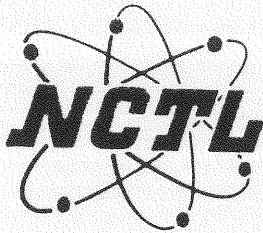


KEYMARK CORPORATION

STRUCTURAL TEST REPORT

**"Model 451 T" Thermally Broken Aluminum
Storefront Mock-Up**

NCTL-110-5685-3



NATIONAL CERTIFIED TESTING LABORATORIES

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STRUCTURAL PERFORMANCE TEST REPORT

REPORT NO: NCTL-110-5685-3

Rendered to:

CLIENT: Keymark Corporation
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Fonda, NY 12068

GAMCO CORPORATION
131-10 Maple Avenue
Flushing, New York 11355

TEST SPECIMEN: Keymark Corporation's Model "451 T" Thermally Broken Aluminum Storefront Mock-Up.

TEST SPECIFICATION: AAMA 501-94, "Methods of Test for Exterior Walls".

TEST METHODS: Tests were performed in accordance with ASTM E283-91, "Standard Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls & Doors"; ASTM E331-93, "Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference"; AAMA 501.1-94, "Standard Test Method for Metal Curtain Walls for Water Penetration Using Dynamic Pressure"; and ASTM E330-96, "Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Pressure Difference".

TEST SPECIMEN DESCRIPTION

GENERAL: The test specimen was a storefront window wall of aluminum and glass measuring 10' 6" wide by 8' high overall. The specimen consisted of three vertical sections joined at the intermediate mullions to provide six fixed lites arranged in two horizontal rows and three vertical columns. The frames were thermally broken using poured urethane thermal barriers, debridged to 1/4".

Each vertical section consisted of a fixed lite over a fixed lite glazed to the framing members. Each fixed lite was recessed from the exterior surface of the framing members by approximately 1-3/4". The bottom fixed lite in each column provided a daylight opening of 29-3/8" high by 39-1/4" wide. The top fixed lite in each column provided a daylight opening of 60" high by 39-1/4" wide.

In each section all framing corners between the horizontal framing members and the vertical framing members were of butt-type construction secured by two #12 x 1-1/4" long screws through the vertical member into screw bosses in the horizontal member extrusion. A 1" wide by 1-1/2" long by 0.038" thick plastic water deflector was employed in the glazing track at both framing corners of the intermediate horizontal framing members in each vertical section. These water deflectors were attached to the glazing track by a silicone sealant (Tremco Spectrum) and were bent downward into the glazing track of the vertical mullions. The head and jams

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employed extruded aluminum covers which were snap-fitted at the frame web. The covers were thermally broken using poured urethane thermal barriers, debridged to 1/4". An L-shaped aluminum end dam with a vertical leg height of 1-3/8" was located at each jamb/sill corner. The vertical mullions were of two (2) piece snap-fitted construction.

GLAZING: The fixed lites were exterior glazed using sealed insulating vision glass with an interior and exterior push-in elastomeric glazing gasket and a snap-in extruded aluminum glazing bead at the sill and intermediate horizontal framing members. The overall glass thickness was 1" consisting of two lites of 1/4" thick clear tempered glass and one space created by a desiccant-filled aluminum spacer system. Each lite was supported by two 1-1/4" wide by 4" long by 5/8" thick elastomeric setting blocks.

WEATHERSEALS: No weatherseals employed.

WEEPS: No apparent weeps employed.

INTERIOR & EXTERIOR SURFACE FINISH: Mill finish aluminum.

SEALANT: The heads of all fasteners used to anchor the specimen to the chamber opening were sealed with a silicone sealant (Tremco Spectrum). The butt corner joints between the horizontal and vertical framing members were profile sealed with a silicone sealant. The glazing corners were sealed with a silicone sealant. The butt corner joints between the horizontal and vertical framing members were perimeter sealed with a silicone sealant on the interior side of the window wall. The sill flashing (sub-sill) was sealed to the interior vertical sill face with a silicone sealant. The interior and exterior specimen perimeters were sealed to the chamber opening with a silicone sealant over a 5/8" diameter closed cell backer rod.

INSTALLATION: The aluminum sill flashing (sub-sill) was anchored to the chamber opening using six (6) #12 x 2-1/2" long screws on approximately 24" centers beginning at 1-1/2" from each end of the sill; two (2) 2" x 3-1/2" x 1/2" thick plastic (polystyrene) shims were included underneath the sub-sill at each anchor point. Each sill horizontal was mounted to the sub-sill by two (2) #12" x 3" long screws placed in the sill glazing track at approximately 7" from each vertical mullion. The left and right jamb mullions of the wall were each anchored to the chamber opening using two (2) #12 by 2-1/2" long screws placed in the mullion glazing track at the approximate 1/3 points of the frame height. Various 4" by 4" plastic shims of 1/4", 1/8", and/or 1/16" thickness were employed between the frame and the chamber opening to maintain squareness of the test specimen. Each head horizontal was mounted to the chamber opening by two (2) #12 by 2-1/2" long screws placed in the head glazing track at approximately 7" from each vertical mullion.

TEST RESULTS

| <u>TEST METHOD</u> | <u>TITLE OF TEST</u> | <u>MEASURED</u> | <u>ALLOWED</u> |
|---------------------------|--|---------------------------|--------------------------|
| ASTM E283-91 | Air Infiltration 6.24 psf (50 mph) | 0.015 CFM/FT ² | 0.06 CFM/FT ² |
| ASTM E331-93 | Static Water Resistance 5.0 GPH/FT ² WTP = 12.0 psf | NO ENTRY | NO ENTRY |

TEST RESULTS (cont'd)

| <u>TEST METHOD</u> | <u>TITLE OF TEST</u> | <u>MEASURED</u> | <u>ALLOWED</u> |
|---------------------------|--|--------------------------------------|--------------------------------------|
| AAMA 501.1-94 | Dynamic Water Resistance 5.0 GPH/FT ² WTP = 12.0 psf (68.5 mph) | NO ENTRY | NO ENTRY |
| ASTM E330-96 | Uniform Load Deflections 35 psf Exterior Left Vertical Mullion Center Horizontal Member 35 psf Interior Left Vertical Mullion Center horizontal Member | 0.345" 0.060" | 0.546" 0.225" |
| ASTM E330-96 | Uniform Load Structural Permanent Set 52.5 psf Exterior Left Vertical Mullion Center Horizontal Member 52.5 psf Interior Left Vertical Mullion Center horizontal Member | 0.005" 0.000" 0.010" 0.057" | 0.191" 0.079" 0.191" 0.079" |

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. A copy of this report along with representative sections of the test specimen will be retained by NCTL for a period of four (4) years. The results obtained apply only to the specimen tested. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen may be drawn from this test.

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