ANSI/AMCA Standard 540-08

Test Method for Louvers Impacted by Wind Borne Debris

An American National Standard
Approved by ANSI on December 22, 2008

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

The International Authority on Air System Components

ANSI/AMCA Standard 540-08

Test Method for Louvers Impacted by Wind Borne Debris

Air Movement and Control Association International, Inc.
30 W. University Drive
Arlington Heights, Illinois
60004

Authority

ANSI/AMCA Standard 540-07 was adopted by the membership of the Air Movement and Control Association International, Inc. on October 11, 2007. It was approved by ANSI as an American National Standard on December 22, 2008.

Copyright

Objections

Air Movement and Control Association International, Inc. will consider and decide all written complaints regarding its standards, certification programs, or interpretations thereof. For information on procedures for submitting and handling complaints, write to:

Air Movement and Control Association International
30 West University Drive
Arlington Heights, IL 60004-1893 U.S.A.

AMCA International, Incorporated
c/o Federation of Environmental Trade Associations
2 Waltham Court, Milley Lane, Hare Hatch
Reading, Berkshire
RG10 9TH United Kingdom

Disclaimer

AMCA uses its best efforts to produce standards for the benefit of the industry and the public in light of available information and accepted industry practices. However, AMCA does not guarantee, certify or assure the safety or performance of any products, components or systems tested, designed, installed or operated in accordance with AMCA standards or that any tests conducted under its standards will be non-hazardous or free from risk.

Related Publications

ANSI/AMCA Standard 500-L	*Laboratory Methods of Testing Louvers for Rating*
AMCA Publication 501	*Application Manual for Louvers*
AMCA Publication 511	*Certified Ratings Program - Product Rating Manual for Air Control Devices*

Review Committee

Robert Van Becelaere	**Ruskin Company**
Mike Almaguer	PCI Industries, Inc
Dane Carey	United Enertech
Vince Kreglewicz	Arrow United Industries
Roger Lichtenwald	American Warming and Ventilating
Dan Rau	Ruskin Company
Bill Vincent	Construction Specialties, Inc.
Mike Watz	Greenheck Fan Corporation
Timothy Orris	AMCA International, Inc.

Contents

1. Purpose 1
2. Scope 1
3. Definitions 1
3.1 Enhanced protection (Essential Facilities) 1
3.2 Basic protection 1
4. Test Specimens 1
4.1 Number of specimens 1
4.2 Size of specimens 1
5. Test Methods 2
5.1 Specimens 2
5.2 Missile 2
5.3 Location of impact 2
5.4 Mounting 3
6. Missiles 3
7. Pass/Fail Criteria 3
8. Product Qualification 3
9. Limitations 3

Annex A Test Specimen Reference Figures 6
Annex B Louver to Building Structure Attachments 10
Annex C Bibliography 11

Test Method for Louvers Impacted by Wind Borne Debris

1. Purpose

The purpose of this standard is to establish uniform methods for laboratory testing of louvers that are impact tested with the large missile described in ASTM E 1996-04 [1] and E 1886-05 [2].

2. Scope

The scope of this standard is for impact testing of louvers used on the outside of buildings as required by the ICC International Building Code [3] and the ICC International Residential Code [4].

The following precautionary statement pertains only to the test method portion, Section 5, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of the regulatory limitations prior to use*.

3. Definitions

3.1 Enhanced protection (Essential Facilities)

Buildings and other structures designated as essential facilities, including, but not limited to, hospitals; other health care facilities having emergency treatment facilities; jails and detention facilities; fire, rescue and police stations, and emergency vehicle garages; designated emergency shelters; communication centers and other facilities required for emergency response; power generating stations; other public utility facilities required in an emergency; and buildings and other structures having critical national defense functions.

3.2 Basic protection

Any building or structure that is not an Essential Facility as described in Section 3.1.

4. Test Specimens

4.1 Number of specimens

4.1.1
A minimum of one test specimen shall be submitted for the large missile impact testing. Additional specimens may be submitted to cover the complete range of louver sizes.

4.1.2
One additional, identical specimen may be submitted for the large missile testing should the specimen described in Section 4.1 fail any portion of the testing. This is described in Section 8.2.

4.2 Size of specimens

The test specimen selected is intended to evaluate the critical failure area of the louver and provide guidance for blade support requirements. The critical failure area for louvers is the connection between the louver blade end and the perimeter louver frame. Failures in this area result in loose material that can result in projectiles in high wind events. The most stringent test specimen for this connection is a section where the blade has no additional support between these end connections. Energy from the impact is transferred to the connection with little absorption by blade flexure. This test specimen also provides guidance regarding the maximum unsupported blade length that will not allow the projectile to pass through the louver blades. Louvers manufactured with blade spans greater than that of the test specimen shall have blade supports at a spacing that matches the tested specimen blade length. These supports are typically located behind the blade running perpendicular to the axis of the blade and are attached to the perimeter frame of the louver or to the surrounding building structure. Due to the fact that the test specimen is used to qualify support locations in this way, the manufacturer may wish to test an additional specimen with a width narrower than desirable support spacing to establish a smaller minimum section width.

The size of the test specimen shall be as defined in Section 4.2.1.1, 4.2.1.2, 4.2.1.3, or 4.2.1.4.

4.2.1 Single section louver qualification

4.2.1.1 Horizontal blade
The test specimen shall consist of a single section. The section width shall be equal to the maximum blade span the manufacturer would supply without providing a blade support plus the added width of the specimen jamb frames. The minimum height of the test specimen shall be 36 inches. The test specimen shall also contain a minimum of five blades. This specimen shall qualify single sections of widths greater than the specimen, provided the manufacturer supports the louver blades at a spacing equal to the blade length of the specimen. The tested width becomes the minimum section certified by the impact test. The specimen qualifies all single section heights. If the manufacturer wishes to certify a width narrower than the test specimen,