



**Western  
Technologies  
Inc.**  
The Quality People  
Since 1955

3737 East Broadway Road  
Phoenix, Arizona 85040  
(602) 437-3737 • fax 470-1341

May 17, 1994

Natural Lighting Co.  
7021 W. Augusta, Ste. 106  
Glendale, AZ 85303

Attn: Paul Bilbrey

Re: ICBO Testing of Plastic Skylights

This is to confirm that the ICBO testing of your Plastic Domed Skylight, Model #5252 has been completed by Western Technologies Inc. The tests performed consisted of Uniform Load Tests, Wind Uplift Tests, and Water Resistance Tests. All tests were conducted in accordance with the ICBO Acceptance Criteria for Plastic Skylights. The test results were found to be acceptable for all tests.

All tests were performed on a typical unit randomly selected from your inventory, which has the following specifications:

- Skylight Dome: 49-1/4 x 49-1/4 x .187"(3/16) pattern 12 prismatic acrylic manufactured by ICI Acrylics Inc. ICBO report #4900, Dome rise was approximately seven inches.
- Skylight Frame: See attached drawing for frame specifications. Frame was attached to 2 x 6 wood curb with 16 (four per side) #12 x 1-1/2 zinc plated screws. A gap of approximately 1/4" was between the frame and vertical portion of wood curb. Frame was sealed to the top of wood curb with a generous bead of silicone. If gap is larger, shims should be placed between curb and frame.
- Skylight Retainer: Attached to frame from the top by 16 (four per side) #10 x 3/4" zinc plated screws.

If you have any questions please feel free to call at your convenience.

Sincerely,  
WESTERN TECHNOLOGIES INC.

Alex Zuran  
Director, Nondestructive and Mechanical Services



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May 12, 1994

Natural Lighting Company  
7021 West Augusta  
Suite 106  
Glendale, Arizona 85303

Attn: Mr. Paul Bilbrey

Re: ICBO Testing of Skylights

Job No. 2163J1210-2

One plastic skylight was selected at random from stock at clients shop for load testing in accordance with the ICBO Evaluation Service Report "Acceptance Criteria for Plastic Skylights," January, 1989. The sample was conditioned in accordance with ASTM D618 by client. The following testing procedure was used.

Prior to incremental loading a proof load of 15 psf was applied and held for one minute and then released. The following measurements were obtained within 5 minutes of load release.

**Deflection in Inches**

Dial Indicator Position	1	2	3	4	5	6	7
Before Proof Load	0	0	0	0	0	0	0
After Proof Load	0	0	.012	.010	.010	.010	.010

Pressure was applied by a vacuum pump. The air temperature during the test was 75 degrees F. Dial indicators were used at the dome peak, at quarter points down the dome side, and on the frame as shown in attached Figure 1.

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Natural Lighting Company  
Job No. 2163JL210-2

The dome was loaded in the following manner:

Dial Indicator Positions  
Deflection/Inches

Load PSF	1	2	3	4	5	6	7	Visual
20	<.100	<.100	<.100	<.100	<.100	<.100	<.100	*
25	<.100	<.100	.100	<.100	<.100	<.100	<.100	*
30	<.100	<.100	.200	<.100	<.100	<.100	<.100	*
35	<.100	<.100	.300	.100	.100	.100	.100	*
40	<.100	<.100	.300	.200	.100	.400	.100	*
45	<.100	<.100	.400	.200	.100	.600	.100	*
50	<.100	<.100	.400	.300	.200	.900	.200	*
55	<.100	<.100	.400	.500	.200	1.100	.200	*
60	<.100	<.100	.400	.700	.200	1.200	.200	*
65	<.100	<.100	.480	.700	.250	1.220	.240	*

\*Each load increment was held for one minute with visual observations made throughout entire test. No increase in deflection was observed after each load increment was obtained.

All testing was conducted in accordance with the ICBO Evaluation Service Report "Acceptance Criteria for Plastic Skylights," January 1989.

If you have any questions regarding this test, please do not hesitate to call.

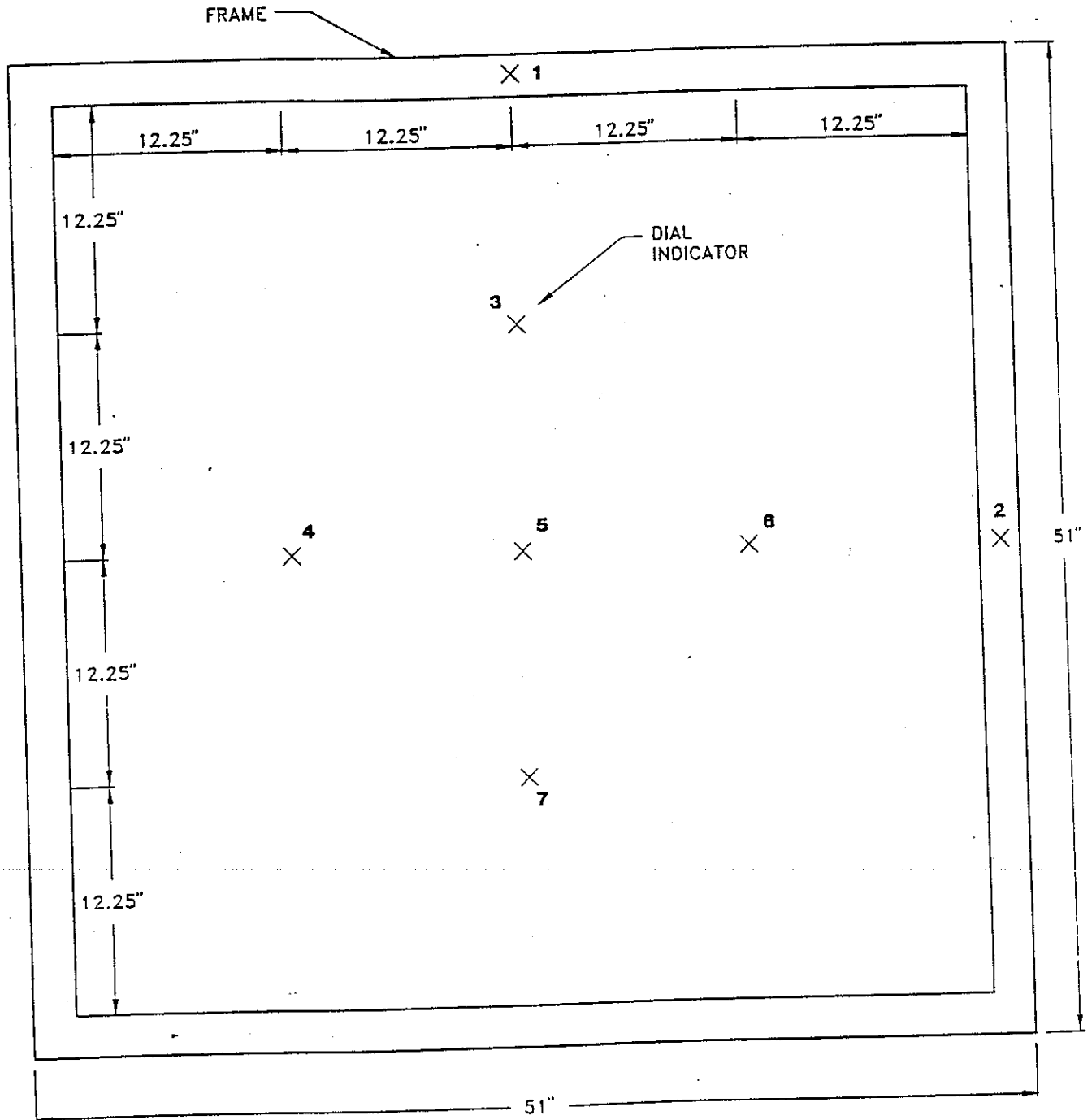
Respectfully submitted,  
WESTERN TECHNOLOGIES INC.



Alexander Zuran III  
Director, Nondestructive & Mechanical Services

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**Figure 1**  
**ICBO Testing of Skylights**  
**Placement of Dial Indicators For Positive Load Test**



**NOTES**

Air Temperature During Test - (75° F)

Reviewed: A. Zuran	Review Date: 04/04/94
Client: Natural Lighting	Prepared: R. L. Christensen
<b>Western Technologies Inc.</b>	
Job No. 2163JI210	Figure: 1

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B

May 16, 1994

Natural Lighting Company  
7021 West Augusta  
Glendale, Arizona 85303

Attn: Paul Bilbrey

Re: ICBO Testing of Skylights  
Wind Uplift Test

Job No. 2163JI210

A positive pressure air test was conducted on one domed skylight as required by ICBO recommendations for Testing of Plastic Skylights. The test was conducted to provide evidence that the fasteners attaching the unit to the roof structure can resist wind uplift forces specified in Section 2311 of the Unified Building Code. Assembly of the test specimen was witnessed by Western Technologies prior to testing. The test specimen selected at random after conditioning by client prior to testing in accordance with ASTM D-618. The test specimen was mounted on a 2" x 6" wood frame simulating a typical roof installation condition ( see Figure 3 attached ). The specimen was assembled and tested at the Natural Lighting Company manufacturing facility and was fastened with sixteen (16) wood screws, four on each side, which is typical of installation in the field.

The frame was fastened and sealed to a 3/4 inch thick plywood board. The air was supplied through a 3/4" line by an air compressor. The rated operating pressure of the compressor was 100 psi. The air was input and controlled by use of a valve. The load procedure used is as follows:

Load/PSF	Time Sustained	Visual Observations
20	1 minute	A slight rise in dome height was observed
25	1 minute	
30	1 minute	
35	1 minute	
40	1 minute	
50	1 minute	
60	1 minute	
70	1 minute	

Natural Lighting Company  
WT Job No. 2163JI210

Referencing UBC chapter 23, paragraph 2316 the Design Wind Pressure was calculated to be 61.77 psf.

$$P = C_e C_q q_s I \text{ where } P = \text{design pressure}$$

$C_e = 1.31$ , using exposure factor C at 40 feet.

$C_q = 2.5$  (1.5 for wall corners + 0.5 added for slope < 2:12 + 0.5 added per ICBO spec.).

$q_s = 16.4$  psf = .1138816 psi, at a wind speed of 80 miles per hour.

$I = 1.15$ , which is the wind factor for essential facilities.

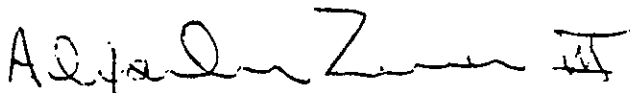
$P = 61.77$  psf.

The pressure applied to the test unit exceeded the Design Wind Pressure calculated per UBC requirements. Therefore the fasteners in the unit as tested meets the requirements of UBC 2311 as referenced in the ICBO report, Acceptance Criteria for Plastic Skylights.

If you have any questions regarding this test, do not hesitate to call.

Sincerely,

**WESTERN TECHNOLOGIES INC.**



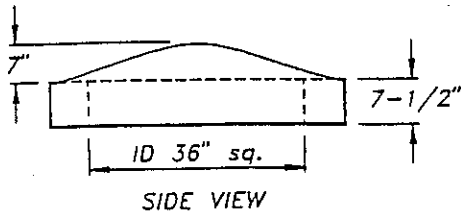
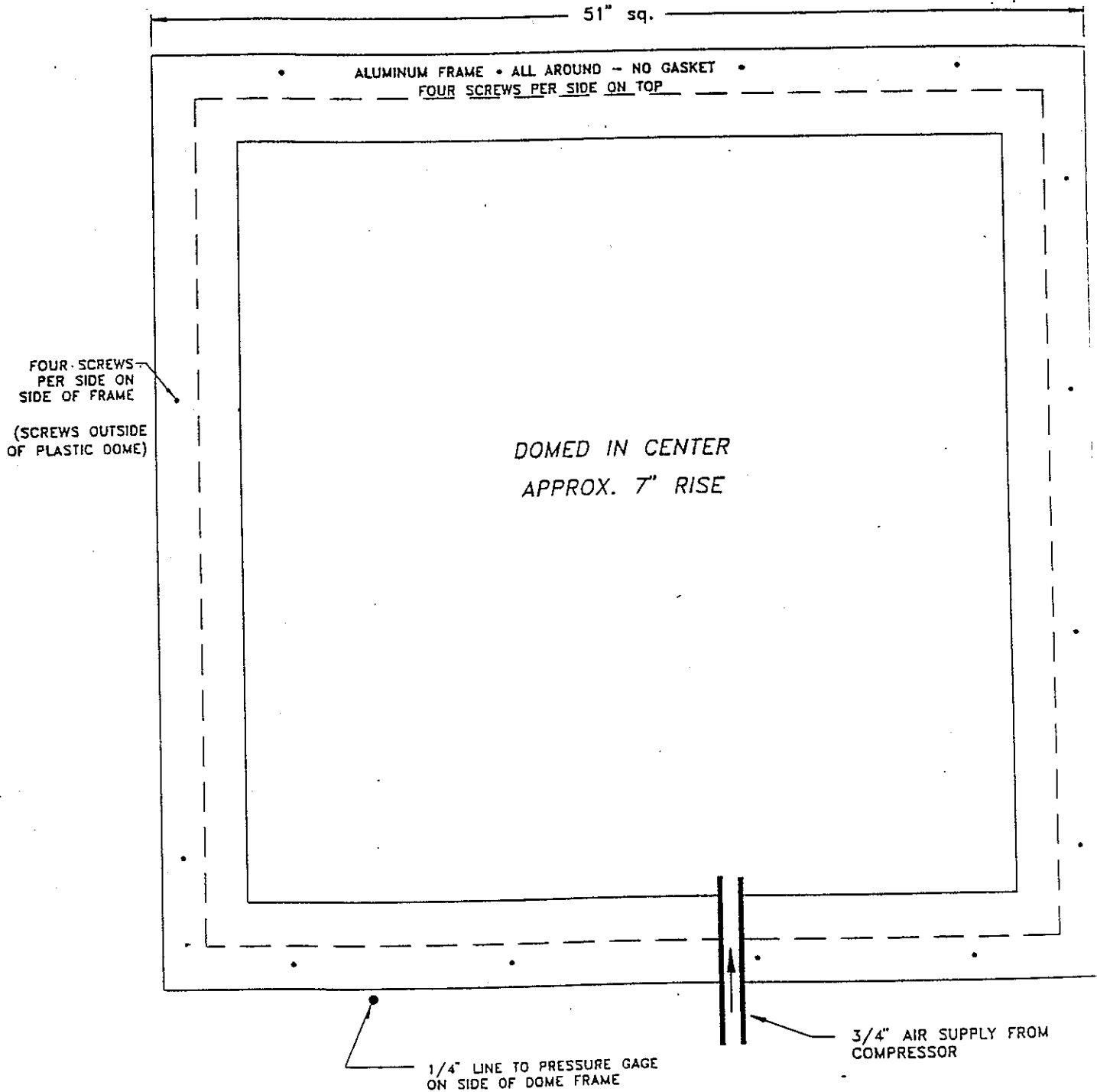
Alexander Zuran III

Director, Nondestructive and Mechanical Services

# Figure 3 – Positive Pressure Test Setup

ICBO Testing of Skylights

Drawing of Test Specimen



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Reviewed: A. Zuran	Review Date: 04/04/94
Client: Natural Lighting	Prepared: R. L. Christensen
<b>Western Technologies Inc.</b>	
Job No. 2163JI210	Figure: 3



**Western  
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3737 East Broadway Road  
Phoenix, Arizona 85040  
(602) 437-3737 • fax 470-1341

C

April 13, 1994

Natural Lighting Company  
7021 West Augusta  
Glendale, Arizona 85303

Attn: Paul Bilbrey

Re: ICBO Testing of Skylights - Water Resistance Test  
WT Job No. 2163JI210

One submitted skylight was tested in accordance with ICBO recommendations for Testing of Plastic Skylights. Assembly of the test specimen was witnessed by Western Technologies prior to submittal. The test specimen was mounted on a 2" wood frame simulating installation conditions. The specimen was assembled at the Natural Lighting Company manufacturing facility and was fastened with sixteen (16) wood screws, four on each side, which is typical of installation in the field.

The sprayer consisted of 8 nozzles inserted into 1/2" pvc piping and mounted above the dome unit eight (8) inches above the dome. Each nozzle was calibrated to deliver 20 gallons of water per hour. A vacuum was applied at 1" of water ( 5.209 psf) continuously for fifteen (15) minutes prior to water application. Water was then applied for an additional fifteen (15) minutes while vacuum remained. A total of forty (40) gallons of water was applied. See Figure 2 attached for reference.

Observations of the test revealed that the water ran out the corner channels during the test, which is how the unit was designed. Removal of the dome after testing showed no signs of water penetration. Therefore, based on the ICBO Evaluation Service Report "Acceptance Criteria for Plastic Skylights," January, 1989, the test results were acceptable. If you have any questions regarding this test, do not hesitate to call.

Sincerely,  
WESTERN TECHNOLOGIES INC.

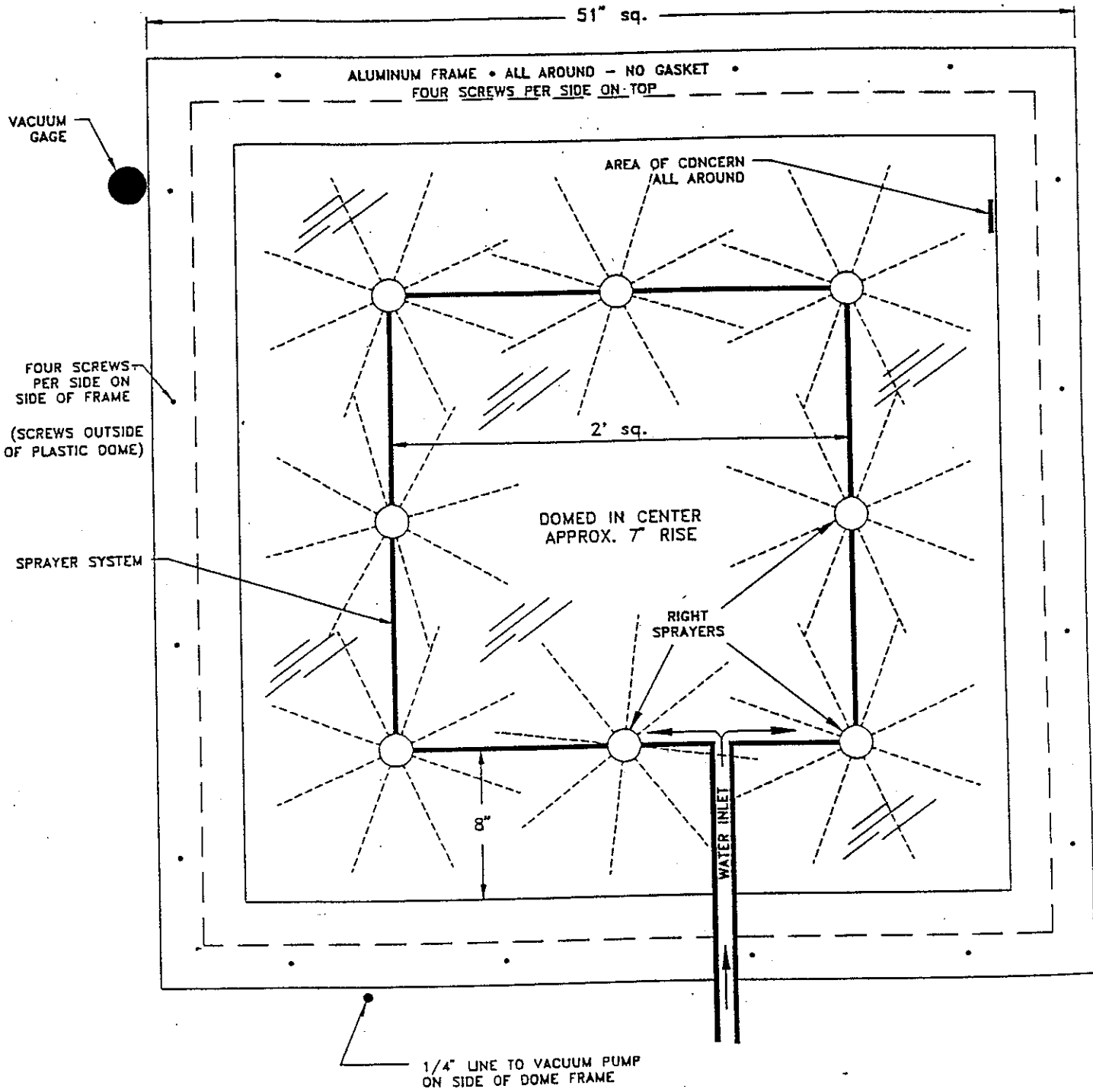
Alexander Zuran III  
Director, Nondestructive and Mechanical Services



# Figure 2 - Water Resistance Test Setup

ICBO Testing of Skylights

Drawing of Test Specimen & Sprayer



Reviewed: A. Zuran	Review Date: 04/04/94
Client: Natural Lighting	Prepared: R. L. Christensen
<b>Western Technologies Inc.</b>	
Job No. 2183JI210	Figure: 2

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# ICBO Evaluation Service, Inc.

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## EVALUATION REPORT

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Report No. 4900

June, 1992

Filing Category: PLASTICS (188)

**PERSPEX CP®, PATTERN-12 AND SAFE-T-VUE® ACRYLIC PLASTICS**  
**ICI ACRYLICS, INC.**  
**10091 MANCHESTER ROAD**  
**ST. LOUIS, MISSOURI 63122**

**I. Subject:** Perspex CP®, Pattern-12 and Safe-T-Vue® Acrylic Plastics.

**II. Description: A. General:** The MS-983 acrylic resin is manufactured and extruded into sheets by ICI Acrylics Inc. and is designated as Perspex CP, Pattern 12 and Safe-T-Vue safety glazing. The acrylic sheets are used under the following applications:

1. Light-transmitting plastics in accordance with the Uniform Building Code:

- a. Glazing—Section 5204.
- b. Exterior wall panels—Section 5205.
- c. Roof panels—Section 5206.
- d. Skylights—Section 5207. The 0.125-inch- and 0.187-inch-thick sheets and 165-inch-thick Pattern 12 sheets comply with Section V B-1 of the ICBO ES Acceptance Criteria for Plastic Skylights.

2. Interior or exterior safety glazing in accordance with Section 5406 of the Uniform Building Code.

3. Signs in accordance with the Uniform Sign Code.

The acrylic sheets may be clear, translucent or opaque depending on the amount of pigment used.

The sheets are produced in sizes up to 6.5 feet wide by 12 feet long in thicknesses ranging from 0.060 to 0.25 inch. Product density is 74 pcf. The material is classified as a CC2 approved plastic.

**B. Identification:** Each glazing sheet bears either a printed removable banner or label with the company name and address and instructions for use or a label on every container describing the product and manufacturer's name and address. In addition, each Safe-T-Vue safety glazing sheet is identified in accordance with Section 5406 (b) of the code.

**III. Evidence Submitted:** Reports of tests in accordance with U.B.C. Standards Nos. 52-2 and 54-2, Part II; ASTM D 1929-68 (1975) and ASTM D 635-74; and weathering test data in accordance with the Acceptance Criteria for Plastic Skylights, dated January, 1989.

### Findings

**IV. Findings:** Perspex CP®, Pattern 12 and Safe-T-Vue® Acrylic Plastics comply with the 1991 Uniform Building Code and the 1991 Uniform Sign Code, subject to the following conditions:

1. Safe-T-Vue safety glazing, in 0.060-inch to 0.250-inch nominal thicknesses may be used in locations subject to impact hazards as set forth in Section 5406 of the U.B.C.
2. When used in skylights, exterior wall and roof panels, the products must be specifically recognized in an evaluation report.

This report is subject to re-examination in one year.

(15)

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