



MID AMERICA TESTING LABORATORY, INC.

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WINDOW MANUFACTURER: Tubelite Inc.
4878 Mackinaw Trail
Reed City, MI 49677

MODEL NUMBER: Tubelite Series CW3700 Casement

PERFORMANCE CLASS: C-AW60 3'-0" X 5'-0"

JOB NUMBER: 03036L

DATE OF REPORT: April 10, 2003

LOCATION OF TESTING: Mid America Testing Laboratory

DATES OF TESTING: March 11-April 7, 2003

EXPIRATION DATE: April 7, 2007

All tests were conducted in accordance with procedures outlined in AAMA/NWWDA 101/I.S.2-97 and applicable ASTM standards.

The following were present for all or portions of the laboratory testing.

Mr. James Brown	Mid America Testing Laboratory
Mr. Rick Heitmann	Mid America Testing Laboratory
Ms. Cindy Barrow	Mid America Testing Laboratory

UNIT DESCRIPTION

The aluminum Series CW3700 project out casement window manufactured by Tubelite was installed in a test chamber by laboratory personnel for purposes of weatherization and structural testing. The overall frame had a dimension of 3'-0" wide X 5'-0" tall. The sash size was 34" wide X 57 5/8" tall.

The unit was glazed with a nominal 1" insulated glass unit comprised of two 1/4" double strength panes. The glazing was set from the interior and utilized a wedge gasket with a Shore A durometer reading of 70 and glazing stops. Glazing tape and caulk were used to seal the glass on the exterior.

The sash was weathered with a bulb gasket on the interior face and run continuously around the sash.

The sash was locked by two (2) cam locking handles located at 10" from the head and sill respectively. The sash was operated by a standard roto crank manufactured by Bronze Craft and located at the sill.

The frame construction consisted of coped corners fastened with #10 - 24 x 7/8" sheet metal screws. The sash construction was mitered and fastened with corner keys crimped in place. All frame seams and screws were sealed with caulk.

FORMAL TESTING

Tests were conducted on the 36" wide X 60" tall project out casement window provided by Tubelite and installed into the test chamber by Mid America Testing Laboratory personnel. Tests were conducted in substantial accordance with the test procedures outlined and described below utilizing the applicable AAMA and ASTM standards.

1. **2.1.2 AIR INFILTRATION TEST** (ASTM E 283) at 6.24 PSF (50 MPH and 1.2" H₂O).

ALLOWED: Air infiltration shall not exceed .1CFM per square foot.

RESULTS: .7 CFM per square foot.

REMEDIAL: Investigative testing and remedial work proved the majority of the air loss was through the hinges. Tubelite provided new hinges which were then installed. The new hinges had a preformed plastic gasket installed between the hinge and sash.

RESULTS: .1 CFM per square foot.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and ASTM E 283.

2. **2.1.3 WATER RESISTANCE TEST** (ASTM E 547) at 12 PSF (69.3 MPH and 2.3” H₂O)

ALLOWED: No uncontrolled water infiltration to the room side.

RESULTS: No uncontrolled water infiltration to the room side.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and ASTM E 547.

3. **2.2.4.5.9 LIFE CYCLE TESTING** (AAMA 910) for 2500 cycles.

	TEST TITLE	ALLOWED	RESULT
2.1.4	Vent cycle test 1250 cycles.	No damage	No damage
2.1.5	Locking hardware cycles.	No damage cycle test 1250	No damage
2.5.2.1	Ventilator Torsion test.	No damage	No damage
2.5.5.2	Ventilator Vertical Load Test.	No damage	No damage
2.1.4	Vent cycle test 1250 cycles.	No damage	No damage
2.1.5	Locking hardware cycle test 1250 cycles.	No damage	No damage

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and AAMA 910-93.

4. **2.1.2 AIR INFILTRATION TEST** (ASTM E 283) at 6.24 PSF (50 MPH and 1.2" H₂O).

ALLOWED: Air infiltration shall not exceed .1 CFM per square foot.

RESULTS: .007 CFM per square foot.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and ASTM E 283.

5. **2.1.3 WATER RESISTANCE TEST** (ASTM E 331) at 12 PSF (69.3 MPH and 2.3" H₂O)

ALLOWED: No uncontrolled water infiltration to the room side.

RESULTS: No uncontrolled water infiltration to the room side.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and ASTM E 331.

6. **2.1.4.1 UNIFORM LOAD DEFLECTION TEST** (ASTM E 330) Held for ten (10) seconds duration for both 50% and 100% loads. Deflections were measured with dial indicators at both 50% and 100% loads.

+20 PSF (50% Positive Design Load) to remove slack

+60 PSF (100% Positive Design Load)

-20 PSF (50% Negative Design Load) to remove slack

-60 PSF (100% Negative Design Load)

ALLOWED: Deflection of framing members shall not exceed L/175 of the span length or 3/29". There shall be no failure of the system.

RESULTS: .19" maximum deflection and there was no failure of the system.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and ASTM E 330.

7. **2.1.4.2 UNIFORM LOAD STRUCTURAL TEST** (ASTM E 330) at 1.5 times design load for ten (10) seconds duration in both directions. Deflections and permanent sets were measured at 1.5 times only.

+45 PSF (75% Positive Design Load) to remove slack
+90 PSF (150% Positive Design Load)
-45 PSF (75% Negative Design Load) to remove slack
-90 PSF (150% Negative Design Load)

ALLOWED: Permanent set of framing members shall not exceed 2/1000 of the span length or .115". There shall be no failure of the system.

RESULTS: At -90 PSF the bottom latch opened.

REMEDIAL: The bottom keeper was adjusted. Testing was repeated.

RESULTS: Permanent set was .10" and there was no failure of the system.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and ASTM E 330.

8. **2.1.8 FORCED ENTRY TEST** (ASTM F 588) Performance Grade 10

	TEST TITLE	ALLOWED	RESULT
10.1.1.1	Lock Manipulation for 5 minutes.	No entry	No entry
10.1.1.2	Lock manipulation for 5 minutes.	No entry	No entry
10.2.2.1	Static load test at 75 pounds.	No entry	No entry

10.2.2.2	Static load test at 150 pounds.	No entry	No entry
10.2.2.3	Static load test at 150 pounds.	No entry	No entry
10.2.2.4	Lock manipulation for 5 minutes.	No entry	No entry

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97 and ASTM F 588.

9. **2.2.5.6.1 VERTICAL DEFLECTION TEST** (AAMA 101-97)

ALLOWED: Maximum deflection of .71" at a concentrated load of 60 lbf.

RESULTS: .23" deflection at a concentrated load of 60 lbf.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97.

10. **2.2.5.6.2 HARDWARE LOAD TEST** (AAMA 101-97)

ALLOWED: There shall be no failure of screws or track, or permanent deformation of support arms at a uniform load of 6.24 PSF.

RESULTS: There was no failure of screws or track, or permanent deformation of support arms at a uniform load of 6.24 PSF.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97.

11. **2.2.5.6.3 TORSION TEST** (AAMA 101-97)

ALLOWED: Maximum deflection of 2.8" at a concentrated load of 20 lbf.

RESULTS: .75" deflection at a concentrated load of 20 lbf.

The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S.2-97.

SUMMARY

The Tubelite Series CW3700 project out casement window unit as described in this report has met or exceeded all applicable test criteria set forth in AAMA/NWWDA 101/I.S.2-97 for a performance class of **C-AW60**.

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A bill of material and die drawings are on file and have been compared to the sample submitted. Samples of the test specimen will be retained at the laboratory. A copy of this report will be forwarded to the validator.

The above results were secured by using the designated test methods which indicate compliance with the performance requirements of the referenced specification. This report does not constitute certification of this product which may only be granted by the validator.

Respectfully Submitted,

MID AMERICA TESTING LABORATORY



Cindy Barrow
Senior Project Manager