ANSI/AHRI Standard 851-2013 (R2023) (SI)

2013 (Reaffirmed 2023) Standard for

Performance Rating of Commercial and Industrial Air Filter Equipment

Approved American National Standard

ANSI

Approved 11 July 2023

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ICS Code: 27.200

Note:

This standard supersedes ARI Standard 850-2004.

For I-P ratings, see AHRI Standard 850-2013 (R2023) (I-P).

This standard was reaffirmed April 2023.

This standard was approved as an American National Standard (ANS) on 11 July 2023.

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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.

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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.

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