

**PROJECT: UNIVERSITY OF CALIFORNIA  
SAN DIEGO, CA**

**DATE: FEBRUARY 27, 1991**

**Air infiltration test per ASTM E283-86**

**Static water penetration test per ASTM E331-86**

**Uniform structural load test at design load per ASTM 330**

**Uniform structural load test at 1.5 x design overload ASTM E330-84**

**CONSTRUCTION  
CONSULTING  
LABORATORY, INC.**

□ 1601 LUNA ROAD, CARROLLTON, TEXAS 76006 214-242-0556  
□ 4751 WEST STATE STREET, SUITE B, ONTARIO, CALIFORNIA 91762 714/591-1789

CCL JOB NO. M90-3196  
March 4, 1991

PROJECT: U.C.S.D. SKYLIGHT PROJECT  
San Diego

DATE OF TEST: February 27, 1991

TESTED FOR:  
Skylight Supplier: Metcoe Specialty Co, Inc.  
Gardena, California

TEST FACILITIES: Construction Consulting Laboratory, Inc.  
Western Division  
4751 West State Street, Building B  
Ontario, California

MOCK-UP DESCRIPTION

The specimen submitted for test was one (1) skylight system measuring 113" across the front face, 152" deep, 162" across the back face, by 144" high.

For a complete description including weepage, sealant, anchorage, and glass details see the drawings.

This report is not complete unless these drawing, marked in red and stamped by this laboratory are included.

TEST SPECIMEN

The specimen was tested in accordance with each applicable ASTM standard.

TEST LOADS

Design Load 25.00 p.s.f. positive/negative  
Overload 37.50 p.s.f. positive/negative



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TEST EQUIPMENT:

1. The test chamber was constructed of structural angles, beams, and columns covered with steel bulkheads, accessible through a bulkhead door.
2. Air infiltration was measured with a Meriam laminar flow element and a Meriam incline manometer.
3. The pressure differential between the exterior and interior of the chamber was created by a positive and negative blower system.
4. The pressure differentials were measured with Meriam vertical and incline manometers.
5. Water was applied from a vertical sprayrack mounted 18" from the face of the specimen. The rack was equipped with swirl-type nozzles spaced two feet on center, vertically and horizontally, which, under controlled pressure, delivered five gallons of water per square foot of wall frontal area.
6. Structural variations were measured with numerous dial indicator gauges with follow-up hands.

NOTE: ALL POSITIVE PRESSURE READINGS ARE CONSIDERED INWARD ACTING AND ALL NEGATIVE PRESSURE READINGS ARE CONSIDERED OUTWARD ACTING.

TESTING AS FOLLOWS:

PRELOAD

The specimen was subjected to a pressure differential of 12.50 p.s.f., 50% of design load, held for 10 seconds and released. An inspection was made to determine any failure.

ALLOWABLE

No visible damage will be allowed.

RESULTS

No visible damage was observed.



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AIR INFILTRATION TEST per ASTM E283-86

The exterior face of the specimen was completely covered with an impervious visqueen material and sealed at the perimeter with tape, thus allowing no movement of air through specimen. The mock-up and chamber were subjected to a positive static pressure differential of 1.57 and 6.24 p.s.f. Air infiltration was measured, indicating the air infiltration through the chamber.

The mock-up was again subjected to a positive static pressure differential of 1.57 and 6.24 p.s.f. after removing the visqueen. Air infiltration was measured indicating the air infiltration through the chamber and the specimen. By subtracting the former from the latter, the air infiltration through the specimen was attained.

ALLOWABLE

Total air infiltration shall not exceed 0.06 c.f.m. per foot of fixed wall area.

Net allowable was calculated according to final mock-up size as determined by measurement.

RESULTS

Specimen passed test.

At 1.57 p.s.f.

Chamber and Specimen	17.0	c.f.m.
Chamber Leakage	13.0	c.f.m.
Specimen Leakage	4.0	c.f.m.

Allowable	26.8	c.f.m.
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At 6.24 p.s.f.

Chamber and Specimen	70.0	c.f.m.
Chamber Leakage	60.0	c.f.m.
Specimen Leakage	10.0	c.f.m.

Allowable	26.8	c.f.m.
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STATIC WATER PENETRATION TEST per ASTM E331-86

Water was applied to the exterior face of the specimen at a rate of five gallons per hour per square foot of wall area, measured at the face of the wall in such a way as to completely and continuously cover the face of the specimen. Simultaneously, a differential static pressure of 6.24 p.s.f. was applied against the face. The application of pressure and water was maintained for a period of fifteen minutes, with observers inside the chamber.

ALLOWABLE

No uncontrolled water shall be allowed during a fifteen minute period.

RESULTS

Specimen passed test.

No uncontrolled leakage was present in the skylight above the level of the sill.

NOTE: However, due to the sill mitre joints and bolt holes not being sealed, there was leakage through these areas.

UNIFORM STRUCTURAL LOAD TEST AT DESIGN LOAD per ASTM E330

A positive pressure of 12.50 p.s.f., 50% of the design load, was applied to the specimen, held for ten seconds and released to set the specimen for positive testing.

With the specimen set, all indicators were set on zero. A positive pressure of 25.00 p.s.f., 100% of the design load, was applied, held for 10 seconds and released. The indicators were read and data recorded.

The blower pump was reversed and set to perform in a negative mode. The test specimen was subjected to a negative load of 12.50 p.s.f., equal to 50% of the design load, held for 10 seconds and released, to set the specimen for negative testing.

With the specimen set, all indicators were set on zero. A negative pressure of 25.00 p.s.f., 100% of the design load, was applied, held for 10 seconds and released. The indicators were read and data recorded.



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ALLOWABLE

Deflection of aluminum members shall not exceed  $L/200$  or  $3/4"$ , whichever is less.

No failure to structural members or glass breakage is allowed.

RESULTS

All measured spans complied with specified allowables.

See Construction Consulting Laboratory's Dial Indicator Chart 1 and 2 of 4.

UNIFORM STRUCTURAL LOAD TEST AT 1.5 X DESIGN OVERLOAD  
ASTM E330-84

All indicators were set on zero. A positive pressure of 18.75 p.s.f., 75% of design load, was applied to the specimen, held for ten seconds, and released.

Indicators were set on zero, and the specimen was subjected to a positive pressure of 37.50 p.s.f., 150% of design load, held for ten seconds and released. Indicators were read and data recorded.

The blower pumps were reversed. The specimen was subjected to a negative pressure of 18.75 p.s.f., 75% of design load, held for ten seconds and released.

Indicators were set on zero, and the specimen was subjected to a negative pressure of 37.50 p.s.f., 150% of design load, held for 10 seconds and released. Indicators were read and data recorded.

ALLOWABLE

No permanent deformation of glass framing members in excess of 0.02% of span, no failure to structural members or anchors, no gross permanent distortion or glass breakage.



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RESULTS

All measured spans complied with specified allowables.

See Construction Consulting Laboratory's Dial Indicator Chart 3 and 4 of 4.

TESTING COMPLETED - As built drawings should accompany this report.

Sincerely,

CONSTRUCTION CONSULTING LABORATORY  
WESTERN DIVISION

Raymond G. Charland  
Senior Test Engineer

RC/rmi

CHART 1 OF 4

PROJECT: UCSD SKYLIGHT PROJECT

DIAL INDICATOR CHART

CCL NO: 90-

STRUCTURAL TEST PRESSURE: 25.00 P.S.F. (100% DESIGN) POSITIVE

NO	INDICATOR LOCATION	POSITION	DEFL/P.S.	NET	ALLOWED	SPAN
1	RAFTER	TOP	07/01			
2	RAFTER	CENTER	30/01	23/01	67	135"
3	RAFTER	BOTTOM	08/00			
4	VERTICAL MULLION	TOP	01/00			
5	VERTICAL MULLION	MIDSPAN	02/00	01/00	48	96"
6	VERTICAL MULLION	BOT	01/00			
7	HORIZONTAL MULLION	MIDSPAN	06/00	06/00	34	68"
8	SILL BETWEEN ANCHORS	MIDSPAN	00/00	00/00	34	68"



CHART 2 OF 4

PROJECT: UCSD SKYLIGHT PROJECT

DIAL INDICATOR CHART

CCL. NO: 90-

STRUCTURAL TEST PRESSURE: 25.00 P.S.F. (100% DESIGN) NEGATIVE

NO	INDICATOR LOCATION	POSITION	DEFL/P.S.	NET	ALLOWED	SPAN
1	RAFTER	TOP	09/01			
2	RAFTER	CENTER	35/01	25/00	67	135"
3	RAFTER	BOTTOM	10/01			
4	VERTICAL MULLION	TOP	01/01			
5	VERTICAL MULLION	MIDSPAN	02/01	01/00	48	96"
6	VERTICAL MULLION	BOT	01/01			
7	HORIZONTAL MULLION	MIDSPAN	07/02	07/02	34	68"
8	SILL BETWEEN ANCHORS	MIDSPAN	00/00	00/00	34	68"

CHART 3 OF 4

PROJECT: UCSD SKYLIGHT PROJECT

DIAL INDICATOR CHART

CCI. NO: 90-

STRUCTURAL TEST PRESSURE: 37.50 P.S.F. (150% DESIGN) POSITIVE

NO	INDICATOR LOCATION	POSITION	DEFL/P.S.	NET	ALLOWED	SPAN
1	RAFTER	TOP	09/00			
2	RAFTER	CENTER	45/00	35/00	27	135"
3	RAFTER	BOTTOM	11/00			
4	VERTICAL MULLION	TOP	00/00			
5	VERTICAL MULLION	MIDSPAN	04/00	03/00	19	96"
6	VERTICAL MULLION	BOT	01/00			
7	HORIZONTAL MULLION	MIDSPAN	07/00	07/00	14	68"
8	SILL BETWEEN ANCHORS	MIDSPAN	00/00	00/00	14	68"

CHART 4 OF 4

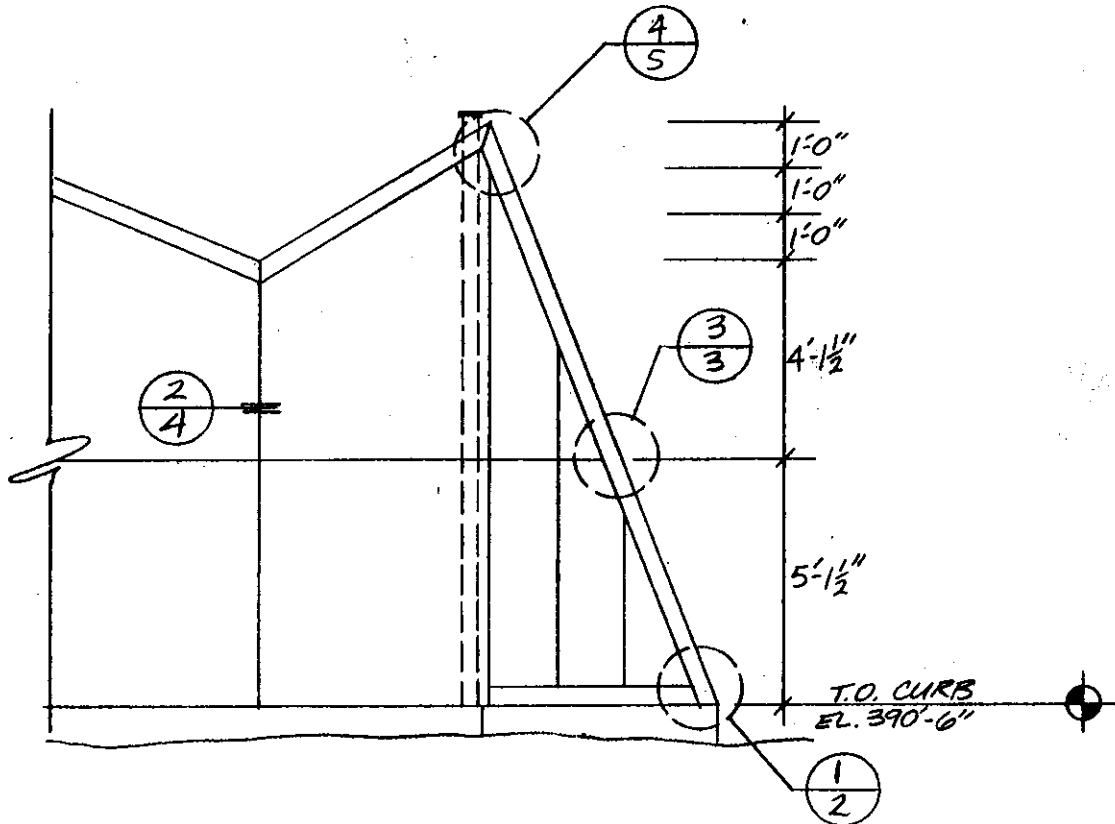
PROJECT: UCSD SKYLIGHT PROJECT

DIAL INDICATOR CHART

CCL NO: 90-

STRUCTURAL TEST PRESSURE: 37.50 P.S.F. (150% DESIGN) NEGATIVE

NO	INDICATOR LOCATION	POSITION	DEFL/P.S.	NET	ALLOWED	SPAN
1	RAFTER	TOP	14/01			
2	RAFTER	CENTER	56/03	40/02	27	135"
3	RAFTER	BOTTOM	18/01			
4	VERTICAL MULLION	TOP	00/00			
5	VERTICAL MULLION	MIDSPAN	05/01	04/01	19	96"
6	VERTICAL MULLION	BOT	01/00			
7	HORIZONTAL MULLION	MIDSPAN	10/01	10/01	14	68"
8	SILL BETWEEN ANCHORS	MIDSPAN	00/00	00/00	14	68"



ELEVATION-VERTICAL PLAN

SCALE :

1/4" = 1'-0"

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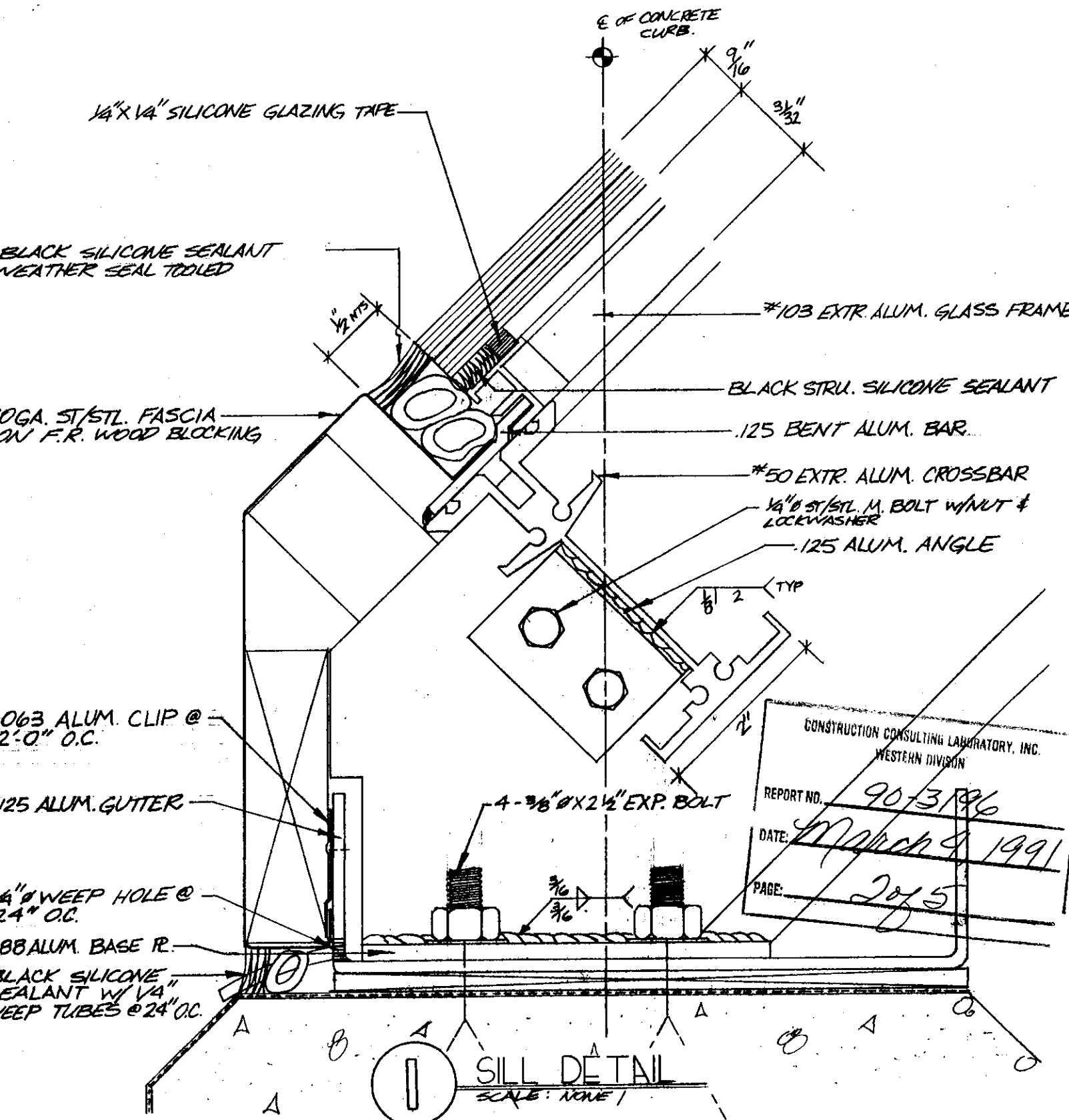
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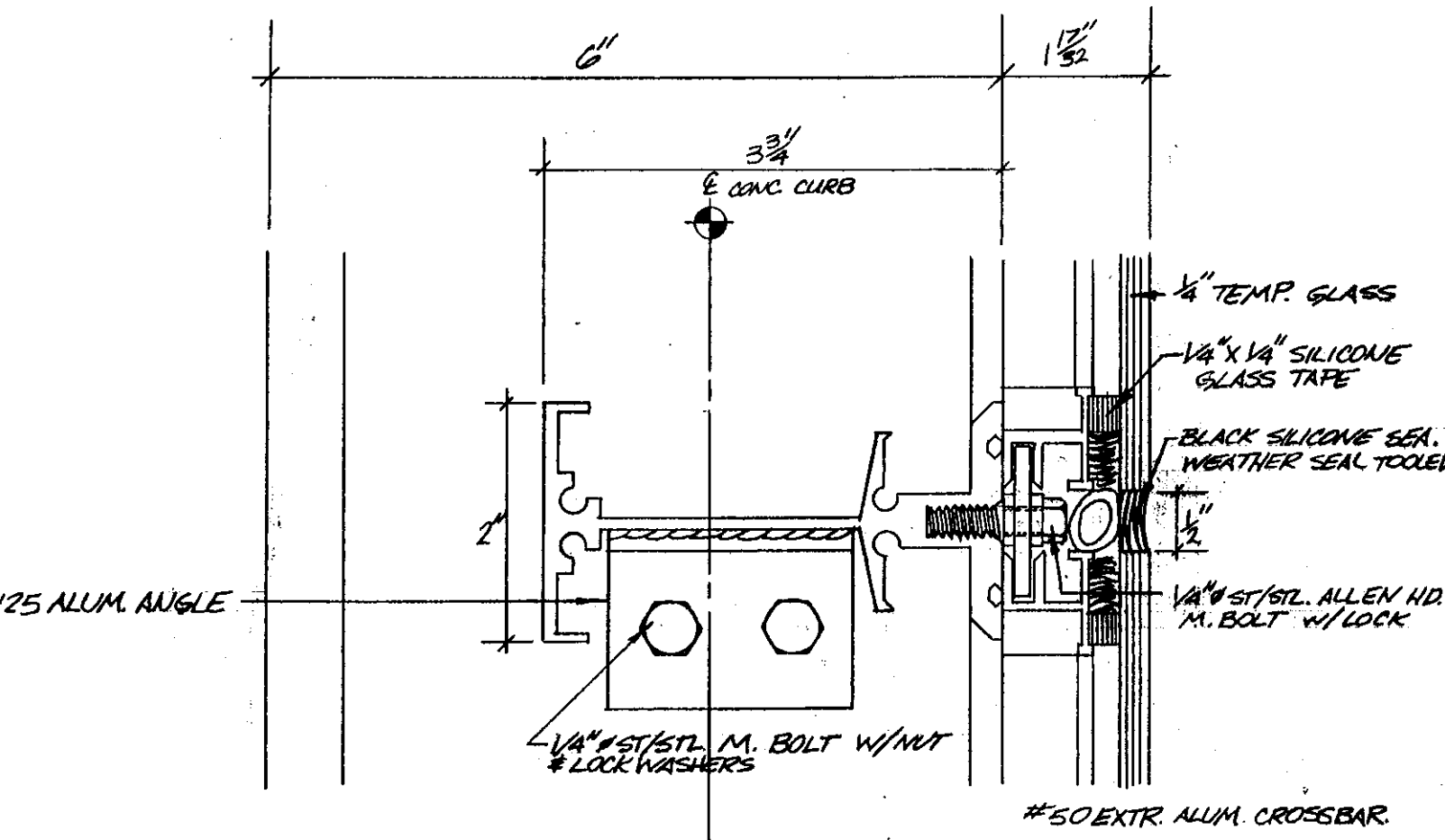
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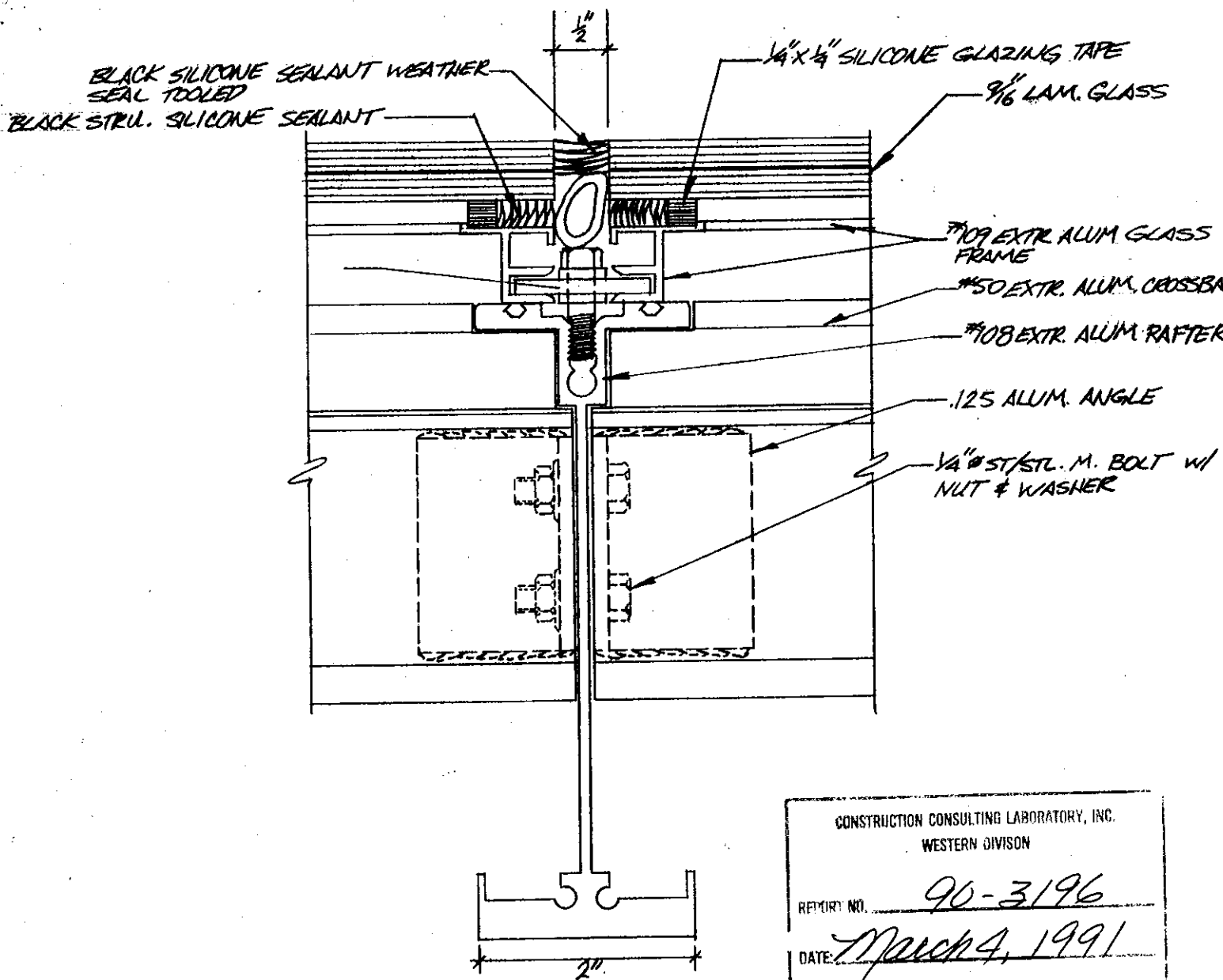
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**RAFTER DETAIL (TYP)**   
 SCALE: NONE



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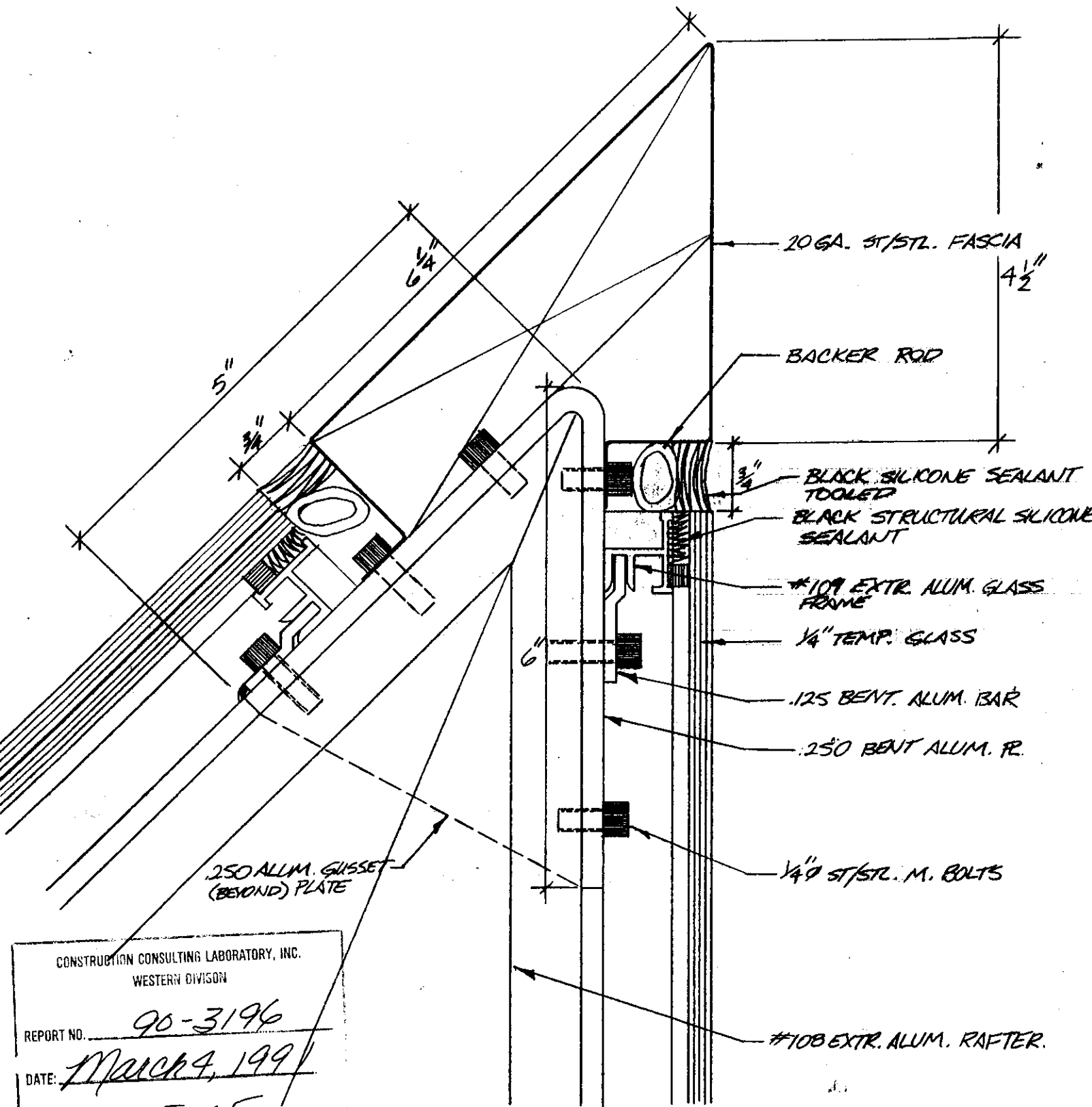
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250 ALUM. GUSSET  
(BEYOND) PLATE

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**HEAD DETAIL**  
SCALE: NONE



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