

# Update No. 1

## AAMA/WDMA/CSA 101/I.S.2/A440-08

### May 2008

**Note:** General Instructions for CSA Standards are now called Updates. Please contact CSA Information Products Sales or visit [www.ShopCSA.ca](http://www.ShopCSA.ca) for information about the **CSA Standards Update Service**.

*Title:* NAFS — North American Fenestration Standard/Specification for windows, doors, and skylights—  
— originally published January 2008

The following revisions have been formally approved and are marked by the symbol delta ( $\Delta$ ) in the margin on the attached replacement pages:

<b>Revised</b>	Clause 4.3.2.1, Table 27, and Figure 24
<b>New</b>	None
<b>Deleted</b>	None

AAMA/WDMA/CSA 101/I.S.2/A440-08 originally consisted of **129 pages** (viii preliminary and 121 text), each dated **January 2008**. It now consists of the following pages:

<b>January 2008</b>	iii–viii, 1–28, 31–74, 77–110, and 117–121
<b>May 2008</b>	29, 30, 75, 76, and 111–116

- Update your copy by inserting these revised pages.
- Keep the pages you remove for reference.



**Note:** *The user should not confuse this option with the option of testing smaller specimens to achieve optional performance grades (PG), as specified in Clause 4.3.2. During testing to achieve optional performance grades (PG), testing of smaller specimens is permitted only after all gateway requirements have been met. In contrast, the option specified in this Clause permits a product to enter Performance Class R via the testing of a specimen with a reduced size compared to the gateway test size requirements specified in Table 27.*

### 4.3 Performance grades (PG)

#### 4.3.1 Assignment of performance grade (PG)

Performance grade (PG) shall be achieved only upon successful completion of all applicable tests specified in Clause 5.

**Note:** *See Clause 0.2.3 for additional details.*

#### 4.3.2 Optional performance grades (PG)

**Note:** *This Clause contains additional requirements and tests for products that may be required by the specifier. It incorporates higher uniform load deflection, uniform load structural test, and water penetration resistance test pressures than those specified in Table 27.*

##### △ 4.3.2.1

The following requirements shall apply to testing for optional performance grades (PG):

- (a) the original specimen shall be permitted to be tested; or
- (b) another specimen of any size shall be permitted to be tested. If the additional specimen is either wider or taller than the gateway specimen, all tests in Clause 5 applicable to the product type shall be conducted.

##### 4.3.2.2

Clause 4.3.2.1 shall be used in conjunction with Clauses 8 and 9. All products tested under Clause 4.3.2.1 shall be required to conform to all the requirements of Clauses 5 to 9 and Table 27 applicable to the product designation under consideration. Prior to being considered for an optional performance grade (PG), a product shall comply with

- (a) the general requirements of Clauses 5 to 7;
- (b) all appropriate material and component requirements specified in Clauses 6 and 7;
- (c) all specific product performance requirements specified in Clause 8 or 9 for the product type; and
- (d) the gateway performance requirements for the minimum performance grade (PG) listed in Clause 8 or 9.

After complying with all minimum requirements specified in Items (a) to (d), the product shall be permitted to be tested in any test size for conformance to an optional performance grade (PG), within the same performance class, in multiple increments of 240 Pa (5.0 psf), as specified in Tables 2 to 4. Optional performance grades (PG) shall not exceed the performance grades (PG) specified in Tables 2 to 4. Clause 5.1 defines the testing sequence.

### 4.4 Product designations

#### 4.4.1 General

A primary designator shall be used to designate products included in this Standard/Specification. An optional secondary designator shall be permitted if desired. The use of a secondary designator, or any portion thereof, shall only be permitted in conjunction with the primary designator and shall be preceded by the primary designator. All written presentations of any secondary designator, or any portion thereof, in any manner, shall have a text size not larger than that of the primary designator. For the purpose of compliance with this Standard/Specification, all written presentations shall include, but not be limited to, the following:

- (a) product labels;

- (b) technical literature;
- (c) web-based or other electronic publications; and
- (d) advertising.

**Table 2**  
**U.S. (only) optional performance grades (PG)**  
(See Clauses 0.2.6.1, 4.3.2.2, 4.4.3.2–4.4.3.4, 5.3.3.1, 5.3.4.2, and 5.3.4.3.)

Performance class and optional performance grades (PG)				Design pressure (DP)		Structural test pressure (STP)		Water penetration resistance test pressure			
								R, LC, CW		AW	
R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)	Pa	(psf)
20	—	—	—	960	(20.00)	1 440	(30.00)	150	(3.00)	—	—
25	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
30	30	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
45	45	45	45	2 160	(45.00)	3 240	(67.50)	330	(6.75)	440	(9.00)
50	50	50	50	2 400	(50.00)	3 600	(75.00)	360	(7.50)	480	(10.00)
55	55	55	55	2 640	(55.00)	3 960	(82.50)	400	(8.25)	530	(11.00)
60	60	60	60	2 880	(60.00)	4 320	(90.00)	440	(9.00)	580	(12.00)
65	65	65	65	3 120	(65.00)	4 680	(97.50)	470	(9.75)	580	(12.00)
70	70	70	70	3 360	(70.00)	5 040	(105.00)	510	(10.50)	580	(12.00)
75	75	75	75	3 600	(75.00)	5 400	(112.50)	540	(11.25)	580	(12.00)
80	80	80	80	3 840	(80.00)	5 760	(120.00)	580	(12.00)	580	(12.00)
85	85	85	85	4 080	(85.00)	6 120	(127.50)	580	(12.00)	580	(12.00)
90	90	90	90	4 320	(90.00)	6 480	(135.00)	580	(12.00)	580	(12.00)
95	95	95	95	4 560	(95.00)	6 840	(142.50)	580	(12.00)	580	(12.00)
100	100	100	100	4 800	(100.00)	7 200	(150.00)	580	(12.00)	580	(12.00)
—	—	—	No limit*	No limit*	No limit*	1.5 × design pressure (DP)	1.5 × design pressure (DP)	580	(12.00)	580	(12.00)

\*There is no limit for optional performance grades (PG) in the AW performance class.

**Note:** Where products are subjected to increased risks of wind-driven rain events, the water penetration resistance test pressure may be increased. The water penetration resistance test pressure is based on 15% of the design pressure (DP) for R, LC, and CW performance classes and 20% of the design pressure (DP) for AW performance classes. The “optional performance grade” water resistance test pressure is capped at 730 Pa (15 psf).

### 5.3.9 Acoustical performance (optional)

#### 5.3.9.1 General

The ability of windows, doors, TDDs, and unit skylights to attenuate sound transmissions is important in locations where exterior noise is excessive or disruptive. Sound attenuation shall be measured and rated either as STC (Sound Transmission Class) for interior frequencies or OITC (Outdoor-Indoor Transmission Class) for exterior sound sources. STC is traditionally used to evaluate sound transmission through interior walls or barriers, whereas OITC is more useful for dealing with external noise, e.g., road, aircraft, and rail noises.

The AAMA and ASTM Specifications specified in Clause 5.3.9.2 shall be used to develop acoustical ratings for windows, doors, TDDs, and unit skylights. AAMA TIR A1 is also a useful reference on acoustical performance and requirements.

#### 5.3.9.2 Procedure

When acoustical performance characteristics are to be determined, all windows, doors, TDDs, and unit skylights shall be tested in accordance with ASTM E 90, ASTM E 1425, or AAMA 1801. STC and OITC ratings shall be derived from ASTM E 413 and ASTM E 1332, respectively. Test specimen size for windows shall be the size tested for the gateway performance of this Standard/Specification, but not larger than 2.23 m<sup>2</sup> (24 ft<sup>2</sup>). Test specimen size for doors shall be as noted in the size tested for the gateway performance of this Standard/Specification, but not larger than 2.23 m<sup>2</sup> (24 ft<sup>2</sup>) for single doors or 4.46 m<sup>2</sup> (48 ft<sup>2</sup>) for pairs.

### 5.3.10 Impact performance (optional)

#### 5.3.10.1 General

The ability of windows, doors, TDDs, and unit skylights to resist impact by windborne debris is important in areas where high wind events, such as hurricanes, regularly occur. Governing building codes or other regulations in these areas frequently require that windows, doors, TDDs, or unit skylights either be rated as impact resistant or be protected by impact-resistant devices.

#### 5.3.10.2 Procedure

When impact performance is to be determined, all windows, doors, TDDs, and unit skylights shall first comply with all other applicable requirements of this Standard/Specification. In addition, the product(s) shall comply with either ASTM E 1996 or AAMA 506. Specimen test sizes shall be the largest width and height for which compliance is desired. For purposes of compliance with either ASTM E 1996 or AAMA 506, specimen test sizes shall not be restricted by the gateway requirements of this Standard/Specification.

## 5.4 Laboratory test report

### 5.4.1

All test reports referencing this Standard/Specification shall include, as a first page, a "Summary of Results" containing, at a minimum, the information shown in Figure 24, in the order shown in Figure 24.

Product manufacturer:	ABC Window Company
Product type:	Aluminum casement window
Product series/model:	1000
Primary product designator:	Class R — PG25 — Size tested 760 × 1520 (30 × 60)
Optional secondary designator:	Positive design pressure (DP) = 2000 Pa (41.8 psf)
	Negative design pressure (DP) = -3000 Pa (-62.7 psf)
	Water penetration resistance test pressure = 188 Pa (3.9 psf)
Test completion date:	11/27/06
(Reference must be made to Report No. 01-1234, dated 11/29/06, for complete test specimen description and detailed test results.)	

Figure 24  
Test report summary of results  
(See Clause 5.4.1.)

#### 5.4.2

The test reports shall include test dates, report dates, test record retention dates (minimum 4 years), the location of the test facility, and a comprehensive description of the test specimen. This description shall provide sufficient detail to allow for verification of the fabrication of the test specimen, including, but not limited to, the following details. The details shall be provided in the following order:

- (a) name and location of the test specimen manufacturer;
- (b) product type, model, and mode of operation (e.g., inswing, project-in-top, project-out-bottom, outswing);
- (c) test specimen overall size/configuration;
- (d) sash, panel, or leaf, sill, and frame component parts list, joinery type, record of materials (including part number, description, quantity), fastening, sealing details, as well as sash, panel, or leaf and frame dimensions;
- (e) weatherstripping type, joinery, retaining method, referenced part number, and size;
- (f) glazing width, height, thickness, and type (e.g., material, airspace thickness, spacer type and identification);
- (g) glazing method (e.g., wet/dry, laid-in, or channel glazing; glazing seals; bite depth; and setting block type and locations);
- (h) drainage system, indicating location and size of all active and passive weepholes, sloped sills, glazing drainage, etc.;
- (i) detailed list of operating hardware components, including part numbers, manufacturer, model, type, materials, locations, application details, fastening and sealing details, etc.;
- (j) sash and frame reinforcement (if none, the report shall state “no reinforcement”);
- (k) screen(s): component parts list, joinery type, fastening method of retention, etc.;
- (l) slope of test specimen installation (for roof windows and unit skylights);
- (m) test specimen installation, including rough opening clearances, perimeter fastening, sealing details, and test buck material;
- (n) the results of all tests listed in Table 27 for the product being tested, including a statement or tabulation of pertinent testing parameters and data collected;
- (o) optional test specimen size/configuration (if applicable);
- (p) if applicable, a statement that the specimen size was in accordance with the alternative minimum test size requirements of Clause 9;
- (q) other data required to be reported in the applicable reference test methods report sections;
- (r) a statement that all tests were conducted in accordance with this Standard/Specification and a complete description of any deviations from this Standard/Specification; and
- (s) a statement of performance ratings obtained.





Table 27 (Continued)

Product type	Product designation	Minimum test size, mm (in)	Minimum design pressure (DP), Pa (lbf/ft <sup>2</sup> )	Deflection at design pressure (DP), mm (in)	Minimum structural pressure (STP), Pa (lbf/ft <sup>2</sup> )	Minimum water pressure, Pa (lbf/ft <sup>2</sup> )	Air leakage resistance		Operating force test	Force to latch test	Deadbolt force test	Forced-entry resistance test	Thermoplastic corner weld test	Deglazing test	Sash/leaf torsion test	Sash vertical deflection test	Sash/leaf concentrated load test on latch rail	Vertical concentrated load test	Vertical concentrated load test on intermediate frame rails	Distributed load test	Stabilizing arm load test	Hold-open arm/stay bar test	Hinge test	Awning, hopper, projected hardware load test	Safety drop test	Unit dead load test	Life cycle testing	Operation/cycling performance	Vertical loading resistance			
							Pa (lbf/ft <sup>2</sup> )	L/s·m <sup>2</sup> (cfm/ft <sup>2</sup> )																								
Fixed window (continued)	Class AW-PG40-FW	1500 x 2500 (60 x 99)	1920 (40.0)	L/175	2880 (60.0)	390 (8.0)	300 (6.2)	0.5 (0.1)																							5.3.6.11	
Greenhouse window	Class R-PG15-GH	900 x 900 x 300 (36 x 36 x 12)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)																							5.3.6.10	
Hinged rescue window	Class R-PG15-HE	Varies	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)																							5.3.6.9	
Horizontally or vertically pivoted window	Class R-PG15-HP/VP	1100 x 1500 (44 x 60)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)																							5.3.6.8	
	Class LC-PG25-HP/VP	1200 x 1500 (48 x 60)	1200 (25.0)	Reported	1800 (37.5)	180 (3.8)	75 (1.6)	1.5 (0.3)																							5.3.6.7	
Δ	Class CW-PG30-HP/VP	1200 x 2200 (48 x 87)	1440 (30.0)	L/175	2160 (45.0)	220 (4.5)	75 (1.6)	1.5 (0.3)																							5.3.6.6	
	Δ Class AW-PG40-HP/VP	1500 x 2500 (60 x 99)	1920 (40.0)	L/175	2880 (60.0)	390 (8.0)	300 (6.2)	0.5 (0.1)																							5.3.6.5	
Horizontal sliding window	Class R-PG15-HS	1600 x 1100 (63 x 44)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)																								5.3.6.4
	Class LC-PG25-HS	1800 x 1400 (71 x 56)	1200 (25.0)	Reported	1800 (37.5)	180 (3.8)	75 (1.6)	1.5 (0.3)																								5.3.6.3
Hung window — vertical sliding	Class CW-PG30-HS	1800 x 1500 (71 x 60)	1440 (30.0)	L/175	2160 (45.0)	220 (4.5)	75 (1.6)	1.5 (0.3)																								5.3.6.2
	Δ Class AW-PG40-HS	2500 x 2000 (99 x 79)	1920 (40.0)	L/175	2880 (60.0)	390 (8.0)	300 (6.2)	1.5 (0.3)																								5.3.6.1
	Δ Class R-PG15-H	1000 x 1600 (40 x 63)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)																								5.3.5

(Continued)

Table 27 (Continued)

Product type	Product designation	Minimum test size, mm (in)	Minimum design pressure (DP), Pa (lbf/ft <sup>2</sup> )	Deflection at design pressure (DP), mm (in)	Minimum structural pressure (STP), Pa (lbf/ft <sup>2</sup> )	Minimum water pressure, Pa (lbf/ft <sup>2</sup> )	Air leakage resistance		Operating force test	Force to latch test	Deadbolt force test	Forced-entry resistance test	Thermoplastic corner weld test	Deglazing test	Sash/leaf torsion test	Sash vertical deflection test	Sash/leaf concentrated load test on latch rail	Vertical concentrated load test	Vertical concentrated load test on intermediate frame rails	Distributed load test	Stabilizing arm load test	Hold-open armstays bar test	Hinge test	Awning, hopper, projected hardware load test	Safety drop test	Unit dead load test	Life cycle testing	Operation/cycling performance	Vertical loading resistance				
							Pa (lbf/ft <sup>2</sup> )	L/s·m <sup>2</sup> (cfm/ft <sup>2</sup> )																									
Hung window — vertical sliding (continued)	Δ Class LC-PG25-H	1100 × 1900 (44 × 75)	1200 (25.0)	Reported	1800 (37.5)	180 (3.8)	75 (1.6)	1.5 (0.3)	•																						5.3.6.11		
	Class CW-PG30-H	1400 × 2300 (56 × 91)	1440 (30.0)	L/175	2160 (45.0)	220 (4.5)	75 (1.6)	1.5 (0.3)	•																						5.3.6.10		
	Δ Class AW-PG40-H	1500 × 2500 (60 × 99)	1920 (40.0)	L/175	2880 (60.0)	390 (8.0)	300 (6.2)	300 (6.2)	1.5 (0.3)	•																					•	5.3.6.9	
Jal-awning window	Class R-PG15-JA	1400 × 1600 (56 × 63)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)																									
Jalousie window	Class R-PG15-J	900 × 1200 (36 × 48)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	6.0 (1.2)																									
Non-hung window — vertical sliding	Class R-PG15-VS	1000 × 1600 (40 × 63)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)	•																								
	Class LC-PG25-VS	1100 × 1900 (44 × 75)	1200 (25.0)	Reported	1800 (37.5)	180 (3.8)	75 (1.6)	1.5 (0.3)	•																								
	Class CW-PG30-VS	1400 × 2300 (56 × 91)	1440 (30.0)	L/175	2160 (45.0)	220 (4.5)	75 (1.6)	1.5 (0.3)	•																								
Side-hinged door	Class R-PG15-SHD	900 × 2000 (36 × 79)	720 (15.0)	Reported	1080 (22.5)	140 (2.9)	75 (1.6)	1.5 (0.3)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Class LC-PG25-SHD	900 × 2100 (36 × 83)	1200 (25.0)	Reported	1800 (37.5)	180 (3.8)	75 (1.6)	1.5 (0.3)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Class CW-PG30-SHD	1000 × 2100 (40 × 83)	1440 (30.0)	L/175	2160 (45.0)	220 (4.5)	75 (1.6)	1.5 (0.3)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Side-hinged window	Δ Class AW-PG40-SHD	1200 × 2400 (48 × 95)	1920 (40.0)	L/175	2880 (60.0)	390 (8.0)	300 (6.2)	0.5 (0.1)		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Class AW-PG40-SHW	1200 × 1800 (48 × 71)	1920 (40.0)	L/175	2880 (60.0)	390 (8.0)	300 (6.2)	0.5 (0.1)																									•

(Continued)



