

AMCA 511-21 (Rev. 12-22)

Certified Ratings Program Product Rating Manual for Air Control Devices



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AMCA Publication 511-21

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Certified Ratings Program

Product Rating Manual for Air Control Devices



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Certified Ratings Program—Product Rating Manual for Air Control Devices

1. Purpose

AMCA Publication 511 dictates proper presentation of data and other required technical procedures for certification of air control devices under the AMCA Certified Ratings Program. This manual shall be used in conjunction with the current edition of AMCA Publication 11.

2. Scope

The products within the scope of this program are air control devices for use in general ventilation and air-conditioning systems.

This program shall apply only to a complete cataloged series of sizes. In regard to louvers, the program only applies to rectangular and square configurations. It shall not apply to individual sizes in a series, or part of a series of sizes, or to special units on which catalog ratings are not published.

The AMCA Certified Ratings Program seal shall be used only in connection with the specifically certified device. The AMCA seal shall be used only on complete units. The application of the AMCA Certified Ratings Program seal to individual component parts, such as blades, frames, etc., is not permitted.

3. References

AMCA Publication 11, *Certified Ratings Program Operating Manual*, Air Movement and Control Association International Inc., Arlington Heights, IL USA.

ANSI/AMCA Standard 500-D, *Laboratory Methods of Testing Dampers for Rating*, Air Movement and Control Association International Inc., Arlington Heights, IL USA.

ANSI/AMCA Standard 500-L, *Laboratory Methods of Testing Louvers for Rating*, Air Movement and Control Association International Inc., Arlington Heights, IL USA.

ANSI/ASHRAE/SMACNA Standard 126, *Method of Testing HVAC Air Ducts*, Sheet Metal and Air Conditioning Contractors' National Association, Chantilly, VA USA.

ANSI/SMACNA *HVAC Duct Construction Standards – Metal and Flexible*, 2005, Sheet Metal and Air Conditioning Contractors' National Association, Chantilly, VA USA.

ASTM E90, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*, ASTM International, West Conshohocken, PA USA.

EN 1751:1998, *Ventilation for buildings - Air terminal devices - Aerodynamic testing of dampers and valves UL 555S, Smoke Dampers*, Plzen, Czech Republic.

4. Definitions and Symbols

4.1 Definitions

All definitions found in AMCA Publication 11, AMCA Standard 99, as well as the definitions in this section, apply to this program.

4.1.1 Aerodynamically similar

Louver and damper designs are considered aerodynamically similar if the profiles of the components in the airstream are geometrically similar. The blades shall be in relative position to the frame, and the center-to-center dimensions shall be

the same. Frame, blade stops, and blade profiles may have slight variances due to manufacturing methods. Blades must have the same streamline shape, meaning their leading and trailing edges shall be dimensionally equal. The overall angle or curvature of the blade must be the same. Slight deviations in material thickness shall not reduce the overall free area by more than 5% for dampers and 2.5% for louvers. Blade seals shall have the same profile, be of the same durometer and be secured to the blade in the same manner.

In addition to these requirements, louver or damper models claiming aerodynamic similarity for the purpose of certifying leakage performance shall meet the following criteria:

- The frames and blades shall have a modulus of elasticity (E) greater than or equal to the originally certified model.
- The blade action (i.e., whether the damper is parallel or opposed blade) shall be the same as the originally certified model.
- The method used for interconnecting the damper or louver blades (i.e., the linkage) shall be the same as the originally certified model.
- The blade and jamb seals shall be the same as the originally certified model.
- The blade axle bearing assemblies shall be the same as the originally certified model.

Aerodynamic similarity cannot be used for thermal efficiency performance.

4.1.2 Air economizer

An air economizer is a housing and damper assembly with an automatic control system that together allows a cooling system to supply outdoor air to reduce or eliminate the need for mechanical cooling during mild or cold weather. It is capable of allowing minimum fresh-air intake into a building to dilute the indoor air, even if not in economizer mode, per applicable codes.

4.1.3 AMCA Certified Ratings Program

The AMCA Certified Ratings Program is a program for certifying a product's performance ratings, as defined in this document.

4.1.4 Appurtenance

An appurtenance is any item in the airstream or on the inlet or discharge of the air control device that may affect the performance of the air control device.

An appurtenance shall be considered part of the air-control device if it is in place when the device is tested for performance rating and the effect of the appurtenance is included in the cataloged performance rating.

4.1.5 Backdraft damper

A backdraft damper is a damper that, when mounted in a duct or opening, permits airflow in one direction and prevents airflow in the opposite direction.

4.1.6 Bubble-tight damper

A bubble-tight damper is a device whose leakage performance at the tested pressure meets the requirements of the bubble test as described in ANSI/AMCA Standard 500-D.

4.1.7 Linkage-connected economizer damper

An actuated intake and return air damper assembly, which may or may not include an actuated exhaust damper, attached to or incorporated into an air economizer.

These dampers have a common linkage and single control shaft that operates both the intake and return air dampers simultaneously.

4.1.8 Identical products

See AMCA Publication 11.

4.1.9 Performance rating(s)

Performance ratings are data generated from actual tested products used to derive the certified and published information.

4.1.10 Shall and should

The word “shall” indicates a mandatory requirement; the word “should” indicates an advisory statement.

4.1.11 Underwriters Laboratories-classified damper

For the purposes of this document, an Underwriters Laboratories (UL)- classified damper is a device classified to UL category “Dampers for Fire Barriers and Smoke Applications” (category code EMME) as a smoke damper, combination fire and smoke damper or corridor damper.

4.1.12 Ultra-low-leakage damper

An ultra-low-leakage damper is a device that leaks 35.2 L/s/m² (6.93 cfm/ft²) or less at a static pressure differential of 3.0 kPa (12 in. wg). Leakage performance of ultra-low-leakage dampers may be certified at any static pressure differential 3.0 kPa (12 in. wg.) or greater as long as the leakage does not exceed $2 \times (\Delta P_s)^{0.5}$.

4.1.13 Volume-control damper

A volume-control damper is a device that, when mounted to a duct or opening, is used to vary the volume of air through the duct or opening. It can be operated manually or mechanically and may have one or more blades.

For the purposes of this document, dampers meeting the definition of a backdraft damper or a UL-classified damper shall not be considered a volume-control damper. Ultra-low-leakage dampers and bubble-tight dampers may be tested as volume-control dampers.

4.2 Symbols

See Table 1 for a list of symbols.

Table 1 — Symbols

Symbol	Description	Units SI	Units I-P
A _{fa}	Free area	m ²	ft ²
E _s	Sand-louver effectiveness	%	
m _i	Sand supplied to injector	kg	lbm
m _u	Weight of rejected sand	kg	lbm
Q	Airflow rate	m ³ /s	cfm
V _{fa}	Free-area velocity	m/s	fpm
ΔP _s	Pressure drop or pressure differential	Pa	in. wg

4.3 Unit conversions

For the purposes of this document, shown SI values (metric) shall be primary while shown I-P values (Imperial) are for clarity and are converted from shown SI values. In some instances, converting from shown I-P values will not result in the shown SI values because of rounding.

5. Data Submittal Requirements

AMCA International staff shall accept test data obtained in only the AMCA laboratory or an AMCA-accredited laboratory. Test data shall conform to the test standard used.

For each air-control device and certification type covered by this program, a separate section of testing and rating requirements is included. The procedures and test data necessary to prepare performance ratings are defined in sections 9 through 26.

The following data shall be submitted with all Certified Rating Product, CRP-5, application forms:

- Results of the test(s), converted to standard air density, where applicable
- Photograph of each test setup
- Performance curve(s) of the test results, with test points identified
- Dimensional drawings

For all louvers certified for free area, the Licensee shall submit the methodology and/or a drawing describing the determination of the A, B, C and L spaces for all single-section louver sizes that are in the product line. For louvers tested with a drain pan, the Licensee shall submit one additional drawing showing the height and setback dimensions of the drain pan. For gravity ventilators, the Licensee shall submit one additional drawing as shown in Section 21.

For louvers, the CRP-5 form shall require the Licensee to declare both the minimum and maximum single-section size(s) of the product line. For louvers with a declared minimum size of equal to or less than 305 mm x 305 mm (12 in. x 12 in.), a license shall be granted for all sizes below the declared minimum.

6. Required Catalog Statements

6.1 Certified product statement

The following statement shall be printed prominently and immediately adjacent to the reproduction of the AMCA Certified Ratings Program seal:

“[Licensee’s name] certifies that the [product designation] shown hereon [or herein] is licensed to bear the AMCA Certified Ratings Program seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program.”

6.2 Certified performance statement

To use the AMCA Certified Ratings Program seal when performance ratings are certified, the following additional statement shall be printed prominently and immediately adjacent to the performance ratings or after the certified product statement:

“The AMCA Certified Ratings Program seal applies to [certification type] ratings.”

Where [certification type] is one of the following:

- Air Performance
- Water Penetration and Air Performance
- Water Penetration, Wind Driven Rain, and Air Performance
- Wind Driven Rain and Air Performance
- Water Penetration, Air Performance, and Sound
- Sound and Air Performance
- Thermal Efficiency and Air Performance
- Air Leakage
- Air Leakage and Air Performance
- Air Leakage, Air Performance, and Thermal Efficiency
- Wind Driven Sand and Air Performance

Free-area certification for louvers is not in the above list as it is an integral part of the louver air-performance certification.

6.3 Appurtenances statement

Where published ratings include the effect of an appurtenance, the following statement shall be printed prominently and immediately adjacent to the performance ratings:

“Ratings include the effect of [insert appurtenance here].”

7. General Guidelines for Air-Control Products

7.1 Licensee's responsibility

It is incumbent on Licensees to develop catalog performance ratings of the certified products so the product provided to their customers performs within the tolerances allowed by the AMCA Certified Ratings Program.

This section provides general guidelines on the process of developing air-performance ratings from tests, and sections 8 through 24 define specific requirements for each type of product.

Unless stated otherwise, it is the responsibility of the Licensee to provide test specimens.

7.2 AMCA staff responsibility

AMCA staff is responsible for the administration of the AMCA Certified Ratings Program and must verify that the performance ratings developed by the Licensee were done in accordance with program requirements.

AMCA staff is also responsible for verifying that the catalog published by the Licensee conforms to program requirements.

7.3 Rating development

The performance ratings of an air control product or a series of similar products are developed from tests conducted in accordance with one or more of the following: ANSI/AMCA Standard 500-D, ANSI/AMCA Standard 500-L, ASTM E90, ANSI/ASHRAE/SMACNA Standard 126 and EN 1751:1998.

7.4 Aerodynamically similar products

Products that are aerodynamically similar to a certified product may be certified without additional testing (see Section 4.1.1).

7.5 Nameplated products

AMCA Publication 11 allows a company to nameplate another company's product line.

For the purposes of this document, a company may also nameplate a product line of its own (i.e., sell an identical product line under a different name). The nameplated product line must be identical to the original product line.

All the requirements of AMCA Publication 11 for certifying a nameplated product line shall also apply.

7.6 Identical products

Products that are identical to a certified product may be certified without additional testing (see Section 4.1.8).

When a certified product's printed catalog exists before the product's electronic catalog, the printed catalog shall be considered the primary catalog.

8. Check Test Tolerances and Required Tests

8.1 Licensee's duty

The Licensee shall maintain, or cause to be maintained, such manufacturing control of certified devices manufactured by or for the Licensee that, when tested in accordance with the required test standard, the tolerances in Section 8.2 shall be maintained.

8.2 Tolerances

If the certified device delivered for the check test does not meet any of the allowable tolerances, the Licensee will be informed in accordance with AMCA International standard operating procedure as it pertains to failed check test notification.

8.2.1 Air performance

The check test airflow at any rated pressure differential shall not be less than 90% of the cataloged airflow.

8.2.2 Wind driven rain performance

For the cataloged class, the check test effectiveness shall not be lower than the following (Table 2):

Table 2 — Check Test Effectiveness (for Wind Driven Rain)

Class	Effectiveness
A	98%
B	90%
C	75%

8.2.3 Water penetration performance

The check test airflow at the point of the beginning of water penetration shall not be less than 90% of the cataloged airflow.

8.2.4 Air leakage performance for adjustable louvers

The check test air leakage at any rated ΔP_s shall not be more than 110% of the cataloged air leakage.

8.2.5 Air leakage performance for dampers

The check test airflow at any ΔP_s shall be less than or equal to the corresponding air leakage requirement for the cataloged class.

8.2.6 Air leakage performance for spiral duct

The check test airflow at the cataloged pressure shall be less than or equal to the air leakage rating plus 1.70 m²/h (1.0 cfm) per 9.29 m² (100 ft²) of duct wall surface area.

8.2.7 Sound performance

The free field noise reduction ratings of the check test unit shall not be less than the cataloged ratings by more than 3 dB in each octave band.

8.2.8 Louver free area

The louver check test free area shall not be more than $\pm 5\%$ of the cataloged value.

8.2.9 Thermal efficiency

The check test thermal efficiency shall not be less than 90% of the cataloged thermal efficiency.

8.2.10 Wind driven sand performance

The check test effectiveness percentage shall not be less than 95% of the cataloged effectiveness percentage. Appropriate comparisons shall be done for each cataloged test point.

8.3 Required check tests for dampers

8.3.1 Damper air performance

One of the originally tested sizes shall be selected and tested in both directions of airflow (front to back and back to front). If the performance is certified in more than one of the allowable test figures, only one figure shall be check tested.

9. Louver | Air Performance Rating Requirements

9.1 Testing requirements

9.1.1 Air performance test

All louvers tested for air performance determinations shall be tested per ANSI/AMCA Standard 500-L, Figure 5.4 or Figure 5.5.

9.1.2 Test sample

Air performance shall be based on tests conducted on a louver with outside dimensions of 1,220 mm x 1,220 mm (48 in. x 48 in.) with a tolerance of +0, -6.3 mm (+0, -0.25 in.).