

# PRODUCT APPLICATION GUIDE

A technical bulletin for engineers, contractors and students in the air movement and control industry.

## Wind-Driven Rain Testing for Louvers

Different regions of the world require special considerations for building construction and component design. One consideration is a climate with severe wind and rain, such as hurricanes. Typical louvers in the industry were not originally designed or tested to handle such extreme conditions. In response to engineers, architects,

and building owners requesting higher levels of protection, various organizations have developed test standards to address concerns of severe weather on louver performance. This prompted manufacturers to design a new type of louver, commonly referred to as a 'wind-driven rain' louver.

	AMCA 500-L		HEVAC	Dade County
	Wind-Driven Rain	Water Penetration		
Sample size	39 in. x 39 in. core dim. or 48 in. x 48 in. outside dim.	48 in. x 48 in. outside dim.	39 in. x 39 in. outside dim.	Largest size
Water Application Method	External Spray	Wetted wall and simulated rainfall	External Spray	External Spray
Water Rate	3 in./hr. or 8 in./hr. optional	4 in./hr. and 1.25 gpm on wetted wall	3 in./hr.	8.8 in./hr.
External Air Movement (wind driven)	29 mph with 50 mph optional	0	29 mph	35, 70, 90, and 110 mph extended range: 140 mph
Internal Air Movement (drawn through)	0, 94.4, 196.9, 295.3, 393.7, 492.1, 590.6, 689.0 fpm	Max. of 1250 fpm	0, 94.4, 196.9, 295.3, 393.7, 492.1, 590.6, 689.0 fpm	None
Duration	30 min. per test velocity	15 min. per test velocity	30 min. per test velocity	15 min.: 35, 70, and 90 mph 5 min.: 110 and 140 mph
Water carry-over limit	Rated on effectiveness vs. core area at all 8 velocity points  Effectiveness ratings: A = 99 to 100% B = 95 to 98.99% C = 80 to 94.99%	Beginning point of water penetration at 0.01 oz. of water per ft. <sup>2</sup> of free area	Rated on effectiveness vs. open hole at all 8 velocity points  Effectiveness ratings: A = 99 to 100% B = 95 to 98.99% C = 80 to 94.99%	Met the following water penetration requirements:  35 mph: none 70 mph: none 90 mph: 0.05% of water applied 110 mph: 0.05% of water applied 140 mph: 0.05% of water applied

*The table above compares AMCA, HEVAC, and Dade County test standards*

The following describes the requirements of the three most commonly used test standards:

1. AMCA Standard 500-L (wind-driven rain or water penetration)
2. HEVAC
3. Dade County testing protocol.

Manufacturers are not required to test in accordance with all standards – they may test to only one or two. To evaluate each manufacturer’s performance claims, understanding the differences between these test standards is important.

**Water Penetration Interpretation**

The AMCA 500-L standard is similar to the HEVAC standard. Both of these standards require forced air like Dade County, but also require air to be drawn through the louver (see figures 1, 2, and 3). Drawing air through the louver simulates the air intake into the building. AMCA and HEVAC introduce water at a rate of 3 in. per hour of rainfall. AMCA allows extended qualifications for 50 mph forced air and 8 in. per hour of rainfall (only for the 39 in. x 39 in.). Whereas Dade County has up to five test velocities, AMCA and HEVAC have eight, each of which must be tested and given an ‘Effectiveness Rating’. The Effectiveness Rating is simply a comparison of the amount of rain through an opening in a wall and the amount of rain through a louver mounted in that opening. The Effectiveness Ratings have letter designations of A, B, C, or D and have a range of effectiveness assigned to them. For instance, a louver preventing 93% of the water that penetrated through the open hole test would be given an Effectiveness Rating of ‘C.’ Since an Effectiveness Rating is given at each of the eight velocities, one louver could theoretically have all four Effectiveness Ratings.

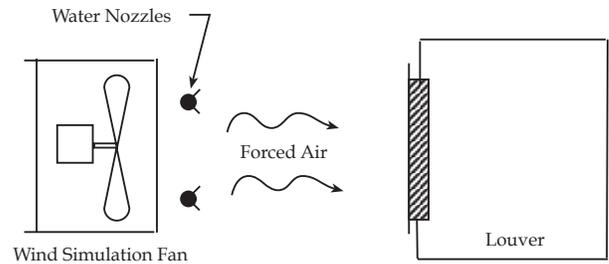
Dade County requires testing of the largest louver size the manufacturer wants to offer; the other two standards require testing of a set size with larger sizes automatically qualifying. Each standard introduces water into airflow, but by different means and rates. Dade County requires that air be forced

into the face of the louver at 35, 70, 90, and 110 mph (there is also an extended range of 140 mph) . Each velocity (35, 70, 90, and 110 mph) is not required to be tested (i.e. a manufacturer can test a louver per Dade County at only 35 mph). For Dade County, velocity tests require different durations: 15 min. at 35, 70, and 90 mph, and 5 min. at 110 and 140 mph. The water carry-over (the amount of water that passes through the louver) must be zero for the 35 and 70 mph tests and 0.05% of the total water applied for the higher velocities.

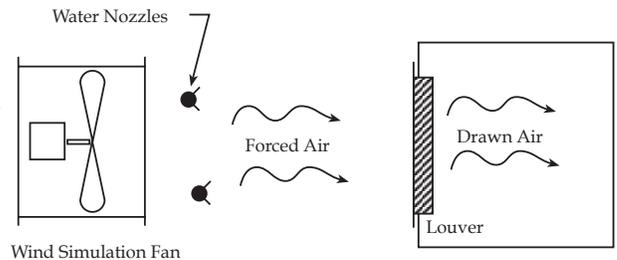
(The information here only takes into consideration the water penetration portion of the standards.)

Greenheck has the most louver models certified to the traditional AMCA 500-L Water Penetration tests. Greenheck rain-resistant models EVH-602 and EVH-801 are qualified to the HEVAC standard and are currently completing testing at AMCA for 500-L Wind-Driven Rain certification with an effectiveness rating of A. Dade County test specimens are under construction for test completion by Fall, 2000. With our wide variety of certified products, you can specify Greenheck with confidence.

*Figure 1: Dade County test setup.*



*Figure 2: AMCA 500-L Wind-Driven rain and HEVAC test setup.*



*Figure 3: AMCA 500-L Water Penetration*

