE RATING OF COMMERCIAL AND INDUSTRIAL AIR FILTER EQUIPMENT

Section 1. Purpose

1.1 *Purpose.* The purpose of this standard is to establish for commercial and industrial Air Filter Equipment: definitions; classifications; test requirements; rating requirements; minimum data requirements for Published Ratings; marking and nameplate data; and conformance conditions.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope.* This standard applies to factory-made Air Filter Equipment and Air Filter Media as used in such equipment, for removing particulate matter, when used in environmental conditioning of inhabited spaces in commercial and industrial facilities

2.2 *Exclusions.* This standard does not apply to the following:

2.2.1 Air Filter Equipment and Air Filter Media for removing particulate matter, when used in industrial or commercial processes not associated with environmental conditioning of inhabited space.

2.2.2 Air Filter Equipment when used in removing abnormally high concentrations of specific contaminants.

2.2.3 Appliances which include Air Filter Equipment in combination with fans, coils, dampers, etc., but can be applied to the Air Filter Equipment as used therein.

2.2.4 Residential air filter equipment covered by AHRI Standard 681 (SI)-2009.

2.2.5 This standard is not intended to apply to HEPA Filters.

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the ASHRAE Wikipedia website (<http://wiki.ashrae.org/index.php/ASHRAEwiki>) unless otherwise defined in this section.

3.1 *Air Filter Equipment.* Air cleaning equipment used for removing particulate matter.

3.2 *Air Filter Media.* The part of the Air Filter Equipment which is the actual particulate removing agent. In the case of Group III equipment (Section 4), the terms charging section and/or collecting section shall be used.

3.3 *Arrestance (A).* A measure of the ability of an air-cleaning device with efficiencies less than 20% in the size range of 3.0-10.0 μm to remove loading dust from test air. Measurements are made of the weight of loading dust, as defined in ASHRAE 52.2, fed and the weight of dust passing the device during each loading step. The difference between the weight of dust fed and the weight of dust passing the device is calculated as the dust captured by the device. Arrestance is then calculated as the percentage of the dust fed that was captured by the device.

3.4 *Average Arrestance (A_{avg})*. For an air-cleaning device with efficiencies less than 20% in the size range of 3.0-10.0 μm , the average value of the Arrestance values made on the device during the loading test, weighted by the amounts of dust fed to the device during each incremental dust loading step.

3.5 *Dust Holding Capacity*. For disposable and manually renewable devices, the Average Arrestance multiplied by the amount of ASHRAE dust fed to the device measured to the nearest gram. Dust is fed until either of these conditions occurs:

3.5.1 The resistance of the device reaches the Rated Final Resistance.

3.5.2 Two consecutive Arrestance measurements are less than 85% of the maximum Arrestance measured during the run. In this case, the Dust Holding Capacity shall not include dust captured during or after a feed increment in which Arrestance has fallen below 85% of the maximum value.

3.5.3 The Arrestance is less than 75% of the peak value.

3.6 *HEPA Filter (High Efficiency Particulate Air)*. A disposable extended media dry-type filter in a rigid frame having minimum particle-collection efficiency of 99.97% for 0.3 micron thermally-generated dioctyl phthalate (DOP) particles (as measured in accordance with MIL-STD 282).

3.7 *Initial Resistance*. The resistance of the device with no dust load, operating at its rated air flow.

3.8 *Published Rating*. A statement of the assigned values of those performance characteristics, under stated Rating Conditions, by which a unit may be chosen to fit the application. These values apply to all units of like nominal capacity and type (identification) produced by the same manufacturer. As used herein, the term Published Rating includes the rating of all performance characteristics shown on the unit or published in specifications, advertising or other literature controlled by the manufacturer, at stated Rating Conditions.

3.8.1 *Application Rating*. A rating based on tests performed at application Rating Conditions (other than Standard Rating Conditions).

3.8.2 *Standard Rating*. A rating based on tests performed at Standard Rating Conditions.

3.9 *Rated Final Resistance*. The maximum operating resistance at which the device should be replaced or renewed, as recommended by the manufacturer.

3.10 *Rating Conditions*. Any set of operating conditions under which a single level of performance results and which causes only that level of performance to occur.

3.10.1 *Standard Rating Conditions*. Rating Conditions used as the basis of comparison for performance characteristics.

3.11 *Sealing Means*. Edge seals to prevent air by-pass under maximum rated operating conditions.

3.12 *Self-renewable Air Cleaner*. A device that incorporates a means to maintain performance at nearly constant level or within pre-established limits. Examples include roll filters, filters equipped with vacuum cleaning systems, and self-washing electronic air cleaners. The self-renewal action is accomplished by means incorporated within the device itself; actuation may be manual or automatic.

3.13 *"Shall" or "Should."* "Shall" or "should" shall be interpreted as follows:

3.13.1 *Shall*. Where "Shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.13.2 *Should*. "Should" is used to indicate provisions which are not mandatory but which are desirable as good practice.

3.14 *Standard Equipment*. The minimum assembly of components required to qualify equipment within one of the classification groups.

3.15 Support. The means necessary to hold the Air Filter Media in the air stream and to prevent air bypass around the filter assembly under maximum rated operating conditions.

Section 4. Classifications

4.1 Groups. For the purpose of this standard, Air Filter Equipment and Air Filter Media are classified into groups:

4.1.1 Group I - Unit or panel

4.1.2 Group II - Extended surface

4.1.3 Group III - Electronic Air Cleaner

4.1.4 Group IV - Air Filter Media

4.1.5 Group V - Self-cleaning, Self-renewable Air Cleaner, or any combination thereof

4.2 Descriptions.

4.2.1 Group I. This group of filters shall include unit or panel type air cleaners. Equipment of this type is characterized by flat shallow assemblies in which the velocity of the air stream approaches the velocity through the Air Filter Media. The equipment may be of the permanent cleanable type, or of the disposable non-renewable type, and may be dry or viscous-coated. Viscous impingement filters are included in this group.

4.2.2 Group II. This group of filters shall include extended surface types. Equipment of this type is characterized by pleated or pocket configuration, wherein the approach velocity of the air stream is substantially greater than the velocity through the Air Filter Media. The equipment may be of the cleanable type or of the disposable type and may be dry or viscous-coated.

4.2.3 Group III. This group of filters shall include electronic air cleaners. Equipment of this type uses high voltage electrostatic principles to collect particulate matter. These filters may be of single-stage or multiple-stage configuration. Part or all of the charging and/or collecting sections may be manually cleanable, automatically cleanable, or disposable.

4.2.4 Group IV. This group shall include all media used for Group I, II, III, or V. Air Filter Media is one component part of Air Filter Equipment; therefore, performance ratings cannot be applied to Air Filter Media alone, but only to Air Filter Equipment in which the media component has been tested. This group is identified for classification purposes only.

4.2.5 Group V. This group of filters shall include self-cleaning, self-renewable, or any combinations thereof. Equipment of this type is characterized by their automatic, semi-automatic or manual cleaning and/or renewal mechanism. These may include disposable moving curtains, self-cleaning stationary curtains or self-cleaning moving curtains.

4.3 Standard Equipment. Standard and optional equipment for Groups I, II, III, and V are specified in this section.

4.3.1 Equipment which is classified as Group I or II filters shall consist of:

4.3.1.1 Air Filter Media

4.3.1.2 Support

4.3.1.3 Sealing Means

4.3.2 Equipment which is classified as Group III filters shall consist of:

4.3.2.1 High voltage power supply - A means of supplying high voltage for the Air Filter Equipment

4.3.2.2 Support

4.3.2.3 Safety controls - A means of positively breaking line voltage power to the device

4.3.2.4 Operating controls

4.3.2.5 Collecting section - A means of collecting particulate matter. Examples are:

4.3.2.5.1 Electrically charged plates which may be viscous coated and which may require periodic cleaning

4.3.2.5.2 Electrically charged plates which hold the collected particles plus a secondary downstream filter which collects the re-entrained particles

4.3.2.5.3 Media and electrically charged active and/or passive grid(s)

4.3.2.6 Charging section (multi-stage equipment only) - The section of the equipment which imparts an electrical charge to the particulate matter.

4.3.2.7 Connectors - A means of transferring high voltage from the power source to the collecting and charging section.

4.3.3 Equipment which is classified as Group V filters shall consist of:

4.3.3.1 Air Filter Media

4.3.3.2 Support

4.3.3.3 Sealing Means

4.3.3.4 Renewal and/or cleaning means

4.3.3.5 Operating controls (for automatic equipment only) - manual and/or automatic means for initiating and terminating the renewal or cleaning cycle

4.3.4 *Optional Equipment.* Optional equipment may include: viscous coatings, frames, automatic control systems, wash accessories or washing systems, pre-filters or after-filters.

Section 5. Test Requirements

5.1 *Method of Test for Rating.* Testing of Groups I, II, III, and V Air Filter Equipment shall be in accordance with ASHRAE Standard 52.2, unless modified below. The equipment shall be tested in accordance with the operating procedure recommended by the manufacturer. Air Filter Equipment in Group V shall be tested using the test program for dust loading effects specified for self-renewable equipment designed to control primarily the resistance of the equipment at or within pre-established limits. Refer to Appendix E for additional requirements.

5.1.1 *Equipment Preparation.* The complete air cleaning equipment shall be prepared in accordance with the manufacturer's recommendations. Preparation shall include:

5.1.1.1 Application (type, amount and method) of viscous coating if the equipment is normally viscous coated

5.1.1.2 Proper mounting of the equipment to ensure the flow of air through the filtering media

5.1.1.3 All Group III equipment shall be run-in for a period of 24 hours prior to test by applying rated nameplate voltage to the device

5.1.1.4 Any other preparations that are recommended by the manufacturer in order to demonstrate the device's intended performance. Airflow across the equipment is not required during the run-in period

5.1.2 *Multiple Airflow Rates.* When equipment is intended to operate at more than one velocity or airflow rate, the equipment shall be tested at those alternate velocities or airflow rates for which Standard Ratings are published by the manufacturer.

5.2 *Method of Testing for Ozone Concentration.* Group III Air Filter Equipment shall be tested for ozone concentration in accordance with Appendix C of this standard.

Section 6. Rating Requirements

6.1 *Published Ratings.* All Published Ratings shall include Standard Ratings and Standard Rating Conditions, but may also include Application Ratings where a statement of conditions of temperature, humidity, and airflow rate, as well as input voltages (where applicable), are provided.

6.1.1 *Reporting Results.* Test results shall be reported using the test report format as shown in Appendix C and Appendix D.

6.1.2 *Standard Ratings.* Standard rating shall be established at the rating conditions as defined in Section 5. The rating data that shall be published are shown below:

6.1.2.1 Initial Resistance

6.1.2.2 Rated Final Resistance

6.1.2.3 Dust Holding Capacity

6.1.2.4 Particle Size Efficiency for three particle size ranges: 0.30 μm to 1.0 μm , 1.0 μm to 3.0 μm , and 3.0 μm to 10 μm .

6.1.2.5 Ozone concentration (for Group III Air Filter Equipment)

6.1.2.6 Rated input power

6.1.3 *Values of Standard Ratings.* Standard Ratings shall be published only in the multiples and terms shown below:

6.1.3.1 Rated airflow rate (s) in multiples of 0.02 m^3/s

6.1.3.2 Resistance (s) in multiples of 2.5 Pa

6.1.3.3 Particle Size Efficiency (s) in multiples of 1%. When the particle size efficiency is greater than 99% is shall be reported as "greater than 99%." When the particle size efficiency is less than 20%, it shall be reported as "less than 20%"

6.1.3.4 Dust loading capacity in multiples of 10 g/m^2 (multiples of 100 g/m^2 for Group V equipment)

6.1.3.5 Rated Input power in multiples of 5 W

6.1.4 *Standard Rating Conditions.* The conditions of tests for Standard Ratings shall be:

6.1.4.1 Temperature range of test air from 10 $^{\circ}\text{C}$ to 32 $^{\circ}\text{C}$

6.1.4.2 Humidity range of test air from 20% to 65%

6.1.4.3 Line voltage supply (where applicable) at Nameplate rated voltage ± 1 V. For multiple voltage equipment, the manufacturer shall designate the test voltage and voltage control set point

6.1.4.4 Rated airflow rate(s) as defined in Section 5, $m^3/s \pm 2\%$

6.1.5 *Application Rating Conditions.* Ratings at conditions other than those specified in Sections 6.1.1 and 6.1.3 may be published as Application Ratings.

6.1.6 *Rated Voltage.* Rated voltage for 50 and 60 Hz Air Filter Equipment shall be in accordance with the nameplate electrical characteristics in Section 9.1.

6.2 *Cleanability Test.* This test shall apply to Air Filter Equipment intended to be cleaned rather than replaced. The complete Air Filter Equipment shall be prepared in accordance with the manufacturer's recommendations and applicable Standard Ratings determined in accordance with the requirements set forth in this section. The equipment shall be cleaned by the method prescribed by the manufacturer and, if the equipment is normally viscous-coated, the coating shall be reapplied in accordance with the manufacturer's recommendations. The equipment shall then be retested in accordance with Section 5.1 to determine the renewed resistance and efficiency in this condition, and the efficiency at the first dust increment. This renewed resistance and efficiency shall be published along with the Standard Ratings.

6.3 *Application Ratings.* Whenever Application Ratings are published or printed, the conditions at which these ratings apply shall be shown. Application Ratings shall include, or be accompanied by, the Standard Ratings clearly identified as such.

6.4 *Tolerances.* Published Ratings shall be such that any sample(s), not exceeding five samples, selected at random and tested in accordance with this standard, shall result in average tested values with an allowance for testing as follows:

6.4.1 The initial resistance shall not exceed the published resistance by more than 10% or 5 Pa, whichever is greater.

6.4.2 Particle Size Efficiency(s) shall not fall below the published efficiency(s) by more than 2% points.

6.4.3 The Dust Holding Capacity shall be not fall below the published capacity by more than 10%.

6.4.4 The input power shall not exceed the published input power by more than 5%.

6.4.5 The Rated Final Resistance shall not exceed the published resistance by more than 10% or 5 Pa, whichever is greater.

Section 7. Minimum Data Requirements for Published Ratings

7.1 *Minimum Data Requirements for Published Ratings.* As a minimum, Published Ratings shall include all Standard Ratings. All claims to ratings within the scope of this standard shall include the statement "Rated in accordance with ANSI/AHRI Standard 851 (SI)-2013." All claims to ratings outside the scope of this standard shall include the statement "Outside the scope of ANSI/AHRI Standard 851 (SI)-2013." Wherever Application Ratings are published or printed, they shall include a statement of conditions at which the ratings apply and shall be accompanied by the Standard Ratings clearly identified as such.

Section 8. Operating Requirements

8.1 *Breaching Test (For Groups I, II, V).* Following the standard rating test (or cleanability test, if performed), a breaching test shall be performed.

8.1.1 Procedure. The equipment shall be tested at a resistance 50% above the maximum Rated Final Resistance for which the manufacturer publishes ratings. The resistance shall be increased by loading the equipment with lint, fly ash, test dust or any combination thereof uniformly distributed across the face of the equipment. This increased resistance shall be applied for a period of three minutes and reduced to less than 10% of the Rated Final Resistance within two minutes. This reduced resistance shall be accomplished by reducing the test duct airflow. This procedure shall be repeated for four additional cycles.

8.1.2 Requirements. During the course of the test, there shall be no evidence of tearing, dislocation from its frame or other damage to the Air Filter Equipment.

Section 9. Marking and Nameplate Data

9.1 Marking and Nameplate Data. As a minimum, the nameplate on each commercial and industrial air filter unit shall display the manufacturer's name, model designation, type of unit, and electrical characteristics (for Group III only).

Nameplate voltages for 60 Hertz systems shall include one or more of the equipment nameplate voltage ratings shown in Table 1 of ANSI/AHRI Standard 110. Nameplate voltages for 50 Hz systems shall include one or more of the utilization voltages shown in Table 1 of IEC Standard 60038.

Section 10. Conformance Conditions

10.1 Conformance. While conformance with this standard is voluntary, conformance shall not be claimed or implied for products or equipment within the standard's *Purpose* (Section 1) and *Scope* (Section 2) unless such claims meet all of the requirements of the standard and all of the testing and rating requirements are measured and reported in complete compliance with the standard. Any product that has not met all of the requirements of the standard cannot reference, state or acknowledge the standard in any written, oral, or electronic communication.

APPENDIX A. REFERENCES - NORMATIVE

A1 Listed here are all standards, handbooks and other publications essential to the formation and implementation of the standard. All references in this appendix are considered part of the standard.

A1.1 ANSI/AHRI Standard 110-2012, *Air-Conditioning, Heating and Refrigerating Equipment Nameplate Voltages*, 2013, Air-Conditioning Heating and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, U.S.A.

A1.2 ANSI/AHRI Standard 681 (SI)-2009, *Residential Air Filter Equipment*, 2009, Air-Conditioning Heating and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, U.S.A.

A1.3 ASHRAE Standard 52.2-2012, *Method Of Testing General Ventilation Air-Cleaning Devices For Removal Efficiency By Particle Size*, 2009, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle N.E. Atlanta, GA 30329, U.S.A.

A1.4 ASHRAEwiki, *Terminology*, <http://wiki.ashrae.org/index.php/ASHRAEwiki>, 2012, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle, N.E., Atlanta, GA 30329, U.S.A.

A1.5 IEC Standard 60038, *IEC Standard Voltages*, 2002, International Electrotechnical Commission, 3, rue de Varembe, P.O. Box 131, 1211 Geneva 20, Switzerland.

A1.6 U.S. Department of Defense, MIL Standard 282, 1995, United States Department of Defense, 6883 Commercial Drive, Springfield, VA 22159-0500, U.S.A.

A1.7 U.S. Department of Health, Education and Welfare, *Food and Drug Administration in the Federal Register*, Volume 39, No. 75, Page 13773 et seq., April 17, 1974, United States Department of Health and Human Services, 200 Independence Avenue, S.W., Washington, DC 20201, U.S.A.

APPENDIX B. REFERENCES - INFORMATIVE

None.

APPENDIX C. - METHOD OF TEST FOR OZONE CONCENTRATION FOR GROUP III AIR FILTER EQUIPMENT- NORMATIVE

Ozone Concentration Requirements (For Group III Equipment). In conformance with the Regulation published by the U.S. Department of Health, Education and Welfare, Food and Drug Administration in the *Federal Register Volume 39*, no Group III equipment shall have a maximum ozone concentration in the effluent air exceeding 0.050 ppm.

C1 *Purpose.* The purpose of this appendix is to provide test procedures for establishing an ozone concentration level for Group III Air Filter Equipment.

C2 *Scope.* The test procedures provided in this appendix are for use with Group III Air Filter Equipment mounted in the ASHRAE duct system described ASHRAE Standard 52.2.

C2.1 *Exclusions.* This appendix is not applicable to field tests or to tests conducted in enclosed space applications.

C3 *Ozone Monitoring Instrument.* An ozone monitor that approved by the U.S. Environmental Protection Agency for ambient air monitoring shall be acceptable for determining the ozone level in the duct.

C3.1 *Calibration.* The calibration of the ozone monitor shall be done according to the procedures outlined in the instrument manufacturer's instruction manual.

C3.2 *Reference Standard.* The reference standard for calibrating the ozone monitor shall be in accordance with the procedures outlined in the *Federal Register*.

C4 *Recording Instrument.* A recorder that is compatible with the recorder output of the ozone monitor shall be used.

C5 *Electrical Measurements.* Electrical measurements shall be taken with indicating instruments. Ionizer and collector voltages shall be recorded and shall be expressed to the nearest 100 V, DC. The ionizer current shall be recorded and shall be expressed to the nearest 0.05 mA, DC.

C6 *ASHRAE Duct.* The ASHRAE duct system described in ASHRAE Standard 52.2 shall be used for this test.

C7 *Location of Ozone Monitor's Sampling Tube.* The ozone monitor sampling tube shall be located immediately adjacent to the downstream sampler and shall point directly into the air stream.

C8 *Performance of Test.* The test shall be started only after a state of equilibrium has been reached. Prior to the start of this test, the ozone background level shall be measured with the Air Filter Equipment off.

C8.1 *Power Supply Voltage.* The voltage input shall be set at the nameplate voltage. Ionizer and collector voltage shall be within the normal operating voltage per the manufacturer's instructions. If adjustable without the use of tools, ionizer voltage and collector voltage shall be adjusted to the maximum level.

C8.2 *Ozone Background Level.* Tests shall proceed only after the background level of ozone in the air passing through the duct has been established with the equipment off. The ozone measurement shall be recorded when the ozone reading reaches a steady state level.

C8.3 *Ozone Measurements.* The Air Filter Equipment shall be turned on and ozone measurements shall be recorded when the ozone reading reaches a steady state level. The concentration shall be recorded to the nearest 0.001 ppm.

C8.4 *Airflow Rate.* Readings by which to determine the airflow rate through the filter shall be recorded, as directed in ASHRAE Standard 52.1.

C8.5 *Background Check.* After the ozone measurement has been recorded, the Air Filter Equipment shall be turned off and the resulting reading recorded.

C8.6 *Recorded Ozone Concentration.* The two ozone background readings shall be averaged, and the result subtracted from the concentration measured in C8.3. This value shall be recorded as the ozone concentration.

C8.7 *Determination of Airflow Rate.* The airflow rate shall be calculated as provided in ASHRAE Standard 52.2, and recorded.

C9 *General Test Data.* The following data shall be recorded for each Air Filter Equipment tested for ozone concentration.

C9.1 Air filter manufacturer name and address

C9.2 Name and address of test facility

C9.3 Date of test run

C9.4 Responsible engineers and technicians

C9.5 Designation of unit

C9.5.1 Model number

C9.5.2 Manufacturer's serial number

C9.5.3 Ionizer current expressed to the nearest 0.05 mA, DC

C9.5.4 Ionizer and collector voltages expressed to the nearest 100 V, DC

C9.5.5 Nameplate voltage

C9.6 Designation of ozone monitor

C9.6.1 Model number

C9.6.2 Manufacturer's serial number

C9.6.3 Calibration date

C9.7 Airflow rate, m³/s

C9.8 Duct air temperature, dry-bulb reading, °C

C9.9 Duct air temperature, wet-bulb reading, °C

C9.10 Relative humidity, %

C9.11 Barometric pressure (Absolute), kPa

C9.12 Air nozzle diameter, mm

C9.13 Pressure drop across nozzle, kPa

C9.14 Sampling point - the distance of the sampling tube from the Air Filter Equipment - expressed to the nearest 150 mm

C9.15 Description of recorder (if used)

C9.15.1 Manufacturer's name

C9.15.2 Model number

C9.16 All ozone concentrations, ppm

Other information, such as photographs, the weather conditions at the time of the test, etc., should be recorded.

C10 *Maximum Ozone Concentration in Effluent Air (C_{Max}).*

$$C_{Max} = C \frac{Q}{Q_{min}} \quad C1$$

Where:

C = Ozone concentration of test

Q = Airflow rate during test, m³/s

Q_{min} = Manufacturer's minimum published airflow rate, m³/s

APPENDIX D. AHRI STANDARD 851 (SI) AIR FILTER EQUIPMENT REPORT SUMMARY – NORMATIVE

Laboratory Information

Report No. _____ Test No. _____ Date _____
 Test laboratory _____
 Operator _____ Supervisor _____

Air Filter Equipment Information

Manufacturer _____
 Product name _____ Model _____
 Test requested by _____
 Air Filter Equipment group _____ Maximum Rated Airflow Rate _____
 Dimensions: _____
 Other attributes _____

Test Conditions

Temperature _____ Relative Humidity _____
 Test Airflow rate (maximum rated) _____ Loading Dust Feed Rate _____
 Remarks _____

Initial Resistance Test Results

Airflow Rate	Resistance	Remarks

Particle Size Efficiency and Dust Holding Capacity Test Results

Test Airflow rate (maximum rated) _____
 Weight of clean Air Filter Equipment _____
 Weight of loaded Air Filter Equipment _____
 Final Resistance _____
 Particle Size Efficiency (0.30 – 1.0 μm) _____
 Particle Size Efficiency (1.0 – 3.0 μm) _____
 Particle Size Efficiency (3.0 - 10 μm) _____
 Dust Holding Capacity _____

APPENDIX E. SUPPLEMENTAL PROCEDURE FOR DEVICES WITH SELF-RENEWAL MECHANISMS - NORMATIVE

E1 Devices with renewal mechanisms designed to restore the device to its original condition and reestablish its original performance characteristics are set to take renewal action when the collected dust significantly affects the performance of the device. Under this standard, such devices are to be evaluated at constant rated airflow. The renewal action is to be taken under one of the four following conditions:

E1.1 When triggered by a sensing element that is part of the air-cleaning device provided by the manufacturer,

E1.2 When the resistance of the device reaches the manufacturer's stated upper operating resistance,

E1.3 When the Arrestance of the device has fallen below 85% of the maximum measured value.

E1.4 To test a Rated Final Resistance of 350 Pa if a final resistance has not been specified. Otherwise, the test shall be conducted to the specified Rated Final Resistance, or until the Arrestance drops below 85% of the peak value, whichever condition is achieved first.